

THE GAS HYDROGEN GAMBIT: NATURAL GAS FOLLY OR FUTURE CLIMATE POLICY?

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The Biden Administration appreciates the deleterious consequences associated with unregulated natural gas usage, while it seemingly shies away from pursuing progressive measures against the industry. But a 2050 future characterized by zero greenhouse gas (GHG) emissions demands that here in the United States and globally, we arrest methane emissions as swiftly as possible. Methane emissions, after all, over the next several decades are far more potent than emissions from coal. And yet, our news is populated with stories warning of increased methane emissions and corresponding initiatives to reduce or eliminate them. To be sure, in April 2023, the White House announced a methane finance sprint to curb emissions, joining a host of other programs targeting methane. It even acknowledged how reducing such emissions would “have an outsized impact on near-term warming.” Unfortunately, little about these existing initiatives afford sufficient comfort that natural gas will not simply replace coal as the fuel cabining our race to reach a 43% reduction in GHG emissions by 2030, the target of the 2015 Paris Agreement, or a net zero energy economy by 2035 or a zero-emission economy by 2050—targets of the Biden Administration.

This Essay probes the array of assumptions animating the Administration’s continued support for natural gas. It chronicles how we may be creeping toward another of what I term energy folly, championing a fuel ostensibly necessary today to support a reliable electric grid and spur the nascent yet emerging hydrogen economy. And it explores how natural gas proponents assume that several initiatives will diminish the climate change impacts from methane emissions, counseling against aggressive programs for reducing

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continued investment in natural gas infrastructure. But as this natural gas infrastructure continues to grow, possibly becoming a future-stranded asset or chilling our willingness to wean ourselves off natural gas, our existing regulatory system avoids any meaningful inquiry into the role of natural gas from now until 2030, 2035, or 2050.

To remedy this, I suggest we ought to engage in this inquiry by constructing appropriate institutional mechanisms capable of asking the right questions. State regulatory commissions, the Department of Energy, and the Federal Energy Regulatory Commission (FERC) ought to appreciate how their decisions today can solidify possibly problematic natural gas infrastructure long after immediate need for the natural gas has faded. To avert this scenario, they should be capable of scrutinizing whether any proposal involving natural gas is necessary not merely immediately or the following year, but five or more years later as well. Regional entities could be formed to aid the endeavor; those entities could be tasked with combining annual analyses by the Energy Information Administration with similar regional assessments and projections on the need for natural gas not just immediately but for the entire physical and economic life of the infrastructure. This ought to include requiring any proposal for new natural gas infrastructure to accept a decommissioning or transition plan. FERC, for instance, should demand from applicants an enforceable timeline for achieving zero emissions, whether through a commitment toward carbon capture, utilization, and sequestration (CCUS) or an agreement to transition away from natural gas and toward hydrogen, or otherwise agreeing to shutter the infrastructure.

Climate change is propelling us into a perilous future, and yet we continue to promote natural gas with unverified assumptions about how we can arrest methane emissions. Those assumptions may well prove our prescience. Natural gas may well provide a catalyst capable of transitioning our energy systems toward a much more dominant hydrogen-based economy. But a gambit with natural gas is risky. Our future, consequently, warrants being cautious and charging our institutions with the obligation to prevent natural gas from becoming the proverbial sword of Damocles, preventing our transition to a zero-carbon economy sooner rather than later.

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INTRODUCTION

The Obama Administration’s principal forays into arresting greenhouse gas (GHG) emissions appreciated the deleterious consequences associated with unregulated continued natural gas usage yet shied away from promoting overly aggressive measures against the industry. From both a political and cost-benefit calculation, the Administration’s initiatives to

instead focus on reducing oil and coal consumption seems reasonable. In 2008, after all, total GHG emissions were 7,052.6 MMTCO₂e, while methane emissions were 737.4 MMTCO₂e.¹ Transportation accounted for roughly 33% of U.S. energy-related carbon dioxide (CO₂) emissions by the end-use sector, and natural gas contributed about 21% of energy-related emissions from fossil fuels; for fuels, coal contributed 36.5%, and petroleum accounted for almost 42%.² The White House lawn ceremony announcing a compromise with the automobile industry, increasing the Corporate Average Fuel Economy standards, arguably signaled the first phase in the eventual decline of the combustion engine.³ Under the Obama Administration, thermal coal for power production began its precipitous decline—animated by a host of factors, including debilitating competition from natural gas.⁴ The market favored natural gas for both power production and home heating. The natural gas industry was not shielded from scrutiny, however. Fracking and earthquakes captivated aspects of the public consciousness—whether in films such as *Gasland* or in local and state legislatures animated by economics or environmental protection.⁵ As a far more potent GHG than coal in the short run, methane emissions admittedly surfaced as a concern, with the Administration developing a *Methane Plan* and promoting targeted policies to reduce emissions.⁶ But these seemingly marginal efforts merged with the subsequent Trump

