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**Green
Industrial Policy's
Unfinished
Business**

A Publicly Managed
Fossil Fuel
Wind-Down

By Kate Aronoff

About the Author

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Executive Summary

Fossil fuel extraction, production, and use must decline rapidly in order to meet even modest climate goals ([Stockholm Environment Institute et al. 2023](#)). Leading climate policies today rely primarily on increasing the production and deployment of renewable and zero-carbon energy in the hopes that those will displace fossil fuels throughout the world's energy systems. While green industrial policies are helping to increase the availability of such fuels and bring down their cost, there are few policies in place to deal explicitly with the much thornier question of winding down the fossil fuel economy: grappling with ongoing, uneven declines and changes in a predominately carbon-based energy system; distributing the burdens of those shifts and of decarbonization equitably; and, perhaps most important of all, ensuring that absolute production declines do actually happen at adequate scale and speed. The interventionist approach that policymakers have embraced in order to bolster low-carbon industries must be extended to include pathways toward phasing out the fossil fuel economy and repurposing its vital infrastructure and expertise. Rather than continuing to approach these as two distinct spheres of policies, this paper argues that decarbonization demands that the United States—now the world's largest oil and gas producer—reconcile its industrial policies (green and otherwise) so as to protect the many people who depend on today's energy systems, and those whose health, livelihoods, and futures depend on their dramatic transformation.

Fossil fuel producers warn that efforts to limit the production of coal, oil, and gas in order to meet the goals of the Paris Agreement will pose an unacceptable cost to the global economy: sacrificing quality of life, limiting prospects for economic development, and creating generalized, widespread misery. It is climate change itself, though, that most credibly promises to bring about this chaotic future. The storms, flooding, droughts, and other extreme weather events fueled by rising temperatures are on track to inflict \$38 trillion worth of losses on the global economy by 2049 ([Kotz, Levermann, and Wenz 2024](#)). Without faster action, those damages could balloon threefold through the second half of the century. The fossil fuel industry's predicament is more discrete. If the world takes action to limit global warming to 2 degrees Celsius and pays that much smaller cost of mitigation, the fossil fuel industry will lose out on many trillions of dollars in future profits—something the industry is eager to prevent. The challenge is to ensure those losses happen so that the rest of the world does not lose much more.

Implementing proactive measures to protect workers and communities amid the energy transition already underway is both a moral necessity and insurance against political blowback that threatens to stymie further decarbonization efforts. What's more, the US allowing its fossil fuel sector to continue extracting and producing coal, oil, and gas with no limits undermines diplomatic efforts to push other countries that are far more dependent on hydrocarbon revenues to limit unnecessary fossil fuel



expansion and pursue alternatives to fossil-fueled development—particularly as financing options for low-carbon energy development remain severely limited in many low- and middle-income nations.

This report will first examine how near-term trends facing the fossil fuel industry threaten to shift mounting private liabilities onto the public. It will then explore the range of tools the US government has historically put behind both the development of the fossil fuel industry and a broader, public-purpose mission of energy independence. This is best understood as industrial policy, defined here as the state-aided and targeted shift of resources toward particular economic sectors and activities. Defining US support for its fossil fuel industry as such is meant both to elucidate the considerable governmental support that sustains conventional energy production and to provide inspiration for what a more robust green industrial policy directed explicitly toward an energy transition—rather than simply energy diversification—could look like. Finally, the report describes a menu of public policy options for leveraging similar tools to manage the declines in US oil and gas production likely to happen as a consequence of ordinary profit-seeking behavior by corporations, including via corporate consolidation, companies' focus on delivering shareholder returns, and the depletion of prime shale reserves. Recommended measures range from lower-hanging fruit (i.e., changes to agency rules) to the creation of new institutions to handle the financial, administrative, and coordination challenges that the coming decades pose.

These changes, focused primarily on domestic oil and gas extraction, are intended to set the stage for the US to adopt a more holistic approach to managing its energy transition by expanding the role of the public sector on both sides of the decarbonization ledger. Rapidly deploying low-carbon energy technologies (through investment) and eliminating fossil fuels (through divestment) are interdependent projects—the ultimate success of which will be measured not by dollars invested but by emissions reduced.

Protecting against energy shortages, managing price volatility, and ensuring equity throughout that inevitably messy process will require a sizable expansion of state capacity so that the losses of the energy transition do not accrue to the public and spoil the potential for future progress at home and abroad. US industrial strategy—including fossil fuel subsidies—must be aligned behind that mission.

Recommendations

Update and Align US Industrial Policy for the 21st Century

- **Fill open federal positions that have oversight, financial regulatory, or rulemaking authority over fossil fuel extraction with personnel that have climate expertise**—such as the directorship of the Department of Interior's



Office of Surface Mining Reclamation, and including both senior executive service and Senate-confirmed positions.

- **Instruct federal agencies to repeal regulatory loopholes, preferential treatment, and discretionary spending**, including ending outlays from the Development Finance Corporation and the US Export-Import Bank directed toward oil and gas companies, which distort the price of fossil fuels and their appeal to investors.
- **Repeal extensive fossil fuel subsidies allocated by the federal tax code and amend federal statutes granting regulatory exemptions for the fossil fuel industry** (see Table 1) via congressional action. Amend subsidies that cannot be eliminated by adding conditionalities that increase climate and environmental standards and federal oversight powers.
- Where appropriate, **take back regulatory authority from industry-captured state regulators** that was previously delegated by federal agencies.
- **Develop contingency plans for the next “bust” to put strings on federal aid when fossil fuel producers ask for bailouts**, including mandatory disclosures, emissions reductions, and diversification, as well as equity stakes commensurate with federal support.
- As agencies manage and disburse funds from the **Inflation Reduction Act and Bipartisan Infrastructure Law**, utilize rulemaking processes and all available federal authorities to ensure that, where possible, state support comes in exchange for a say over how and where vital energy infrastructure is built so as to ensure timely and equitable distribution. **Create barriers to fossil fuel industry abuse of these funds**, including through Notices of Funding Opportunities.

Designate and Regulate Systemically Important Fossil Fuel Producers

- **Mount a blue-ribbon commission** of relevant experts and stakeholders to triage existing agency capacities for regulating fossil fuels and determine criteria for systemic importance.
- **Create a comprehensive inventory of fossil fuel firms’ physical infrastructure assets and associated greenhouse gas emissions and pollutants** so as to track asset ownership transfers and more accurately assess risks and clean-up costs.
- **Require fossil fuel producers to conduct regular stress tests** for physical and transition risk scenarios and **create “living wills”** (plans for companies to safely



unwind in the event of insolvency) so as to protect consumers, workers, and the broader economy against fuel price shocks and energy sector volatility.

- **Establish funding pools for cross-agency fossil fuel infrastructure clean-up, reclamation, and decommissioning efforts** through additional fees on producers, similar to the Deposit Insurance Fund.
- **Closely scrutinize all mergers, acquisitions, and divestments** above a certain size and/or greenhouse gas emissions and pollution intensity for compliance with environmental and fair competition regulations.
- **Establish an independent federal agency** to protect the public against environmental and financial harms caused by energy infrastructure—potentially, to begin with, as an arm of the Consumer Financial Protection Bureau.

Expand the Public Sector’s Role in Guiding the Energy Transition

- **Establish a cabinet-level office, the Transition Coordination Administration (TCA), to triage relevant federal agencies and authorities for powers, funds, and research that can be used to further an all-of-government approach to managing the energy transition** and ensure climate and environmental integrity across federal energy transition efforts, inclusive of fossil and green energy.
 - Regional TCA offices will **provide technical assistance and facilitate direct community engagement related to transmission and renewable energy siting.**
 - Each year, the TCA will publish a detailed inventory of the impact of federal policy on greenhouse gas emissions, co-pollutants, environmental justice, biodiversity, and more.
- **Create an independent public benefit corporation wholly or majority owned by the US government, called Energy for America (EFA), to serve as a clearinghouse for managing physical fossil fuel assets that come under federal control and to act as a general-purpose energy developer backed by the full faith and credit of the US government.**
 - **EFA will function as a coordination hub to retrain workers in carbon-intensive extraction** (where necessary) and match them with energy sector jobs that fully meet or exceed their previous wages, pensions, and benefits. Those who are unable to find a relevant placement are entitled to full salary and benefits replacement for at least five years. A new federally subsidized retirement system for retirement-eligible workers would be created within the Federal Employees Retirement System (FERS).



- If EFA engages in fossil fuel production as a result of asset acquisitions, **all production plans will by charter be made to align with an expert-generated, equity-based timeline for limiting warming to well below 2 degrees Celsius.**

Introduction

This report focuses primarily on upstream oil and gas production in the United States, arguing that government subsidies, intervention, and planning have always been the basis for developing and sustaining US energy systems. These market-shaping and creating state functions—industrial policies—were essential to the development of the US oil and gas industry, which, like its counterparts around the world, continues to rely on expensive and elaborate forms of government support. With some notable exceptions, the policies that have built and sustained the US fossil fuel industry have left key decisions over the production, distribution, and pricing of the United States' most important commodities in the hands of the private sector. But unlike in most other oil-producing countries—particularly wealthy nations—relatively few of the profits derived from US oil and gas are shared with the American public. This creates a structural misalignment: entrusting market actors whose sole obligation is to their managers, investors, and shareholders to accomplish public policy priorities that often run counter to the interests of those same managers, investors, and shareholders.

Troublingly, green industrial policies appear to be adopting the same model. Key decisions about when, how, and where essential low-carbon assets get built remain concentrated in the hands of a private sector whose sole obligation is to generate returns for investors and profits for shareholders ([Brusseler et al. 2024](#); [Daly and Chi 2022](#)). Worse still is the fact that these two industrial policies are at odds with one another: The US continues to actively support and subsidize its fossil fuel industry as it pursues green industrial policies meant to—somehow, on some timeline—transition away from that very industry. While green industrial policies are already helping to diversify US energy and foster strategic growth industries, decarbonization is too important and audacious a goal to leave up to this idiosyncratic process or to the corporate executives entrusted to drive it forward. There is no collection of incentives that will convince fossil fuel companies to begin euthanizing their core business model in time to limit warming to less than 2 degrees Celsius.

This paper explores several strategies for bridging the dangerous gulf between current US climate policy and the urgent challenge of decarbonization, defined by Brusseler ([2023](#)) as “a project to transform and expand fixed capital and infrastructure stocks through investment and divestment.” Its concerns lie on either side of that ledger: investing in the energy systems needed to confront the climate crisis while divesting from those that are driving it. As Grubert and Hastings-Simon ([2022](#)) note, high-level government planning is needed to attend to the problems of the “mid-transition,” a



relatively under-theorized “transition period where zero-carbon and emitting fossil fuel systems co-exist at scales where each imposes operationally relevant constraints on the other.”¹

Failing to insulate voting publics from expected disruptions to energy supply and price swings during this period allows incumbent energy producers and their political allies to capitalize on those events (or even just the idea of them), blame climate-friendly elected officials for sowing chaos, and make the case for building excessive amounts of new fossil fuel infrastructure. As Espagne et al. (2023) note, such mid-transition dynamics could engender alarming amounts of geopolitical fragmentation as every country fights “to capture larger shares of declining markets at the expense of other producers.” Additional, limited investments in fossil fuel capacity will be needed throughout the transition to continue meeting the world’s considerable and growing energy demands. Yet there is currently no mechanism to prevent overinvestment and ensure that newly built carbon-intensive infrastructure does not operate indefinitely (Rystad Energy 2023).