1. See U.S. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, DOE/EIA-0573, EMISSIONS OF GREENHOUSE GASES IN THE UNITED STATES 2008, at 1 (2009). The Energy Information Administration (EIA) uses million metric tons of carbon per quadrillion British thermal units (Btu) to reach an equivalent value in kilograms of carbon per million Btu, when calculating emissions. And carbon is converted to carbon dioxide (CO₂) by multiplying it by a factor of 44/12 (weight ratio of CO₂ to carbon), and then it “use[s] the weight ratio of 2.20462 pounds per kilogram to convert each fuel’s emissions factor from kilograms per [million] British thermal units to pounds per British thermal units (Btu).” U.S. ENERGY INFO. ADMIN., ENVIRONMENT: METHODOLOGY, <https://www.eia.gov/environment/emissions/includes/methodology.php> (last visited Feb. 1, 2024).

2. U.S. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, DOE/EIA-0573, EMISSIONS OF GREENHOUSE GASES IN THE UNITED STATES 2008, at 2 (2009).

3. *Obama Unveils MPG Rule, Gets Broad Support*, MSNBC (May 18, 2009, 2:45 PM), <https://www.nbcnews.com/id/wbna30810514>. See generally ROBERT R. NORDHAUS & SAM KALEN, ENERGY FOLLIES: MISSTEPS, FIASCOS, AND SUCCESSES OF AMERICA’S ENERGY POLICY (2018).

4. See Sam Kalen, *A Bridge to Nowhere? Our Energy Transition and the Natural Gas Pipeline Wars*, 9 MICH. J. ENV'T & ADMIN. L. 319, 330 (2020).

5. See *Gasland* (HBO Documentary Films 2010).

6. See *infra* note 117 and accompanying text.

Administration's pro-natural gas bent to leave us where we are today—with a natural gas conundrum.

Stories about methane releases populate the news amid dialogues about natural gas usage that remain obscured by a myriad of voices. Methane enjoys the dubious distinction of being considerably more potent, albeit for a shorter period, than CO₂ emissions. The International Energy Association (IEA) calculates that methane is responsible for about 30% of global warming.⁷ Over a twenty-year period, methane reportedly is at least eighty times more potent than CO₂, with one journalist reporting how methane had been “ignored for decades,” yet “scientists now know that methane is much more potent than carbon dioxide as a greenhouse gas in the short term, even though it lingers for only a decade in the atmosphere before breaking down.”⁸ One study even posits that methane could be “four times more sensitive to global warming than previously thought” and may, “if left unchecked,” further global warming.⁹ In April 2023, reports surfaced that methane emissions might be 70% higher than the Environmental Protection Agency's (EPA's) estimates—at roughly 14.8 million tons rather than 8.7 million tons.¹⁰ Natural gas even surfaced during the 2023 G-7 discussions

7. GLOBAL METHANE TRACKER 2023, INT'L ENERGY AGENCY 25 (Feb. 2023), <https://www.iea.org/reports/global-methane-tracker-2023>. The Intergovernmental Panel on Climate Change's (IPCC's) 2023 synthesis report notes how, in 2019, methane concentrations “were higher than at any time in at least 800,000 years,” and because of its short-term potency “rapid and sustained reductions in methane emissions can limit near-term warming and improve air quality by reducing global surface ozone.” CLIMATE CHANGE 2023 SYNTHESIS REPORT, INT'L PANEL ON CLIMATE CHANGE 4, 95 (2023), https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_FullVolume.pdf.

8. Tim Cocks, *Explainer: Why Methane Emissions are Threatening Climate Stability*, REUTERS (Nov. 3, 2022), <https://www.reuters.com/business/cop/why-methane-emissions-are-threatening-climate-stability-2022-11-03/>.