Though US diplomats pushed aggressively for world leaders to adopt language to “transition away” from fossil fuels at UN climate talks in 2023, the document they created contains no concrete plans nor authority to realize that ambition (United Nations 2023). Only states can compel companies to undertake unprofitable activities or (failing that) initiate, operate, and own those activities directly. Neglecting to do so—only embracing climate policies that incentivize private-sector, low-carbon development—implies an oddly utopian view of how the US and the world will decarbonize: trusting that a properly incentivized private sector will proliferate enough low-carbon energy projects to eliminate the core business model of one of the planet’s most powerful industries—in other words, voluntarily replacing the energetic basis of the global economy in time to meet the goals of the Paris Agreement.

There are many reasons to doubt the market is up to such a fearsome task. The most recent Intergovernmental Panel on Climate Change (IPCC) report finds that about 30 percent of oil, 50 percent of gas, and 80 percent of coal reserves will have to remain unburned to limit warming to 2 degrees Celsius (Pathak et al. 2022). This would come at a tremendous cost to fossil fuel producers. The International Renewable Energy Agency (IRENA) projected in 2019 that limiting warming to 2 degrees Celsius would entail rendering \$11.8 trillion worth of fossil fuels assets completely worthless; delaying action by another decade boosts that figure to \$19.5 trillion (IRENA 2019). The math here isn’t hard to work out: Either fossil fuel-producing firms lose many trillions of dollars in

¹ See also: “During the mid-transition, neither zero-carbon nor carbon-emitting infrastructure can fully support all energy services on its own, and the overall system is not optimized for either infrastructure’s sociotechnical particularities. Risks of maladaptations, overlooked opportunities for synergies, and uncoordinated decision-making are high during the mid-transition, particularly as infrastructures encounter simultaneous climate, technology, and societal dynamics that are not well characterized by past experience” (Grubert and Hastings-Simon 2022).



future earnings, or the world's governments, people, and companies lose many, many trillions more as the world warms by more than 2 degrees Celsius.² Emerging research finds that the economic damages from climate change are estimated to be six times larger than previously thought, with business-as-usual warming scenarios expected to lead to a 31 percent loss to present value global welfare due to the persistent rise in extreme, economically damaging weather events expected to result from elevated global temperatures ([Bilal and Känzig 2024](#)). The climate crisis and fossil fuel production and use are already having destructive effects on public health, fueling displacement and driving geopolitical conflict ([Vohra et al. 2021](#); [IDMC 2024](#); [Jaramillo et al. 2023](#)).

Grounded in exciting recent advancements in green industrial policies, this paper asserts a stronger role for government oversight and management of the speed, quality, and distributional consequences of the chaotic, too-slow energy transition already underway. Crucially, such policies are needed to stop the fossil fuel industry from dumping its current and future losses onto the public. Policies to prevent that transfer of losses onto public balance sheets are meant in no small part to help build the political case for decarbonization—to mitigate the consequences of such a dramatic shift in the world's energy systems, distribute them equitably, and prevent fossil fuel interests and their political allies from halting future progress. US policy has long recognized the limits of the private sector in meeting energy and public policy goals: The US energy sector is, in reality, a private-public partnership, with benefits accruing primarily to the former.

Just as important as managing the energy transition is ensuring that the ways the US builds a low-carbon economy do not replicate the unbalanced, inequitable ways that it has subsidized the development of the fossil fuel economy. Energy is a systemically important sector and should be treated accordingly—doing so can build and improve upon best practices put in place after the 2008 financial crisis, including the oversight and accountability mechanisms created by 2010's Wall Street Reform and Consumer Protection Act. This paper outlines a parallel, complementary regulatory regime to oversee the fossil fuel sector in a similar manner so as to understand and reduce the tremendous risks that business model poses to the American public and US national interests. The final section of this paper suggests ways to begin to construct a holistic regulatory apparatus to manage the energy transition. These range from steps that could be taken using executive powers to an expansion of existing regulatory authorities and the creation of novel coordination bodies and institutions, including a public energy developer.

² Tracing ultimate ownership of fossil fuel assets, Semieniuk et al. ([2021](#)) find that the market risk posed by stranded assets falls on private owners concentrated in OECD countries, including via pension funds: “Financial markets are exposed to a US\$690 billion correction, comparable to the mispricing that triggered the 2007-08 crisis.”



Green Industrial Policy’s Unfinished Business

The years since the pandemic have seen a revolution in how policymakers relate to economic and environmental problems. Responding to COVID-19 and the supply chain crises that accompanied it required government intervention to produce vaccines and bolster, or in some cases create, welfare state programs that kept millions out of crushing poverty ([Trisi 2023](#)). Movements for climate justice demanded that the White House prioritize decarbonization, and the two trends together—an embrace of more visible government involvement in the economy and a renewed focus on the climate—helped shift federal policy conversations about greenhouse gas emissions reductions away from talk of narrow market tweaks and toward an embrace of green industrial policy. What emerged, after months of negotiations on how to codify that shift, was the Inflation Reduction Act (IRA), which focused on building out domestic supply chains for clean energy and deploying emissions-free technologies over the coming decade.

The IRA does not establish a legal mandate for decarbonization or target a specific emissions-reduction outcome.³ It instead uses federal funds to encourage private-sector investments in electric vehicles and solar and wind energy and to nurture earlier-stage low-carbon energy technologies such as carbon capture and storage, geothermal energy, and hydrogen.⁴ There is also funding to encourage the extraction and refining of critical minerals, such as the lithium used in EV batteries and energy storage. Overall, these incentives are largely “carrots” for private-sector firms, including consumer- and producer-side subsidies, new funding for research and development (R&D), and a massive expansion of the Department of Energy’s Loan Programs Office, now armed with more than \$400 billion in lending capacity for low-carbon energy projects and emissions controls ([McDonald et al. 2023](#)). The IRA might also be said to include some “sticks”—or, more accurately, “sticks on carrots”—to limit the types of investments that can be made under its auspices. For example, Buy America provisions attached to electric-vehicle tax credits exclude foreign-made cars and require that domestic automakers source an escalating percentage of their components from the US or its trade partners in order for vehicles to qualify either at all or for the full suite of incentives.

³ For further details on IRA provisions see [Ramseur 2023](#). Ensuing regulations from the Environmental Protection Agency have built upon the IRA to set enforceable goals on a sector-by-sector basis, notably in transportation and power generation. IRA incentives for carbon capture, utilization and storage, for instance, allowed the EPA to argue that such technologies would be an economical “best means of emissions reductions” for power plants to use in meeting clean-performance standards ([Meyer 2023](#)).

⁴ Given the material and environmental footprint and supply chain concerns bound up in renewable energy, as well as the sheer number of technologies often grouped under the umbrella of “clean energy,” this paper largely avoids that terminology, instead using “low-carbon” and “green” energy/energy technologies interchangeably to reference the targets of green industrial policies.



As with the CHIPS and Science Act, these “stick”-like provisions are meant to address the considerable gap between the US and its main competitors in 21st-century growth industries—low-carbon energy technologies, in the case of the IRA. China produces 54 percent of the world’s electric vehicles and 83 percent of lithium-ion batteries ([Chang and Bradsher 2023](#); [Coppola 2023](#)). It’s also the dominant player in the processing of minerals critical to the energy transition, refining 68 percent of nickel, 40 percent of copper, 59 percent of lithium, and 73 percent of cobalt globally ([Rodrigo and Purdy 2022](#)). By 2025, China could control a third of the world’s lithium market ([Bloomberg News 2023](#)). As National Security Advisor Jake Sullivan ([2023](#)) explained in a much-discussed speech at the Brookings Institution, the Biden administration’s approach to industrial strategy is, on the one hand, a rejection of the dead consensus among elite policymakers that “markets always allocate capital productively and efficiently.” On the other hand, it’s a recognition that—as former National Economic Council head Brian Deese ([2021](#)) has explained—there is “not a market-based solution to try to address some of the big weaknesses that we’re seeing open up in our economy when we’re dealing with competitors like China,” who have employed (per Sullivan) “nonmarket practices and policies” in expanding green export sectors.

As a result, the industrial strategy that the Biden administration has embraced thus far revolves around deploying “targeted public investments . . . that unlock the power and ingenuity of private markets, capitalism, and competition to lay a foundation for long-term growth” ([Sullivan 2023](#)). As Deese ([2023](#)) wrote, the IRA was designed to:

[E]ncourage private investment in clean energy. Tax incentives make the investments attractive, but businesses, along with rural cooperatives, nonprofits and others, must judge whether investing their own money in a hydrogen factory or a wind farm will pay off. In the end, *the law will be only as successful as their appetite to invest at a scale that will meaningfully reduce emissions warming the planet and increase the nation’s energy security.* (Emphasis added)

In some areas, this approach seems to be succeeding in building out domestic supply chains for strategic export industries and increasing low-carbon energy deployment. Investments in “clean tech” and semiconductor manufacturing in 2022 were nearly double what they were the year before, prior to the passage of either the IRA or the CHIPS Act ([Chu and Roeder 2023](#)). Clean energy installations were up 13 percent over the year prior to the IRA’s passage, and there was a 37 percent uptick in investment in “clean energy manufacturing and deployment” ([Bermel et al. 2023](#)). The Rhodium Group predicts that, through 2030, the IRA will lead to greenhouse gas emissions reductions 7 to 10 percent greater than they would have been otherwise ([Larsen et al. 2023](#)). Rhodium also projects power sector emissions to be less than half of what they would have been without the IRA.

As even its most enthusiastic backers acknowledge, the IRA is just one piece of a much longer project to decarbonize the United States. Several factors are currently slowing

low-carbon energy deployment despite generous subsidies, from the difficulty of building interstate transmission lines to supply chain bottlenecks, from ideological opposition to renewables in state and local governments, and rising interest rates ([Gold 2023](#); [Bozuwa and Mulvaney 2023](#)). Moreover, while state incentives have rapidly driven down the cost of wind and solar power, declines in the levelized costs of energy (LCOE) from renewables have not yielded the scale of deployment some energy modelers might have expected as kilowatts generated by cleaner forms of energy became cheaper than those made by fossil fuels ([BloombergNEF 2023](#)). As Christophers (2024) argues, real-world investment decisions are typically driven by profit, not prices. That is, low prices that may help drive consumers toward low-carbon energy technologies can also mean lower and less reliable returns. Together, such factors have proven a major deterrent to investors. Renewable energy project developers have accordingly struggled to court them to finance the massive up-front costs required for large-scale installations—even as the cost per kilowatt hour of renewable power has dropped ([Christophers 2021](#); [Gelles et al. 2023](#)). Offshore wind developers have walked away from major projects off the East Coast of the United States, citing supply chain troubles, insufficient subsidies, and dissatisfaction with power purchasing agreements demanded (by investors) to insulate investors from the volatility of wholesale power markets ([Hansen et al. 2024](#); [Chu, Smyth, and Williams 2023](#)). Thanks to these dynamics, Bloomberg New Energy Finance now predicts the US will get just 29 percent of the way toward the Biden administration’s goal of deploying 30 megawatts of offshore wind by 2030 ([Wade and Dlouhy 2023](#)).

The difficulties of scaling up low-carbon industries also make it highly unlikely that incumbent energy producers will diversify their businesses such that they stop relying primarily on the extraction, transportation, processing, and distribution of hydrocarbons. Fossil fuel companies have begun to divest from their low-carbon ventures for reasons similar to those driving away offshore wind investors: It’s not profitable enough. For example, 60 percent of oil and gas executives surveyed by Deloitte in July 2023 said they would invest in low-carbon projects if returns exceeded 12 to 15 percent. But returns on major renewable energy projects in 2022 ranged between 6 to 8 percent. In almost all cases, those returns are premised at least in part on government subsidies. For the foreseeable future, renewables are unlikely to offer returns comparable to those available in the oil and gas business ([Chronis, Hardin, and Mittal 2023](#)).