9. Kate Ravilious, *Methane Much More Sensitive to Global Heating than Previously Thought-Study*, GUARDIAN (July 5, 2022), <https://www.theguardian.com/environment/2022/jul/05/global-heating-causes-methane-growth-four-times-faster-than-thought-study> (summarizing Chin-Hsien Cheng & Simon A.T. Redfern, Impact of Interannual and Multidecadal Trends on Methane-Climate Feedbacks and Sensitivity, Nature Communication).

10. See Shelby Webb, *U.S. Methane Emissions 70% Higher than EPA Estimates-Study*, E&E NEWS: ENERGYWIRE (Apr. 18, 2023, 6:59 AM), <https://subscriber.politicopro.com/article/eenews/2023/04/18/u-s-methane-emissions-70-higher-than-epa-estimates-study-00092366>. Notably, recent studies provide an important caveat that methane intensity (amount of releases related to amount of production) has declined. *Id.*; see Xiao Lu, Daniel J. Jacob, Yuzhong Zhang, Lu Shen, Melissa P. Sulprizio, Joannes D. Maasackers, et al., *Observation-Derived 2010–2019 Trends in Methane Emissions and Intensities from US Oil and Gas Fields Tied to Activity Metrics*, 120 PNAS 17, Apr. 17, 2023, at 1, 5. The United States is credited with

with nations exploring language about the fuel's future.¹¹

Not surprisingly, therefore, reducing or eliminating methane releases warrants urgent attention. The United Nations reports that arresting methane emissions is an efficacious tool for attacking climate change.¹² Both the Obama and Biden Administrations crafted methane plans, while Congress, through the Inflation Reduction Act (IRA), ushered in its own methane response program.¹³ For instance, the IRA added a provision to § 136 of the Clean Air Act (CAA) for monitoring and reporting; it

having decreased flaring, a natural gas refining process that produces methane, by 9% between 2021 and 2022. See Carlos Anchondo, *U.S. Gas Flaring Plunges, Report Says*, E&E NEWS (Apr. 18, 2023, 7:01 AM), <https://subscriber.politicopro.com/article/eenews/2023/04/18/u-s-gas-flaring-plunges-report-says-00091208> (discussing *Global Gas Flaring Tracker Report*, THE WORLD BANK (Mar. 2023), <https://thedocs.worldbank.org/en/doc/5d5c5e8b0f451b472e858ceb97624a18-0400072023/original/2023-Global-Gas-Flaring-Tracker-Report.pdf>). Earlier reports similarly suggested that methane releases were being undercalculated. E.g., Ester Wells, *EPA 'Grossly' Underestimating Oil Methane Emissions—Study*, E&E NEWS (July 1, 2021, 7:18 AM), <https://subscriber.politicopro.com/article/eenews/2021/07/01/epa-grossly-underestimating-oil-methane-emissions-study-000118>.

11. See Brian Dabbs, *G-7 Meeting Set to Shape Future of Natural Gas*, E&E NEWS (Apr. 14, 2023, 6:50 AM), <https://www.eenews.net/articles/g-7-meeting-set-to-shape-future-of-natural-gas/>. The EU has been debating measures to reduce natural gas dependence. See Dave Keating, *Ooops, They Did it Again? After ICE Controversy, Now EU's Gas Boiler Ban May be Killed*, ENERGY MONITOR (June 8, 2023), <https://www.energymonitor.ai/sectors/heating-cooling/oops-they-did-it-again-after-ice-controversy-now-eus-gas-boiler-ban-may-be-killed/>. Germany, in particular, has sought to ban oil and gas heating in new home construction, only to trigger objections. See, e.g., Sören Amelang, *Germany's Proposed De Facto Ban on New Fossil Boilers from 2024 Meets Fierce Resistance*, ENERGYPOST.EU (June 2, 2023), <https://energypost.eu/germanys-proposed-de-facto-ban-on-new-fossil-boilers-from-2024-meets-fierce-resistance/>; Petra Sorge, *Germany to Ban Oil and Gas Heating for New Houses From Next Year*, BLOOMBERG (Feb. 22, 2023, 12:31 PM), <https://www.bloomberg.com/news/articles/2023-02-22/germany-to-ban-oil-and-gas-heating-for-new-houses-from-next-year>; Riham Alkousaa & Markus Wacket, *German Cabinet Approves Bill to Phase Out Oil and Gas Heating Systems*, REUTERS (Apr. 19, 2023, 8:15 AM), <https://www.reuters.com/business/energy/german-cabinet-approves-bill-phase-out-oil-gas-heating-systems-2023-04-19/>.

12. See U.N. ENVIRONMENT PROGRAMME, *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions*, (May 6, 2021), <https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions>; U.N. ENVIRONMENT PROGRAMME, *Global Methane Assessment 2030: Baseline Report* (Nov. 4, 2022), <https://www.unep.org/resources/report/global-methane-assessment-2030-baseline-report>; see also *Cut Methane Emissions to Avert Global Temperature Rise, UN-Backed Study Urges*, U.N. NEWS (May 6, 2021), <https://news.un.org/en/story/2021/05/1091402>.

13. Inflation Reduction Act, Pub. L. No. 117-169, 136 Stat. 1818, sec. 60113 (2022).

appropriated \$850 million dollars through 2028 toward methane mitigation; it allocated considerable sums toward waste from marginally producing wells; and it adopted a methane release charge program.¹⁴ The Biden Administration is so serious about tackling the problem that it is now employing a cabinet-level federal task force dedicated to searching out methane release offenders.¹⁵ But since the IRA, the cacophony of issues surrounding natural gas usage and methane releases continue to flourish.¹⁶

14. See Greg Dotson & Dustin J. Maghamfar, *The Clean Air Act Amendments of 2022: Clean Air, Climate Change, and the Inflation Reduction Act*, 53 ENV'T L. REP. 10,017, 10,021 (2023) (describing methane reduction programs). The methane charge has since come under scrutiny. See Samantha Handler, *Methane Emissions 'Tax' Draws Scrutiny on EPA's Collection Role*, BL (Mar. 14, 2023, 5:00 AM), <https://news.bloombergtax.com/daily-tax-report/methane-emissions-tax-draws-scrutiny-on-epas-collection-role>; Nico Portuondo, *Why Republicans Want to Kill the Compromise Methane Fee*, E&E NEWS (Mar. 3, 2023, 6:21 AM), <https://www.eenews.net/articles/why-republicans-want-to-kill-the-compromise-methane-fee/>. For a discussion of the methane charge, see JONATHAN L. RAMSEUR, CONG. RSCH. SERV., R47206, INFLATION REDUCTION ACT METHANE EMISSIONS CHARGE: IN BRIEF 1 (2022).

15. See Robin Bravender, *Biden Deploys Cabinet-Level Team to Hunt Methane Leaks*, E&E NEWS (July 26, 2023, 1:17 PM), <https://subscriber.politicopro.com/article/eenews/2023/07/26/biden-deploys-cabinet-level-team-to-hunt-methane-leaks-00108283>; WHITE HOUSE, FACT SHEET: BIDEN-HARRIS ADMINISTRATION HOSTS WHITE HOUSE METHANE SUMMIT TO TACKLE DANGEROUS CLIMATE POLLUTION, WHILE CREATING GOOD-PAYING JOBS AND PROTECTING COMMUNITY HEALTH (2023).

16. See Isabella O'Malley, *Methane Big Part of 'Alarming' Rise in Planet-Warming Gases*, AP NEWS (Apr. 6, 2023, 12:37 PM), <https://apnews.com/article/methane-emissions-climate-change-noaa-fe5f29a93e5407f1f80d383eb829b41e>; Associated Press, *Methane from Gulf Oil Production Undercounted-Study*, E&E NEWS (Apr. 4, 2023, 6:18 AM), <https://subscriber.politicopro.com/article/eenews/2023/04/04/methane-from-gulf-oil-production-undercounted-study-00090222>; Jennifer Hijazi, *Methane Response Program 'Foreshadows' Hyper-Local Monitoring*, BL (Mar. 10, 2023, 5:00 AM), <https://news.bloomberglaw.com/environment-and-energy/methane-response-program-foreshadows-hyper-local-monitoring>; see also Bloomberg Law Automation, *US Allocates Millions for Methane Emission Reduction Projects*, BL (Mar. 13, 2023, 2:51 PM), <https://www.bloomberglaw.com/product/blaw/bloombergtterminalnews/bloombergtterminal-news/RRH32JDWX2PS>. For stories prior to the Inflation Reduction Act (IRA), see, for example, Carlos Anchondo, *Report Documents 30 Permian Methane 'Super-Emitters'*, E&E NEWS (Jan. 24, 2022, 7:21 AM), <https://subscriber.politicopro.com/article/eenews/2022/01/24/report-documents-30-permian-methane-super-emitters-ee-285468>; Carlos Anchondo & Mike Soraghan, *Permian Pipelines Leak More Methane than EPA Estimates-Study*, E&E NEWS (Oct. 5, 2022, 7:19 AM), <https://subscriber.politicopro.com/article/eenews/2022/10/05/permian-pipelines-leak-more-methane-than-epa-estimates-study-00060251>; Rob Hotakainen, *Methane Emissions Rose to New High in 2021-NOAA*, E&E NEWS (Apr. 7, 2022, 1:38 PM), <https://subscriber.politicopro.com/article/eenews/2022/04/07/methane-emissions-rose-to-new-high-in-2021-noaa-00023779>; Heather Richards, *Permian Basin Flaring hits 'All Time*