If such returns are achieved, that will almost certainly be the result of additional government incentives to shoulder the risk of renewables investments and allow private actors to reap the rewards. That’s especially true considering that fossil fuel profits themselves continue to be heavily subsidized, as described below. BP has already walked back earlier promises to taper oil production and boost green spending, citing disappointing profits ([Strasburg 2023](#)). Former BP CEO Bernard Looney said of the company’s shift that “if we see value, we’ll do it. If we don’t, we won’t” ([BP 2022](#)). Shell



CEO Wael Sawan made similar points when asked if he would accept lower returns on low-carbon ventures during the company's Q4 2022 earnings call:

We will drive for strong returns in any business we go into. We cannot justify going for a low return. Our shareholders deserve to see us going after strong returns. If we cannot achieve the double-digit returns in a business, we need to question very hard whether we should continue in that business. Absolutely, we want to continue to go for lower and lower and lower carbon, but it has to be profitable. ([SA Transcripts 2023](#); [Woods 2023](#))

Even in areas where incumbent energy firms have more expertise, such as carbon capture and storage, investments remain modest. Oil and gas companies accounted for less than 2 percent of global investment in low-carbon projects like carbon capture, utilization, and storage (CCUS); electrified transport; energy storage; and renewables in 2022. Worse still, 72 percent of oil and gas executives surveyed by Deloitte in July 2023 favored optimizing their hydrocarbon business, while just 26 percent favored a pivot toward low-carbon resources and solutions ([Chronis et al. 2023](#)).

Increasing low-carbon energy deployment and manufacturing does not on its own displace fossil fuels across the economy or incentivize incumbent energy producers to make meaningful shifts toward decarbonization. That's especially true in the US. Crude oil exports have surged by 770 percent following the 2015 repeal of the Crude Oil Export Ban ([US EIA 2024b](#)) amid impressive gains in renewable energy deployment and electric vehicle sales. The carbon intensity of the global energy supply has not changed dramatically in decades, meanwhile, and large additions of renewable power—including in the United States—are meeting new energy demand rather than displacing fossil fuels in aggregate ([DNV 2023](#)). Fossil fuels continue to account for 80 percent of global energy supply. In 2022, coal, oil, and gas accounted for 79 percent of total US energy consumption; transportation accounts for the largest share of emissions (28 percent) ([US EIA 2023a](#); [US EPA 2024a](#)).

The IRA, meanwhile, is not expected to drive major domestic emissions reductions outside of the power sector through 2030, with very modest declines projected for transportation and heavy industry ([CRS 2023](#)). Emissions from agriculture and buildings—responsible for the most significant boost in overall US emissions in 2022—are projected to remain similar to what would be expected without the IRA ([Rivera et al. 2023](#)). Modeling of projected IRA-induced emissions reductions shows that US petroleum usage declines (11 to 32 percent) are also nearly identical to declines that would be expected to happen without the IRA (11 to 31 percent) ([Bistline et al. 2023](#)). Rhodium finds that, in order to meet its Paris Agreement pledge of reducing economy-wide emissions by 50 to 52 percent by 2030, the US will need to average a 6.9 percent emissions reduction every year from 2024 through 2030—more than triple the estimated 1.9 percent drop in 2023 ([King, Gafney, and Rivera 2024](#)).



Incentives for low-carbon ventures are not convincing fossil fuel companies to transition away from their core business model, particularly as they continue to rake in record earnings from fossil fuels. Moreover, oil and gas executives see little contradiction between current US climate policy and an indefinite future for extracting and selling hydrocarbons. ExxonMobil CEO Darren Woods has held out the US as a model for other countries to follow, specifically praising the fact that the IRA will “let the market work to deliver on the objective of reducing emissions and lowering emissions intensity” and not penalize fossil fuel producers ([Woods 2023](#)).

Woods and his colleagues’ confidence is well-founded. The world is now on track to produce double the amount of fossil fuels in 2030 than is consistent with limiting warming to 1.5 degrees Celsius, and 69 percent more than is consistent with capping warming at 2 degrees Celsius ([Stockholm Environment Institute et. al. 2023](#)). The US has produced record levels of crude oil in 2023, and is expected to do the same in 2024 ([US EIA 2023b](#)). The Center for Biological Diversity ([2023](#)) found that 17 major fossil fuel projects approved by the Biden administration are projected to create more emissions in 2030 than will be eliminated by US climate policy, including the IRA. The US now accounts for more than a third of all planned oil and gas expansion through the end of this decade—more than any other country on earth ([Iolulalen and Trout 2023](#)).

If decarbonization is truly the goal, then climate policy in the world’s biggest oil and gas producing country cannot leave fossil fuel production untouched. The urgent, unfinished business of the IRA is thus not simply to actualize a transition to renewable energy and low-carbon goods, but to convince policymakers to embrace a more activist state to manage the decline of fossil fuels, too. While aspects of the IRA can be leveraged toward that goal, fully realizing it will require additional action from Congress and federal agencies.

Though greenhouse gasses are the primary concern addressed in this paper, they are hardly the only danger posed by unchecked fossil fuel development. From extraction to transportation, refining, and combustion in cars and power plants, each link of the fossil fuel supply chain poses considerable social, financial, and environmental risks. Communities living fenceline with fossil fuel industry—in the US, predominantly working-class communities of color—face elevated rates of respiratory illness and rare cancers, and routine threats to water quality and supply from flaring, leaking pipelines, and other hazards baked into the business model of incumbent energy producers. As the fossil fuel industry looks to expand into areas like petrochemicals, these non-greenhouse gas-related concerns should be front of mind and encourage an approach to fossil fuel regulation that considers the full scope of harms the industry poses. The proposals detailed below are necessary but not sufficient for addressing these risks and should be seen as a complement to ongoing efforts to alleviate the range of non-greenhouse gas-related threats that fossil fuels pose to air and water quality, as well as to public health and the environment more broadly.



The Price of Unmanaged Decline

Without a plan for a managed decline of fossil fuel production, the US will leave places that are less able to transition rapidly away from fossil fuels to shoulder both the brunt of those financial losses, along with the earliest and worst effects of climate change. As Greg Muttitt et al. (2023) find, IPCC pathways toward limiting warming by 1.5 degrees place outsized emphasis on developing countries axing coal use while leaving the US and Europe with a generous timeline to continue using, extracting, and exporting oil and gas. Carbon Tracker (2023) finds that 40 oil and gas-producing countries that rely on fossil fuel revenues to finance government activities could together see those revenues drop from \$17 trillion to \$9 trillion by 2040 in certain energy transition scenarios; higher-cost producers within that group face losing between 50 to 70 percent of expected revenues. Indebted, climate-vulnerable countries face particular difficulties, as such revenues are often poured into debt service rather than prospective climate mitigation or transition efforts (Gallagher et al. 2023). International Monetary Fund policy advice often further encourages indebted loan-recipient countries to exploit available oil and gas revenues, potentially exacerbating transition risks (Seward et al. 2021).

In the United States, the consequences of a messy, unmanaged transition off of fossil fuels will similarly hit hardest in the places most dependent on oil and gas revenues, including Tribal governments that collect that income directly. Fossil fuels contributed at least 14 percent of state and locally generated public revenues—used for schools, roads, public safety, and other essential services—in the country’s most fossil resource revenue-dependent states: Wyoming, North Dakota, Alaska, and New Mexico (Raimi 2023).

How Fossil Fuels Survive: “Hot Potato” Wells and the Coming Wave of Backdoor Bailouts

That oil and gas companies are doubling down on drilling should not suggest that they are continuing on with business as usual. In any possible transition scenario, the fossil fuel industry faces radical disruptions to its business model, and modest production declines are already underway in parts of the US for reasons largely unrelated to climate change and climate policy. There is a transformation happening in the US oil and gas sector—just not one to excise hydrocarbons.

The shale boom that propelled the US to become the world’s largest oil and gas producer and exporter was premised on circumstances that no longer exist: historically low interest rates and generous investors willing to let drillers burn through their cash. Companies now reckoning with rising interest rates and shareholder demands for bigger payouts are adopting a new business model that prioritizes profitability and “capital discipline” over the rapid-fire production that defined much of the decade



before the pandemic. In the process, an increasingly consolidated industry is eager to shed an ever-growing number of unprofitable assets and liabilities, and firms will do everything in their power to offload them onto the public. That this infrastructure is leaking untold amounts of greenhouse gasses into the atmosphere poses an obvious challenge for decarbonization. The volatile nature of the oil and gas industry, moreover, could once again require bailouts even more expansive than the many it's already received.

It's important to understand how this situation developed. While hydraulic fracturing from shale rock is old technology, the main barrier to its expansion—and reason for companies not to invest—had throughout most of the 20th century been how expensive it was. In the mid-2000s, a goldilocks combination of high oil prices, low interest rates, and decades of state-led industrial policy allowed hydraulic fracturing to take off. As noted below, the US government coordinated with government labs, universities, and industry to pour billions of dollars over several decades into basic research, feasibility, and commercialization efforts aimed at making fracking viable. Declining conventional oil production in the US then yielded the higher prices necessary to justify more capital-intensive drilling practices. Investors with excess cash, meanwhile, were eager to find a place to park it.

Drillers had a good pitch: Where conventional oil production is a game of whack-a-mole—hunting around for productive land—fracking guarantees production so long as you happen to be on a shale rock formation; it's expensive but reliable. For roughly a decade, success in shale fields was accordingly judged by how quickly companies could dig, not by how profitable they were (McClellan 2018). OPEC's move to depress oil prices in 2014 exacerbated long-running issues and drove many drillers, particularly smaller independent firms, out of business, triggering a wave of bankruptcies and consolidation. Investors became increasingly fed up with a sector whose primary business model was to burn through their cash and subsidize consumers ([Denning 2019](#)). By 2019, they had begun to demand that drillers reign in spending and start turning a profit. Another shock came when the pandemic and restrictions to handle it crashed global fuel demand in 2020, leading crude oil prices to briefly turn negative and forcing oil and gas drillers to ask the Federal Reserve for a bailout ([Bailout Watch 2021](#)).

The companies that survived have since been focused largely on getting their finances in order, boosting efficiency, and reorienting toward longer-term profitability. Even as oil prices soared following the end of pandemic restrictions and the war in Ukraine, companies refused to chase prices as high as \$200 per barrel. Producers are instead looking to build balance sheets that can withstand new shocks by preparing for a future in which there will be less demand for fossil fuels, settling into more modest levels of production that allow them to both make a profit and keep prices from dropping too much by flooding the market with supply.



All the while, production from previously prolific US shale patches is beginning to decline. Well productivity in the Eagle Ford and Bakken shale formations in Texas and Montana (Eagle Ford) and North Dakota and South Dakota (Bakken) has fallen 35 percent since 2021. Combined production is down 20 percent since 2020, and drillers are exhausting top-tier wells while looking to less productive sites ([Williams-Derry and Kunkel 2021](#); [Rassenfoss 2023](#); [Enverus 2023](#)).

This paradoxical situation—booming overall production and shale resource maturity—is good news for bigger companies, now flush with cash following record profits in 2022, that are able to produce barrels more cheaply than small and mid-sized frackers. Bloomberg found in 2022 that drillers that produce fewer than 100 barrels a day spend \$4.11 per barrel. Those that produce over 1,000 barrels a day spend just \$1.46. Such dynamics are producing a new wave of consolidations as oil majors buy up smaller firms and strip them for parts in the name of efficiency ([Enverus 2024](#)).⁵ “The thrill is gone and grinding out efficiencies is in,” as Bloomberg’s Liam Denning put it. “That’s a perfectly reasonable sort of enterprise to run. On the other hand, if someone better at it comes along and makes a decent offer, it will be hard to justify refusing them” ([Denning 2023](#)).

Stranded Assets and Shed Liabilities: What Unmanaged Wind-Down Looks Like

As larger companies snap up smaller competitors—or simply try to streamline their own balance sheets—they will attempt to shed any assets that are unprofitable to own or operate as cheaply as possible. What happens to the assets that no company wants amid consolidations and longer-term declines?

The International Energy Agency’s (IEA) World Energy Outlook projected for the first time in 2023 that global coal, oil, and gas demand will peak by the end of this decade. That pathway still leaves the world on track to reach 2.4 degrees Celsius of warming by 2100 ([IEA 2023](#)). However, US-based fossil fuel producers—who’ve dismissed the IEA’s modeling—are essentially betting on a world that’s even warmer, in which fossil fuel demand declines much more gradually and they’re the ones to sell the last tankard ([Edgecliffe-Johnson and Smyth 2023](#)). In either event, or (certainly) in more rigorous decarbonization pathways, there are myriad tools that private fossil fuel developers in the US can use to leave the public holding the bag for the consequences of fossil fuel extraction.

⁵ In 2023, crude oil and gas exploration and production companies spent a combined \$234 billion on mergers and acquisitions, with major announced deals including ExxonMobil’s \$60 billion all-stock acquisition of Pioneer Resources and Chevron’s announced \$53 billion purchase of Hess ([EIA 2024a](#)). In Q1 2024, upstream companies announced a record \$51 billion in mergers and acquisitions, 60 percent of which involved assets in the Permian Basin ([Jacobs 2024](#)).



The US already has an estimated 10 million orphaned, abandoned, idled, marginal, and legacy wells ([Hammack et al. 2016](#)). There is little certainty about the full number of these wells or their emissions, and such studies typically rely on small sample sizes ([Gianoutsos et al. 2024](#)). The Environmental Protection Agency (EPA) ([2024c](#)) estimates that abandoned oil and gas wells in the US emitted 303 kilotons of methane in 2022—the equivalent of 8.5 million metric tons (MMT) of carbon dioxide, or the annual emissions of 2 million gas-powered cars. Such wells can also leak toxic chemicals like benzene into local water supplies. Even properly plugged wells require constant monitoring to protect against leaks as concrete fails over time. And while coal mine reclamation and cleanup is overseen at the federal level by the Department of the Interior’s Office of Surface Mining Reclamation and Enforcement (OSMRE), there is currently no parallel agency, statute, or process for oil and gas drilling. Consequently, there is very little understanding of the true scale of the problem or how to fix it ([Sadasivam 2022](#)). In practice, decisions about how to deal with these wells are predominately made by for-profit companies incentivized to shed them as quickly and cheaply as possible. These incentives have only increased as oil and gas industries restructure.

Companies now reckoning with rising interest rates and investor demands for bigger payouts will be made to settle into a new business model that prioritizes profitability over the rapid-fire production that defined much of the decade before the pandemic. Whether the US government passes proactive policies to phase out fossil fuels or not, ongoing changes in the energy sector are likely to continue leaving the US to clean up the industry’s mess.

When the operating expenses of wells exceed the revenue companies can earn from them, they become a liability on a firms’ balance sheet. Rather than taking on the considerable cost of decommissioning these assets at the end of their useful life, companies will delay; sell those declining wells off to smaller, less accountable firms; or try to walk away scot-free.

The decline of coal power and production offers a preview of what that process might look like. Between 2012 and 2017—as coal was outcompeted by gas on the grid—four of the United States’ largest coal producers used bankruptcy to shed nearly \$5.2 billion of environmental and retiree liabilities, essentially transferring them onto public balance sheets. Joshua Macey and Jackson Salovaara ([2019](#)) found that failing coal companies leaned on bankruptcies as a means of evading federally mandated responsibilities to pay for coal miners’ health benefits and land restoration. In 2021, auditors for the West Virginia legislature found that the state’s bonding program—federally approved plans to collect enough funds from coal companies to cover clean-up costs—had just 10 percent of the funds it would need to reclaim a rapidly accumulating stock of shuttered mining infrastructure ([Allred et al. 2021](#)). Absent some kind of federal intervention, the remainder will fall on the state’s Special Reclamation Fund to cover those costs, leaving West Virginia taxpayers to make up a shortfall worth potentially billions of dollars.



Furthermore, in West Virginia—the country’s fifth most fossil fuel–dependent state—coal severance tax revenue dropped from \$600 million in 2011 to \$200 million in 2020 because of the industry’s overall decline, prompting massive cuts to state services like education and health care. Revenue from oil and gas production there dropped to \$125 million in 2020, down from \$250 million in 2015 ([Raimi et al. 2023](#)).

Oil and gas companies have availed themselves of similar tactics. In declaring bankruptcy, Gulf driller Fieldwood Energy looked to exploit a Department of the Interior statute allowing environmental responsibilities to be transferred back to previous owners. Fieldwood proposed to offload \$7 billion worth of cleanup on an offshore drilling rig back to Chevron, Marathon Oil, and BP, all the while creating a new corporate entity to buy up its still-profitable assets. The company prevailed ([Sadasivam 2021](#)). Fieldwood’s debts were forgiven, and its profitable assets were loaded into a new company. A federal judge further ruled in 2021 that Fieldwood’s previous owners would need to pay to clean up the assets left behind ([Wolf 2021](#); [Matthews 2021](#)).

Companies’ desire to shed liabilities has also helped to empower the expansion of little-known firms built to exploit loopholes in environmental statutes and lax oversight. For example, Diversified Energy is now the largest owner of oil and gas wells in the US, having acquired low-production wells from other companies while claiming to be able to keep them operational through 2095. Such projections allow Diversified to greatly underestimate the Asset Retirement Obligations (AROs) that come with well ownership, which mandate that companies responsibly retire old wells. Diversified claims, furthermore, to be able to plug its network of 60,000 wells for an average cost of \$21,000, well below industry standard costs. Researchers at the Ohio River Valley Institute argue that such accounting tactics mean that Diversified is understating its liabilities by hundreds of millions of dollars ([Boettner and Hipple 2022](#)). Nevertheless, Diversified has also accepted contracts to clean up abandoned wells at far higher prices, including, in 2022, to clean up 100 wells in West Virginia at costs as high as \$126,000 each ([Beard 2022](#)).

Laws for how to properly deal with orphaned, abandoned, marginal, idle, and legacy wells are dispersed throughout state and federal statutes ([Biven 2021](#)). For decades, the Department of the Interior required drillers who leased out Bureau of Land Management (BLM) lands to put up a bond of \$10,000 per plot—essentially, a fee returned to the company if they properly plug and abandon wells on federal land. The minimum offering for statewide bonds—covering the entirety of a company’s leases in a given state—was just \$25,000. Companies could also purchase nationwide policies for \$150,000. Until 2024, the minimum per-lease standard—established in 1960—had not been raised in 60 years, giving companies little incentive to meet cleanup obligations. Had the standard been pegged to inflation, it would now be \$105,000 per plot.

The Department of the Interior has taken steps to remedy that situation. In April 2024, the Department finalized new bonding requirements for companies that drill on federal



lands, establishing a \$150,000 minimum for all lease-wide drilling and a statewide minimum of \$500,000. Nationwide minimums were also eliminated ([BLM 2024](#)). States have undertaken similar reforms in recent years. In 2015, for example, Wyoming’s Oil and Gas Conservation Commission voted unanimously to quadruple its minimum bonding requirement for drilling leases on state and private lands from \$25,000 to \$100,000 ([Accountable.US 2023](#)).

Estimates vary for how much it actually costs to plug and reclaim wells, and such costs vary widely based on the type of well. The US Government Accountability Office (GAO) estimates that cleaning up and plugging abandoned wells could cost between \$61 and \$435 billion, but that figure notably excludes an additional estimated 1.2 million undocumented onshore wells ([GAO 2019](#)). A 2019 GAO study found that “low-cost” wells require around \$20,000 to reclaim, while “high-cost” wells typically cost \$145,000. Nevertheless, the same study found that, in 2018, BLM held bonds that amounted to just \$2,207 per well ([GAO 2019](#)).

The problem is worse at the state level. Carbon Tracker found that states—which generally set their own bonding requirements for private lands—hold just 1 percent of the funds needed to cover an estimated \$280 billion in outstanding oil and gas liabilities across 2.6 million orphan wells. Further research by Carbon Tracker, published in May 2023, shows that it will cost \$21 billion to decommission California wells alone; California has just 1 percent of that set aside ([Purvis 2023](#)). Yet, oil and gas production there is expected to earn just \$6.3 billion over the same time period.

Historically, public funds have been used to help fill the gaps between the industry-held bonds and the true costs of cleanup. But these funds not only fall well short of need; they also let industry off the hook, utilizing public funds to perform work that in many cases companies are required to undertake at their own expense. Because so many of those statutes are so outdated, though, they offer little incentive for firms to mount their own cleanup operations. Federal funding offers them new streams of revenue for work they ought to be doing already. The Bipartisan Infrastructure Act, for instance, allocated \$4.7 billion to plug orphan wells nationwide. That provision was passed largely at the urging of the Interstate Oil and Gas Compact Commission, a quasi-governmental association of state oil and gas industry regulators that functionally serves as a lobby shop for oil and gas interests at the federal level ([Biven, Palacios, and Boettner 2022](#)). Nevertheless, even with this additional funding, states face hundreds of billions of dollars in orphan well liability risk, even by conservative estimates.

There are two paths to dealing with this problem. In the first, as previously discussed, companies will do all they can to move these liabilities off their balance sheets—selling them off to smaller and less scrutinized firms (e.g., Diversified), delaying decommissioning for as long as possible, or finding loopholes to simply pass those ballooning costs on to their competitors or the public. State and local governments will shoulder the burden of both cleanup and collapsing tax bases as executives move on to



more prolific, polluting sites in the US and abroad ([O'Leary 2023](#)). Workers thrown out of a job and communities forced to deal with the considerable pollution these assets generate are cannon fodder in that process and easy prey for those looking to cast blame for oil and gas-dependent communities' misfortune onto climate policy instead of the corporations responsible. An already enormous stock of polluting assets will grow, and the federal government will continue to struggle to even understand the scale of the problem, let alone manage it. The other path, explored below, sees the government take an active role in regulating the fossil fuel sector, raising financial penalties for polluters who ditch their responsibilities to workers and the environment, and updating its industrial policies to meet the most pressing challenge of the 21st century head-on.

Why the Energy Transition Requires Public Intervention and Planning

Treating fossil fuel producers as systemically important—as large banks are now—can open up regulatory pathways for both disclosure and revenue generation. Unlike the financial sector, however, the core business model of the fossil fuel sector is a threat to the habitability of the planet. To prevent tens of billions of dollars worth of toxic fossil fuel liabilities from being transferred onto public balance sheets, the US should establish new public institutions capable of mitigating the inevitable social, financial, and environmental risks posed by continued fossil fuel production.

Though this represents a more creative use of federal powers, such capacities are best thought of not as an expansion of federal authority, per se, but as a redirection of the considerable state resources already gifted to the US energy sector. More importantly, these capacities must be seen as a necessary, if not inevitable, intervention on behalf of a public at risk. So long as planning decisions about fossil fuel production, investment, and distribution in the world's largest fossil fuel-producing country are made by the private sector, those plans will not align with the goals of the Paris Agreement. The multifaceted costs of ordinary production declines expected over the coming decades—costs likely to be incurred even absent proactive fossil fuel wind-down policies—will be offloaded onto taxpayers and the federal government; there is no evidence, past or present, that suggests anything to the contrary.

The Fossil Fuel Industry Is a Public-Private Partnership

The fossil fuel industry as we know it would not exist if not for government intervention, ranging from subsidies to research and development support to high-level market coordination: in short, industrial policy.



Nearly as quickly as oil became an important commodity, the companies who drilled it asked policymakers for help. In 1914, amid a spate of new discoveries, Oklahoma's Independent Producers League petitioned state officials to limit production to keep prices from crashing. The Oklahoma Corporation Commission (OCC)—which oversaw railroads, electric utilities, and other industries deemed important to the public—responded by promptly establishing the country's first quotas on oil production. But the Commission lacked the teeth to enforce them. The following year, after voluntary controls floundered, the state legislature passed a bill granting the OCC legal authority to restrict production. The purpose of that law, and those that followed in other states, was conservation: to prevent drillers from ruining viable fields through reckless extraction methods, and to protect the industry as a whole by keeping prices from crashing (McNally 2017, 45-48).

Federal intervention came later, in 1926, when Calvin Coolidge's administration responded to industry pressure by mounting the Federal Oil Conservation Board. "The oil industry itself might be permitted to determine its own future," Coolidge wrote in the introduction to a report from that body. "That future might be left to the simple working of the law of supply and demand but for the patent fact that the oil industry's welfare is so intimately linked with the industrial prosperity and safety of the whole people, that Government and business can well join forces to work out this problem of practical conservation" ([US Federal Oil Conservation Board 1926](#)).

In some cases, governments have put boots on the ground in the name of maintaining industry profitability. When federal courts overruled Oklahoma's quota-making system in 1931 amid a particularly painful bust, Governor William "Alfalfa Bill" Murray declared martial law and dispatched National Guard troops to shut down 3,106 active wells. "The state's natural resources must be preserved," he reportedly said, "and the price of oil must go to \$1 a barrel; now don't ask me any more damned questions." Similarly, throughout the Roosevelt administration, federal officials cracked down on the trade of so-called "hot oil" produced illegally in quota states and sold elsewhere. "Our task," Franklin D. Roosevelt's Interior secretary Harold Ickes said in 1933, "is to stabilize the oil industry upon a profitable basis." Kansas, Louisiana, New Mexico, Mississippi, Arkansas, and Michigan would all come to implement their own quotas. The most important quota system, though, was maintained by the Texas Railroad Commission (TRC), a parallel to the OCC. While reluctant to say it was doing anything of the sort, the TRC would for decades manage global oil prices and stabilize the industry by toggling quotas within the country's largest oil-producing state.

Today, government assistance to protect oil and gas production is baked into everything from the tax code to diplomatic relationships and multilateral development banks. The basic reasons for this support still hold. The US's historic abundance of independent producers has made it difficult for the industry to stabilize prices at profitable levels on its own. As individual companies rush to exploit newly discovered reserves, they have routinely flooded the market with supply and sent prices spiraling



downward. On the other hand, too-high prices are a key driver of inflation and voter dissatisfaction. Navigating the balance between industry and public interests has thus always required—and continues to require—elaborate state intervention.

By some estimates, US governments (state and federal) offer roughly \$20 billion worth of permanent, sector-specific financial support per year to fossil fuel producers. Achakulwisut, Erickson, and Koplow (2021) divide these kinds of subsidies into three categories: “forgone government revenues through tax exemptions and preferences; transfer of financial liability to the public; and below-market provision of government goods or services.” They find that 16 such subsidies increased the modeled internal rate of return (used by companies to make investment decisions) on new oil fields by 16 percent at average 2019 prices. Gas fields were similarly found to have a 13 percent greater internal rate of return (IRR) as a result of government support policies. Just one century-old subsidy for “intangible drilling costs”—allowing firms to write off the cost of new drilling equipment—was found to increase IRR on oil and gas fields by 11 and 8 percent, respectively.

These subsidies are only one part of the longstanding US industrial policy from which fossil fuel executives have benefited. As OPEC exercised more control over global oil prices through the 1970s, the Nixon administration responded by launching “Project Independence,” starting with the Emergency Petroleum Allocation Act, signed by Richard Nixon in November 1973, which set a price ceiling based on when oil had been drilled (Knittel 2014). Two years later, the Energy Policy and Conservation Act of 1975 created the Strategic Petroleum Reserve to protect against import disruptions (Pirog 2017).

Nixon likened “Project Independence” to US efforts to build the atomic bomb and land on the moon: “Let us set as our national goal, in the spirit of Apollo, with the determination of the Manhattan Project, that by the end of this decade we will have developed the potential to meet our own energy needs without depending on any foreign energy sources,” he said from the Oval Office (1973). Successive administrations have since sought to foster “energy independence” through a sweeping mix of supply and demand side measures aimed at bolstering domestic sources of energy and reducing energy consumption, including bans on fuel exports, expanded price controls, rationing, a national speed limit of 55 miles per hour, and Corporate Average Fuel Economy (CAFE) standards to limit gasoline usage.

Government support has aided not just the ordinary functioning of the fossil fuel industry but has also catalyzed transformations within the sector by providing patient capital, research support, and helping to open up new markets abroad. The shale boom would arguably become Project Independence’s most successful product. Although the shale boom has been hailed as an example of private sector dynamism, in reality, the federal government was an early and consistent driver of innovations in hydraulic fracturing—a method oil and gas executives had written off as too expensive to be



worth pursuing ([Burwen and Flegal 2013](#)). For example, from 1976 through 1992, the Eastern Shales Gas Project—initiated by the Energy Research and Development Administration, which was a precursor to the Department of Energy (DOE)—collaborated with drilling companies, universities, and government research institutions to scope out the availability of shale gas in the Appalachian, Michigan, and Illinois Basins and investigate how best to extract it. Also in 1976, the Federal Energy Regulatory Commission imposed a tax on interstate gas sales, directing funds mainly toward the industry-run Gas Research Institute (GRI). As a complement to basic research into extraction techniques being done by the Department of Energy, the GRI—whose budget peaked at around \$200 million per year in the 1990s—focused on how to commercialize those discoveries. Additionally, a production tax credit for unconventional gas drilling, in place from 1980 through 2002, is believed to have *doubled* the production of unconventional gas during that time, helping to make otherwise uneconomic wells worthwhile for drillers (See Table 1).

Table 1. US Federal Support for Fracking

Program	Type	Years in Place	Administering Agency ⁶	Description
Energy Research and Development Administration (Eastern Shales Gas Project, Western Gas Sands Program, Methane Recovery from Coalbeds Program)	R&D	1976–1992	Department of Energy	Collaboration between industry, university, and government labs responsible for foundational advances in seismic mapping, drilling technologies, and experimental well demonstrations. \$258 million in 2023 dollars. As is often the case with early-stage research, relatively modest funding bore outsized dividends. For instance, DOE-funded development of a polycrystalline drillbit is estimated to have yielded cost savings of \$15.6 billion from 1982 to 2008.
Gas Research Institute	R&D	1976–2000 ⁷	Federal Energy Regulatory Commission (FERC)	Private sector–led initiative focused on commercialization of unconventional gas resources. Partially financed by a FERC-approved surcharge on gas, paid by utility customers.

⁶ Agencies are referred to by their modern names, which may be different from the names of their forerunners responsible for these policies (i.e., Federal Energy Regulatory Commission vs. Federal Power Commission).

⁷ Replaced by the Gas Technology Institute in 2000; FERC surcharge ended in 2004.



Natural Gas Policy Act of 1978	Pricing Incentive, Regulatory Relief	1978–1989 (Public L. No. 101-60 1989) ⁸	Department of Energy	Lifted wellhead price controls on unconventional gas, including that obtained via hydraulic fracturing. As price controls were initially left intact for conventional gas, the bill offered unconventional drillers a significant pricing incentive until the end of all wellhead price controls in 1989.
Crude Oil Windfall Profits Tax (Sec. 29 Production Tax Credit)	Tax Credit	1980–2002	Internal Revenue Service	Financed by taxes on crude oil windfall profits, the Sec. 29 production tax credit offered operators \$10 billion of regulatory relief between 1982 and 2002.
Natural Gas Pipeline Liberalization (GAO 1987 ; FERC 2020)	Infrastructural Support	1985–Present	FERC	Pursuant to the Natural Gas Policy Act, FERC issues a series of orders opening access to interstate pipelines, as well as providing federal siting and eminent domain authority to spur new pipeline construction (Golden and Wiseman 2015).
Regulatory Determination for Oil, Gas, and Geothermal Exploration, Development, and Production Wastes (EPA 1988)	Regulatory Exemption	1988–Present	Environmental Protection Agency	Exclusion of oil and gas production wastes from Resource Conservation and Recovery Act Subsection C (EPA 2024b). Oil and gas operations had already been exempted from sections of the Clean Water Act (Sec. 402) dealing with stormwater runoff (EPA 2023).
Energy Policy Act of 2005 (“Halliburton Loophole”)	Regulatory Exemption	2005–Present	Environmental Protection Agency	Amends the Safe Drinking Water Act to exclude the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil or gas, or geothermal production activities, from the definition of underground injection. ⁹ The Act further exempted several types of oil and gas drilling operations from National Environmental Policy Act environmental impact statement requirements.

⁸ Natural Gas Wellhead Decontrol Act officially removed wellhead price controls for all gas in 1989.

⁹ Since the passage of the Safe Drinking Water Act (SWDA) in 1974, the EPA had declined to require permits for Class II Underground Injection Control (UIC) injection wells used for hydraulic fracturing, which it did not consider a threat to underground drinking water. The Eleventh Circuit Court of Appeals ruled in 1997 that the EPA was required to regulate fracking under Subsection C of the SDWA. The Agency responded in a 2004 study that non-diesel “frac fluids” used in extraction did not pose a threat, the findings of which were integrated into the Energy Policy Act of 2005.



Global Shale Gas Initiative (State Department 2010)	Trade, Diplomatic Support	2010–2016	State Department	Widespread diplomatic effort to encourage the adoption of shale gas drilling abroad via “an umbrella of laws and regulations.” The Initiative created and secured business opportunities for US oil and gas companies abroad, often working in direct partnership with companies (Blake 2014).
Small-scale Natural Gas Exports (rule) (DOE 2018)	Trade Support	2018–Present	Department of Energy	Expedites small-scale liquid natural gas exports.
Industry-requested changes to COVID-19 relief programs	Bailout	2020–2021	US Federal Reserve	The Fed made a suite of changes to its pandemic relief programs that had been requested by oil and gas lobbyists, many of which made it easier for companies that struggled with high debt loads and low cash flow long before the pandemic to use federal funds to pay down preexisting debts and take on larger, riskier loans. Fed bond-buying programs purchased a disproportionate amount of fossil fuel debt (InfluenceMap 2020 ; Gelzinis, Madowitz, and Vijay 2020).

Source: [Golden and Wiseman 2015](#)

Other forms of state support for fracking are harder to quantify, but no less important. Omnibus energy packages passed during the George W. Bush administration, for example, exempted hydraulic fracturing from EPA drinking water regulations and the Clean Water Act, with devastating effects on public health ([Ahmed 2023](#); [Greenpeace n.d.](#)). During the Obama administration, State Department officials sought to open up new markets for US shale abroad through the Global Shale Gas Initiative ([Blake 2014](#)). Perhaps most important to the industry, though, was the relaxation of gas export rules and the 2015 repeal of a 40-year-old ban on crude oil exports, traded as a bargaining chip for the temporary extension of tax credits for wind and solar power.

Because many US refiners lack the capacity to process oils extracted through fracking domestically, allowing more widespread exports has been critical to the industry’s success. Greenpeace found that within five years of the crude oil export ban being lifted, crude oil exports grew by 750 percent, becoming the United States’ top export overall ([Donaghy, Noël, and Stockman 2020](#)). By 2023, the US had become a net exporter of crude oil for the first time, and the EIA projects it will retain that status through 2050 ([OGJ 2023](#)). This poses considerable material and political risks to decarbonization. A US that is pursuing a virtually unmitigated build-out of fossil fuel infrastructure that will remain operational for decades has little diplomatic leverage to demand that lower-income countries halt their own fossil fuel development—something often asked of countries on the receiving end of loans from



Bretton Woods Institutions. A good-faith effort by the US to begin phasing down fossil fuel usage and production domestically is a necessary precursor to negotiating with other oil producers toward a coordinated energy transition, along with the provision of much-needed climate finance allowing countries to “leapfrog” to zero-carbon energy. There is also reason to believe that, left to their own devices, fossil fuel companies will stoke additional, artificial demand for fossil fuels at home and abroad ([McCormick, Smyth, and Chu 2024](#)).

Fossil Fuel Management Is Green Industrial Policy

While fossil fuel lobbyists regularly argue that the government should not be in the business of “picking winners and losers,” the fossil fuel industry has had a historically symbiotic, even parasitic, relationship with the public sector. It is welcome news that the US is now more forcefully incentivizing green energy production with a similar set of industrial policy tools as those used to build and sustain the fossil fuel industry. It would be a mistake, however, to understand green industrial policy of the sort embodied in the Inflation Reduction Act as wholly separate from the suite of non-market mechanisms utilized to foster a stable and profitable fossil fuel industry.

Herein lies the limit of green industrial policy as such: If its goal is simply to build out domestic supply chains for low-carbon energy technologies, then there is no contradiction between green industrial policy and industrial policies that back an ever-expanding fossil fuel sector. But if the goal is to reduce emissions and transition to a fundamentally different energy system—rather than to simply diversify US energy production and consumption—then these two bodies of policy must be reconciled into a unified industrial strategy.

In the near term, status quo US government support for the fossil fuel industry poses pressing risks. Even leaving climate considerations aside, by heavily subsidizing renewable energy build-out, federal policy is continuing to support the development of infrastructure—and workforces—that companies will likely try to offload onto public balance sheets once it becomes a liability on theirs.

Owing to recent changes to BLM bonding requirements, there may soon be more money available to plug and reclaim old wells. The US, however, still does not have a plan to responsibly manage wells at the end of their life cycle. Conversely, more wells are being added to the queue as the BLM continues to open additional land for drilling. Assets on private and state lands are even more difficult to track. Even within just the purview of the Department of the Interior, there are more powerful tools available to bring bonding requirements in line with climate goals. Those include expanding the preferential treatment provided to renewable energy development under the Bureau of Land Management’s updated Renewable Energy Rule and requiring firms to either make use of the 12.3 million acres of public lands currently leased out to them or cede it back ([Land Management Bureau 2024](#); [Rowland-Shea and Mirza 2023](#)).



Yet planning for decarbonization is too big a task for any one agency. Just as industrial policy nurtures the growth of fledgling ventures and technologies deemed important to the public interest, a coherent green industrial policy must also responsibly manage the decline of carbon-intensive business models. This is arguably consistent with the “portfolio approach” to green industrial policy described by Mariana Mazzucato (2021, 53) and Dani Rodrik (2014). As it did in responding to the oil crises of the 1970s, the US has now taken bets on the success of several cutting-edge industries through the CHIPS and Inflation Reduction Acts. Those private-sector incentives should be just one piece of that strategy. Policymakers pursuing emissions reductions should “tilt the playing field” toward an equitable, speedy energy transition and embrace their power to shape and create markets. “Governments,” Mazzucato (2021, 143) writes, “have a fundamental role to play in providing a stable, consistent conduit for investment which ensures that regulation and innovation converge along a green trajectory that addresses climate change.”

The tools of, for example, market coordination, risk-bearing, and price management that the US has historically brought to bear on its “mission” for a predominantly fossil fuel-based energy independence must be organized under a new and similarly ambitious mission: decarbonization.

Fossil Fuels Are Systemically Important

For nearly a century, policymakers on both sides of the aisle have treated domestic energy production as a *de facto* public good. Yet while investor-owned electric utilities must apply to elected or appointed state public service commissions to build infrastructure and raise rates, drillers, refiners, and traders have broad discretion over both investment and pricing decisions. These prices play an outsized role in driving inflation and are highly volatile (Weber et al. 2022). Furthermore, energy prices are systemically important, per criteria outlined by Hockett and Omarova (2016): the ubiquitous use of energy in the real economy; its popularity as an investment asset; and the widespread use of benchmark prices and indexes, like Brent Crude or West Texas Intermediate, which are “determined by small numbers of oil-producing firms or states much as LIBOR is determined by a small number of large-banking institutions” (Hockett and Omarova 2016).¹⁰

Nevertheless, federal and state governments exert surprisingly little control or influence over these prices. The US’s primary tool to influence oil prices is the Strategic Petroleum Reserve, which it has used more actively since the beginning of Russia’s war on Ukraine and the ensuing shock to global oil prices. The White House’s commitment

¹⁰ LIBOR refers to the London InterBank Offered Rate, formerly a benchmark interest rate calculate from estimates submitted by top banks and accepted as a key measure of the cost of borrowing between banks.



to refill the stockpile when prices reach \$79 per barrel, while a generous incentive for drillers to increase production, has had a relatively muted effect on domestic prices or production—much like the repeated calls from administration officials to boost production as gas prices rose in 2022 ([DOE 2023](#)). Instead, oil and gas CEOs have been nonplussed, refusing to alter production plans in ways that depart from the types of industry changes discussed earlier, i.e., to maximize shareholder returns and stabilize balance sheets ([The White House 2022](#)). “Whether it’s \$150 oil, \$200 oil, or \$100 oil, we’re not going to change our growth plans,” Pioneer CEO Scott Sheffield said at the time ([Crowley and Wethe 2022](#)). “If the president wants us to grow, I just don’t think the industry can grow anyway.”

As Karlsson and Melodia ([2023](#)) argue, SPR releases are at best a stopgap measure for insulating consumers from the inherent volatility of fossil fuel prices. Furthermore, strategies that encourage production over the longer run—including the de facto price floor of SPR repurchases—threaten to lock in carbon-intensive infrastructure and deepen the public’s greatest vulnerability to fluctuating fuel prices: fossil fuel dependence ([Karlsson and Melodia 2023](#)).

Actually Existing Public Ownership

Direct state energy planning isn’t completely alien to the United States. In the 1940s, the US created an oil company with the explicit aim of buying up controlling stakes in private companies, in part because Franklin D. Roosevelt recognized energy as a sector too important to be left to the whims of the market. In a letter appointing Harold Ickes to serve as the country’s wartime Petroleum Coordinator, Roosevelt wrote about the urgency of making oil “available, adequately and continuously, in the proper forms, at the proper places, and at reasonable prices to meet military and civilian needs” ([Roosevelt 1941](#)).

During World War II, Ickes, with Roosevelt’s blessing, created the Petroleum Reserves Corporation (PRC) as a subsidiary of the Reconstruction Finance Corporation (RFC). Fearing the country might run out of oil during wartime, Ickes’s chief objective was to use RFC funds to acquire a “participating and managerial interest” in Standard Oil of California (“Socal”) and Texaco’s operations in Saudi Arabia. The two firms—which controlled concession agreements with Saudi leaders via the California-Arabian Standard Oil Company—were among those that would go on to form the Arab American Oil Company, ARAMCO. The PRC’s mandate was explicitly imperial, as the US (and military leadership, in particular) feared it had missed out on an opportunity to



do what the British Empire had done with British Petroleum, which was majority-owned by the UK government before being fully privatized in 1987.

“Any realistic appraisal of the problem of acquiring foreign petroleum reserves for the benefit of the United States,” Ickes wrote, “compels the conclusion that American participation must be of a sovereign character compatible with the strength of the competitive forces encountered in any such undertaking” ([Randall 1983](#)). Though Ickes collaborated extensively with oil companies in other wartime planning bodies, the PRC board would exclude the private sector and include the secretaries of state, interior, war, and the navy. Furthermore, although the resources would be government-owned, the PRC would contract with Socal, Texaco, or other companies to oversee drilling, infrastructure, and refining operations. Unfortunately, the project folded amid intense industry opposition and divisions within the Roosevelt administration, where the idea of planning to acquire oil via contract (e.g., buying it) eventually won out over ownership.¹¹

Nevertheless, the government was in the business of drilling for oil and gas throughout the 20th century. In fact, until 1998, the US government owned a 78 percent stake in what had been the country’s ninth-largest oilfield ([GAO 1995](#)). The Naval Petroleum and Oil Shale Reserve (NPOSR) was set up under William Howard Taft to provide fuel for the military, including from the infamous Teapot Dome Reserve in Wyoming. But in 1976, the office’s mandate was changed so that it could sell crude oil commercially under the auspices of the Department of Energy, including from Naval Petroleum Reserve No. 1 (NPR-1) in California’s Central Valley.

In the 1990s, Assistant Energy Secretary Patricia Godley proposed turning the NPOSR into a government corporation, noting its potential to generate revenues that—according to one proposal—would be deposited into Treasury accounts at the end of the year. From 1976 to 1993, the GAO found that NPOSR brought in \$15.7 billion and spent just \$2.9 billion, netting \$12.8 billion. It would make \$13.6 billion throughout the time it was administered by DOE—\$25 billion in today’s dollars. The Clinton administration passed on the proposal. And thanks to the fact that NPOSR was barred from investing in improved production, yields from NPR-1 had declined considerably by the mid-90s, prompting the administration to eventually put it up for auction. Occidental Petroleum’s \$3.65 billion purchase of NPR-1 in 1998 remains the largest

¹¹ Ickes’s attempt to build a government-owned pipeline in the Middle East—in partnership with Standard Oil of California and Texaco—sparked anger from both liberals and conservatives. The former thought it was a waste of public time and funds to build something that would only help corporations make money. Conservatives, predictably, saw it as government overreach (see [Carmical 1944](#)).



divestiture of federal property in US history ([Office of Cybersecurity, Energy Security, and Emergency Response, n.d.](#)). Then-sitting Vice President Al Gore, who engineered the privatization as part of his “Reinventing Government” initiative, served on Occidental’s board of directors and had over \$500,000 in stock at the time of the sale ([Royce, Ballenger, and Heller 2000](#)). Now, just one of the original six properties is still under NPOSR control.

Direct government ownership has been more common in the power sector. The Pacific Northwest’s Bonneville Power Administration is one of four power marketing agencies housed within the DOE, which builds transmission lines that transport electrons from federally owned hydropower generation. The New York Power Authority—established under Roosevelt—continues to generate publicly owned electricity and has recently received a mandate to construct renewable energy as well ([NYS S4006C 2023](#)).

A 21st-Century Energy Policy: Recommendations

Ongoing changes in the fossil fuel sector and the realities of the climate crisis demand updating how the US regulates and supports energy production. The following sections lay out a menu of policy options to prevent the transfer of private risk onto public balance sheets and build upon ongoing work to further the energy transition through green industrial policy, drawing on both historical precedents and approaches used to oversee other sectors that are vital to US national interests: regulating the fossil fuel sector as such; creating new public institutions to coordinate the energy transition; and working toward both outcomes with policy levers available through executive and agency actions.

A Framework for Fossil Fuel Oversight and Consumer Protection

Even if there was no climate crisis, the US’s approach to handling its fossil fuel sector would seem odd. Heavily subsidized for-profit companies have exclusive control over the management and exploitation of what are arguably the country’s most important natural resources. Yet, despite granting those firms generous and longstanding support, the US government can exert influence only around the edges. Federal agencies only determine where (and to a limited degree how) fossil fuel infrastructure can be built, as well as whether companies are abiding by federal environmental statutes. Exploration and production are largely regulated by states, typically via industry-friendly or -captured state commissions ([Allison and Mandler 2018](#)). Beyond



this, the government has very few tools with which to influence, much less control, fossil fuel industries.

The history of the oil industry in the US has been defined by diffuse companies collectively undermining the stability of their own industry, remedied in most instances by private cartel- and state-led attempts at market coordination. The shale boom and ensuing bust show that these basic dynamics are still in place. Since the US no longer acts as the world's dominant swing producer—having long ago lost its ability to single-handedly manipulate global oil prices at will—managing the impact of fuel price volatility now requires routine government interventions to make up for lost planning capacities. Most recently, that has taken the form of emergency financial assistance, including preferential treatment in the Fed's corporate bond-buying program in 2020. In the months after the Fed purchased \$432.1 billion worth of already issued fossil fuel bonds, investors also lent the long-struggling industry \$93.5 billion ([Public Citizen 2022](#)). Such ad hoc responses reward the industry's most self-destructive behaviors and, in turn, pose more widespread threats: an accumulating stock of both toxic assets and greenhouse gasses in the atmosphere.

Policymakers have rightly sought to use financial regulations to account for and limit the risks that fossil fuels and climate change pose to economic stability, with a focus on financial institutions themselves and corporate disclosure requirements. But the US has made little attempt to regulate energy producers so as to account for their unique systemic importance. Whatever the pace of a transition away from fossil fuels, the coming decades promise widespread disruptions in the energy sector and require a novel regulatory regime premised on defining and mitigating the considerable risks the US oil and gas sector poses to the public.

Taking inspiration from post-2008 recession banking regulations, Congress should implement new protections for consumers and the environment against risky business practices:

- **Require oil and gas firms to contribute a nominal percentage of profits toward a common fund for cross-agency fossil fuel infrastructure cleanup, reclamation, and decommissioning efforts.** States would be able to access these funds provided bonding and royalty rules are comparable to updated BLM standards.
- **Mandate all oil and gas firms registered with the Securities and Exchange Commission submit a full inventory of their physical infrastructure assets, associated greenhouse gas emissions, criteria air pollutants, and toxic and priority pollutants to be compiled in a federal database.** For all wells, firms would include status (i.e., active, inactive, suspended, abandoned). For active wells, they would include estimated productive lifespan. This offers regulators a deeper understanding of the physical and transition risks that companies face



and allows them to track asset ownership transfers and more accurately assess actual and estimated clean-up costs. These would be used to assess appropriate **wellhead trust funds**,¹² which are monies set aside for the future asset retirement obligations of individual oil and gas wells and beyond the reach of bankruptcy courts.

- **Develop climate-conscious contingency plans for price stabilization** to protect consumers and the broader economy against fuel price shocks and volatility ([Weber et al. 2022](#)).
- **Mandate companies submit “living wills,” for approval by federal regulators, that map out plans for bankruptcy courts to follow should they fall into severe financial distress** ([Jarque and Price 2015](#)). Plans should minimize life-cycle greenhouse gas emissions and other social, environmental, and financial costs to the public. Companies should also be required to **conduct regular stress tests to determine how their asset portfolios perform under various physical and transition risk scenarios** ([Morgan 2024](#)).
- **Scrutinize all mergers, acquisitions, and divestments** above a certain size and/or greenhouse gas emissions and pollution intensity for compliance with emissions regulations and fair competition rules in consultation with the EPA, Federal Trade Commission (FTC), and other relevant agencies.
- **Establish an independent federal agency, similar to the Consumer Financial Protection Bureau, dedicated to protecting the public against financial and environmental harms caused by energy infrastructure and cracking down on businesses that exploit loopholes in extractive industry regulation.**

Such a Dodd-Frank-style fossil fuel industry reform bill is unlikely to pass through Congress without a sizable Democratic majority. Elements of such a package, however, might be possible to implement through existing federal authorities. A **blue-ribbon Commission on US Energy Stability**, for example, could conduct a thorough evaluation of which of the functions listed above would require new legislation or could be undertaken (in whole or in part) using existing authorities, as well as establish the criteria for determining which fossil fuel firms qualify as systemically important.

In the meantime, there are several opportunities to take immediate action that are well within the bounds of existing federal statutes. By taking the modest step of accounting for well-documented climate and transition risks, the Office of Information and Regulatory Affairs (OIRA) could reasonably review and modify regulations that benefit the fossil fuel industry. The Federal Reserve’s dual mandate to preserve full employment

¹² Per Biven et al. ([2022](#)): “Operators would be able to choose either a lump-sum payment upon establishment of the trust that reflects the estimated full costs of decommissioning, or pay an annual payment into a sinking trust fund until it reaches the estimated full cost.”



and price stability arguably also warrants specific attention to fossil-fueled price volatility and “mid-transition” dynamics that could create turbulence in energy markets more generally. The Secretary of the Treasury has broad authority to use the Exchange Stabilization Fund (ESF) as a necessary complement to the Fed’s efforts on that front and insulate the public against energy shortages and supply shocks, including through the purchase of “instruments of credit or other securities” ([Datta, Amarnath, and Williams 2022](#)). Increased scrutiny of fossil fuel mergers and acquisitions can happen entirely at the discretion of the FTC. While staffing vacancies present difficulties, the EPA and Department of Justice are also fully empowered to reverse historically low levels of enforcement against corporate polluters ([Aronoff 2024](#)).

President Biden’s Executive Order on Climate-Related Financial Risk ([EO 14030](#)) has also largely not been implemented. But in September 2023, Senators Elizabeth Warren (D-MA), Bernie Sanders (I-VT), and others laid out a number of immediately actionable steps for doing so, including ([Elizabeth Warren 2023](#)):

- Leading the Financial Stability Oversight Council (FSOC) in finalizing and immediately beginning to use its recently proposed analytic risk framework and designation guidance for non-bank systemically important financial institutions, to allow for adequate federal supervision of asset managers and other major, non-banking financial institutions that are driving the unchecked growth of climate-related financial risk;
- Playing a role in developing and encouraging the uptake of higher-quality climate scenario analysis exercises for banks, grounded in climate science;
- Expanding access to the Climate Data and Analytics Hub beyond the staff of the Office of Financial Research (OFR), the Federal Reserve, and the Federal Reserve Bank of New York, to which the pilot is currently limited, in order to give all FSOC member agencies access to public climate and financial data, high-performance computing tools, and analytical and visualization software;
- Aligning financial institutions with the net-zero transition and working to close gaps in its recently published net-zero transition guidance; and
- Investigating the extent to which abuse of 501(c)(3) and 501(c)(4) authorities is used to anonymize political obstruction by fossil fuel companies of measures that could open a pathway to climate safety.

Fully realizing the potential of the Treasury’s Climate Hub through these and other means could make immediate progress toward aligning the financial sector with national climate goals. Pertinent to this paper, such implementation can also help to create proof of concept for climate-related fossil fuel regulation. Under the same auspices, financial regulators should also exert pressure on ratings agencies (i.e., Moody’s) to include assessments of climate risk in their gradings policies.

Each new dispersal of federal funds for fossil fuel extraction, moreover, should be seen as an opportunity to demand accountability by adding conditionalities that advance the



goals of decarbonization and consumer protection ([Mazzucato and Rodrik 2023](#)). Such strings aren't unheard of in recent memory. In April 2020, the Canadian government provided \$1 billion to clean up 237,000 inactive and abandoned wells, many of which flowed to Alberta. The province's auditor general reports that Alberta has just \$295 million on hand in securities from the industry to cover its \$60 billion in closure liabilities; subsequently leaked documents found those could be as high as \$130 billion ([De Souza et al. 2018](#); [Auditor General of Alberta 2023](#)). Federal funds—a small fraction of what's needed—were granted on the premise that the Alberta Energy Regulator would begin collecting cleanup funds from extractive companies. Governed by the Alberta Energy Regulator (AER), that “polluter pays” approach was announced in August 2020 as part of a new Liability Management Framework. However, much like in the US, the regulatory capture and lack of transparency plaguing the AER should be cause for skepticism as to whether it will meaningfully improve upon its previous failed approach to liability matters ([Yewchuk, Fluker, and Olszynski 2023](#)).

There are positive and (perhaps many more, as mentioned above) negative lessons to be drawn from Alberta's approach to wellhead reclamation. Policymakers in the US, though—which now has its own \$4.7 billion orphan and abandoned well cleanup program—might take inspiration from the fact that federal clean-up funds from Canada came with modest strings attached. The Treasury Department, for instance, may still be able to include similar measures as it continues setting guidance around Bipartisan Infrastructure and Inflation Reduction Act incentives.

While not the core focus of this paper, new authorities described therein should be used (where applicable) to oversee low-carbon energy companies, as well. A key danger of a green industrial policy aimed primarily at bolstering private-sector profits is that it threatens to recreate the most backward elements of our current energy system: showering subsidies onto companies that have no legal obligation to deliver the public goods and services those incentives were meant to provide. Baking democratic accountability into a decarbonized energy system at this relatively early stage can give the public a voice in both the transition to that system and its continued functioning ([Bozuwa and Mulvaney 2023](#); [Shams et al. 2023](#)).

Managing the Transition in the Public Interest

Expanding regulatory oversight will be critical to managing near-term shifts facing the energy sector, as well as the uncertainties of climate change and the energy transition. Yet the public sector has to play an even more hands-on role.

The core focus of US climate policy has been to turn elements of a decarbonized world into return-generating assets capable of attracting private investors. This is necessary but not sufficient for decarbonization—particularly in a context in which carbon-intensive energy production is also still being generously incentivized.



The Inflation Reduction Act was “designed to mobilize private capital to achieve our climate goals and strengthen long-term growth,” per the Treasury Department ([Van Nostrand and Feiveson 2023](#)). But private capital has a different achievement in mind: making money. The premise of state subsidies for things like wind turbines and electric cars is to bring those two goals together: make green ventures more attractive to invest in than they might have been otherwise. Complementary policies like fuel efficiency standards and power plant regulations can shift the math even further in that direction.

Given the urgency of decarbonization, building a zero-carbon system while simultaneously phasing out the fossil fuel system cannot be left up to private sector actors pursuing their own narrow self-interest—however well-incentivized. There is no inherent reason for zero-carbon energy in the US—with its high up-front costs and modest returns—to be built in the mold of the country’s fossil fuel systems, controlled top to bottom by for-profit actors. Whatever subsidies are provided to them, profit-seeking firms have no incentive to attend to coordination problems that could doom the energy transition to be slow, painful, and chaotic. Shifting market incentives can also backfire if not accompanied by higher-level planning; companies accountable only to their investors will necessarily seek the least-cost, highest-profit path toward regulatory compliance, subsidies, and green bona fides. For example, in 2019 BP divested its Alaskan assets, selling them off to the little-known Texas firm Hilcorp. Afterward, the company celebrated a 16 percent drop in emissions across its operations. Emissions from the assets BP sold off in Alaska, however, rose under Hilcorp management by the carbon equivalent of putting 108,000 new cars on the road ([Adams-Heard 2021](#)).

Furthermore, every component of decarbonization is not guaranteed to attract investors. What, for example, is the business case for storing carbon underground forever and maintaining the vast pipeline network required to do so indefinitely? Will the fossil fuel companies using federal funds to stake out a dominant place in that burgeoning sector ever see those returns as preferable to returns from oil and gas, and are they capable of undertaking such a radical change to their business model? If that service is as important to reaching zero emissions as many climate models suggest, why should it be treated as a commodity rather than a public service ([Buck 2020](#); [Buck 2022](#))? Even well-developed technologies like offshore wind are likely to need continued, reliable state support (i.e., tax breaks) to scale up at the awe-inspiring scale that even modest climate goals demand: per the IPCC, a tripling of renewable energy capacity by 2030 ([Christophers 2022](#)). That state support is all the more important in a high-interest rate environment.

The elaborate support the US government has and will likely continue to provide to its energy sector ought to entitle it to more say over how it’s run. If states are going to continue spending billions of dollars a year to subsidize energy production, those funds should, wherever possible, come in return for equity stakes in “clean” and “dirty” industries that allow for democratic oversight of the energy transition. Attaching



modest strings to continued state subsidies—as well as prospective bailouts—can also allow the federal government to begin crafting novel institutions purpose-built for decarbonization, exercising its powers as both market shaper and creator and as a provider of public goods, services, and dynamism ([Mazzucato 2016](#)).

More research is needed to determine precisely which forms of federal support lend themselves best to ownership opportunities, given in exchange for both routine forms of federal support and bailouts. A National Capital Management Corporation (NCMC)—outlined by Omarova ([2022](#)) as part of a broader National Investment Authority (NIA)—might be particularly well-suited to handle the taking and governance of those stakes. A government corporation, an NCMC would have three core powers: sponsoring and managing investment funds; “purchasing equity instruments and otherwise holding and managing direct ownership stakes in any entity, both on its own behalf (as the agent of the US government) and on behalf of NCMC Funds”; and “exercising any rights and powers necessary or incidental to equity ownership and fund/asset management” ([Omarova 2022](#)).

An NCMC-like structure could exercise its ownership rights to align energy companies toward the goal of decarbonization, i.e., “aggregate public benefit,” as determined by the NIA board and NCMC board of directors. Rather than only shouldering the risks of early-stage investments in low-carbon energy technologies, equity stakes in sectors spurred on by the IRA can allow returns from successful firms the US supports to be reinvested toward furthering a national investment strategy aligned behind the project of reducing emissions. By realizing the upsides of early-stage investment that typically flow to such investors—and taking advantage of liquidity support from the Treasury and Federal Reserve, where necessary—such funds can help to finance public goods not intended or expected to generate returns.

A public asset manager could also play a major role in the restructuring of firms at risk of bankruptcy, serving as a “debtor-in-possession” creditor. Should oil and gas firms require emergency federal assistance, an asset manager could manage their reorganization so as to meet national climate priorities and protect impacted workers and communities. In concert with the regulatory changes outlined above, this process can ensure that carbon-intensive firms follow through on the “living wills” they’ve created and fully meet their environmental and workforce obligations rather than unload them via bankruptcy courts or sales.

In the spirit of managing the immense coordination challenges posed by decarbonization, I propose the creation of two new federal entities aimed at expanding public-sector involvement in and oversight of the energy transition. The following descriptions of each are intended less as fully realized proposals than as an invitation for future discussion about what form expanded government capacities for decarbonization could and should take.

Transition Coordination Administration

- The Transition Coordination Administration (TCA) will be a cabinet-level office tasked with **triaging relevant federal agencies and authorities for powers, funds, and research that can be used to further an all-of-government approach to managing the energy transition.** The TCA will assess gaps in administrative capacity, delegate research tasks, and create actionable plans via existing or novel federal offices in partnership with universities and national labs. It will further serve as a **watchdog to ensure climate and environmental integrity across federal energy transition efforts**, including by commissioning regular reports on greenhouse gas reductions driven by federal policy.
- The TCA will be governed by a **10-member Board composed of the leaders of key relevant agencies**, such as the Departments of Labor and Energy, so as to delegate activities, creatively allocate federal resources, and create a centralized venue to regularly disseminate information on how dispersed transition activities are aligning toward governmental priorities.
- **Five appointed, nonvoting experts** will serve the Board in an advisory capacity for four-year terms. Offices headed by each of these advisors, supported by career staff, will be tasked with leading relevant workflows and organizing listening sessions around the country to help assess needs, with a focus on regions already or soon-to-be impacted by energy transitions. In the process, staff will conduct tailored informational sessions that detail funding opportunities available to communities through the Inflation Reduction Act and Infrastructure Investment and Jobs Act, connecting interested parties with technical assistance to access grants, tax incentives, job opportunities, and more.
- **Observers** from additional agencies will be invited to participate in working groups and committees and required to attend monthly briefings.
- A **10-person Stakeholder Advisory Council** will provide regular input to the Board and be able to avail itself of expert office staff for assistance with research, writing, and more. The Council will include at least one representative each from transition-affected labor unions and Tribal entities, and will be regionally representative and no more than 50 percent white or male.
- Within one year of its first meeting, the TCA will release a report detailing action plans for federal agencies, recommended legislative action, and concrete proposals for building out **regional TCA offices** that can provide technical assistance and facilitate **direct community engagement related to transmission and renewable energy siting.** Each year, the TCA will publish a detailed inventory of the impact of federal policy on greenhouse gas emissions, co-pollutants, environmental justice, biodiversity, and more.



Energy for America

- Energy for America (EFA) will be an independent **public benefit corporation wholly or majority-owned by the US government**. At least initially, it will be a clearinghouse for managing physical fossil fuel assets that come under federal control—including orphaned wells—and will eventually act as a general-purpose energy developer backed by the full faith and credit of the US government.
- Much like the Tennessee Valley Authority (TVA), EFA will be able to develop fully owned and operated large-scale renewable energy projects. This could be done independently and in partnership with private-sector firms.
- Similarly to the TVA, EFA will also be **exempt from the Antideficiency Act**—which ties most federal funding to existing appropriations—for all but its use of appropriated funds and will be free to engage in debt financing, make equity investments, and acquire assets. EFA will, however, be closely monitored by the TCA and its regional offices, which will be tasked with protecting against corruption and ensuring the company follows high-road labor and environmental standards.
- If EFA does engage in fossil fuel production as a result of asset acquisitions, all production plans will by charter be made to align with an expert-generated, equity-based timeline for limiting warming to 1.5 degrees Celsius.
- The company will **directly hire displaced energy sector workers for well cleanup, decommissioning, and remediation efforts** as unionized federal employees. Like other EFA work areas, this will initially happen through partnership agreements with private-sector firms (e.g., oilfield services companies), with the goal of building in-house expertise and poaching top-tier talent.
- In cooperation with the Department of Labor and other relevant federal agencies, EFA will serve as a coordination hub to retrain workers in carbon-intensive extraction and match them with jobs that fully match or exceed their previous wages, pensions, and benefits. Potential placements include well cleanup and rig decommissioning, as well as EFA renewables, geothermal, and carbon management projects.
- **All non-executive level staff whose firms come under EFA management for any reason will be guaranteed full salary and benefits replacement for at least five years**, whether or not they find an applicable EFA placement. **All workers above the age of 50 will be eligible for early retirement**. A new federally subsidized



retirement system for retirement-eligible workers will be created within the Federal Employees Retirement System (FERS).¹³

- EFA will work with the Power Marketing Administration and Tennessee Valley Authority to ensure existing federal entities are taking full advantage of uncapped renewable energy tax credits and other incentives provided by the Inflation Reduction Act. Where necessary, the EFA will offer robust technical expertise to allow rural electric cooperatives, municipal utilities, and Tribal entities to take full advantage of these incentives.

Additional Near-Term Recommendations

Creating a “Dodd-Frank” for climate or a public holding company for fossil fuel assets would require not just legislative authority but broad support in Congress. But **there are plenty of vital changes that can be made right away to ensure a just and equitable transition away from fossil fuels.** Indeed, that “lower-hanging fruit” is necessary to lay the groundwork for more sweeping changes. The actions summarized below are critical complements to both the Inflation Reduction Act and the hard work already underway in many federal agencies to strengthen regulations and update dangerously outdated policies. All of these steps can be taken without Congress and are well within the bounds of long-held federal statutes:

- **Fully staff federal agencies with personnel that have climate and other relevant expertise, and an interest in putting it to work.** Open positions include directorship of the Department of the Interior’s Office of Surface Mining Reclamation and Enforcement, which is charged with overseeing state-level coal mining reclamation and cleanup efforts. The Treasury Department’s climate hub still has no climate scientists on staff. Lacking driving vision, these agencies are neither doing the jobs Congress and the president have tasked them with nor transforming for the 21st century.
- **Where possible, repeal agency rules and regulatory exemptions (see Table 1) that distort the price of fossil fuels and their appeal to investors, and make it easier for executives to sell banks and asset managers on plans for reckless overinvestment.**
- **Continue to update outdated rules across agencies and have the EPA take back authority to enforce federal statutes (i.e., Clean Water Act, Safe Drinking Water Act) from industry-captured state regulators** such as the Texas Railroad Commission.

¹³ While this is a relatively low retirement age, evidence suggests that older workers in carbon-intensive industries are less likely to transition into green jobs than younger workers ([Curtis, O’Kane, and Park 2023](#)).



- **As the oil and gas business is cyclical, instruct the Treasury Department and any other relevant federal agencies to develop detailed plans to put strings on federal aid the next time companies ask for bailouts.** Wherever possible, attach conditionalities to fossil fuel subsidies that require reauthorization ([Mazzucato and Rodrik 2023](#)).

Conclusion

A 21st-century energy system should not be premised on coaxing for-profit companies to provide critical goods and infrastructure to meet a poorly defined set of goals, despite having no legal obligation to do so. Continuing to leave it up to the industry to decide when and how it invests in our energy systems all but guarantees that the US will continue to produce amounts of oil and gas plainly out of step with the Biden administration's stated goal of limiting warming to 1.5 degrees Celsius.

Public ownership is a commonplace feature of energy systems the world over, particularly in major oil and gas-producing nations. The case for giving the public greater control over its most important resource would be clear even if the climate were not changing; fuel prices play an outsized role driving inflation, and reliance on them leaves the US economy vulnerable to fluctuations in commodity prices that it has very little ability to control. Fossil fuel executives, meanwhile, poison our communities and our politics—filling backyards and public lands with trash, polluting our air and water, and undermining democracy via uncapped political donations.

Any good-faith attempt at an energy transition demands a direct confrontation with one of this country's most powerful industries. Given the fossil fuel industry's expansive influence over politics at every level of government, the recommendations above are, conservatively speaking, massively ambitious. Still, the changes demanded here are orders of magnitude less dramatic than what could happen if the fossil fuel industry is allowed to continue unchecked.

From 1980 through 2022, the National Ocean and Atmospheric Administration's National Centers for Environmental Information (NCEI) found that the US was hit by an annual average of 7.9 weather and climate-related disasters costing more than \$1 billion. For the last five years of that study—from 2018 to 2022—the annual average was 17.9 such events ([Smith 2023](#)). Extreme weather events now cost the US roughly \$150 billion per year, according to the US National Climate Assessment ([Jay et al. 2023](#)). The Office of Management and Budget estimates that—absent concerted federal action—climate change could cost the US economy 10 percent of GDP per year by 2100, or \$2 trillion in today's terms ([Vahlsing and Yagan 2022](#)). It's also worth mentioning the extraordinary costs of fossil fuel use to public health: One 2018 study, published in



Environmental Research, found that fossil fuel–related pollution accounts for one in five premature deaths worldwide ([Vohra et al. 2021](#)).

Preventing the worst imaginable climate outcomes requires placing firm constraints on the fossil fuel industry to ensure that it does not make trillions of dollars in profits by exacerbating the climate crisis. But US oil and gas drillers are just one piece of a much larger global fossil fuel economy; Gulf Oil producers are also planning prodigious expansions in production. And in much of the world, coal continues to meet rising energy demand in the absence of realistic alternatives. What incentive is there for much smaller and poorer countries to transition away from fossil fuels if its richest economy is making no effort to do the same?

As the US navigates an already climate–changed world, it has the opportunity and the resources to provide an example for how a major oil and gas producer can decarbonize quickly and equitably. In striving toward that goal, it’s vitally important to not repeat the fossil fuel economy’s worst mistakes. The public deserves to share fully in the benefits of America’s energy future and to have a voice in where, how, and when it comes about. Only by creatively expanding the state’s role in this transition—managing strategic investments in green energy and careful, managed divestments from fossil fuels—can the US build an industrial policy fit for the 21st century.



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