For public lands, the Bureau of Land Management (BLM) has once again announced plans for addressing methane waste (leakage, venting & flaring).¹⁷ The EPA similarly has re-entered the fray with updated CAA New Source Performance Standards (NSPSs) for the oil and gas pipeline industry.¹⁸

Acting pursuant to the 2020 Pipes Act, the Pipeline and Hazardous Materials Safety Administration (PHMSA) joined the club by proposing new regulations targeting methane releases as well.¹⁹ And even in Europe, when the Nord Stream 1 and 2 pipelines exploded, it produced one of the largest recorded methane leaks,²⁰ as the EU Energy Chief encouraged countries to limit methane releases.²¹

High, E&E NEWS, (Nov. 6, 2019, 7:19 AM), <https://subscriber.politicopro.com/article/eenews/2019/11/06/perman-basin-flaring-hits-all-time-high-022575>; Nicole Sadek, Zoha Tunio & Sarah Hunt, *Oil and Gas Companies 'Flare' or 'Vent' Excess Natural Gas. It's like Burning Money—And It's Bad for the Environment*, INSIDE CLIMATE NEWS (Feb. 25, 2022), <https://insideclimatenews.org/news/25022022/flaring-venting-natural-gas-economics/>; Mike Soraghan, *Unregulated Pipelines May be Biggest Methane Emitters* E&E NEWS (Jan. 13, 2022, 7:24 AM), <https://subscriber.politicopro.com/article/eenews/2022/01/13/unregulated-pipelines-may-be-biggest-methane-emitters-285130>.

17. Waste Prevention, Production Subject to Royalties, and Resource Conservation, 87 Fed. Reg. 73,588, 73,588 (Nov. 30, 2022) (to be codified at 43 C.F.R. pts. 3160, 3170). See generally Heather Richards, *Interior Methane Rules Could Revive Public Lands Fight*, E&E NEWS (Nov. 29, 2022, 6:30 AM), <https://subscriber.politicopro.com/article/eenews/2022/11/29/proposed-blm-methane-rules-could-revive-public-lands-fight-00071037>; Heather Richards, *Greens Urge Public Hearing on New BLM Methane Rule*, E&E NEWS (Jan. 13, 2023, 1:22 PM), <https://subscriber.politicopro.com/article/eenews/2023/01/13/greens-urge-public-hearing-on-new-blm-methane-rule-00077893>. Governmental entities lose about \$64 million in revenue from methane leakage on public lands. See Heather Richards, *Methane Leaks on Public Land Worth \$500M a Year, Report Says*, E&E NEWS (Jan. 26, 2023, 1:58 PM), <https://subscriber.politicopro.com/article/eenews/2023/01/26/methane-leaks-on-public-land-worth-500m-a-year-report-says-00079644>.

18. See *infra* note 123 and accompanying text.

19. See *infra* note 116 and accompanying text. Pipeline and Hazardous Materials Safety Administration (PHMSA) closed the significant regulatory loophole that excluded gathering lines from regulation. See Mike Soraghan, *Unregulated Pipelines May be Biggest Methane Emitters*, E&E NEWS (Jan. 13, 2022, 7:24 AM), <https://subscriber.politicopro.com/article/eenews/2022/01/13/unregulated-pipelines-may-be-biggest-methane-emitters-285130>.

20. See Meg Kelly, Ellen Francis & Michael Birbaum, *Nord Stream Spill Could Be Biggest Methane Leak Ever But Not Catastrophic*, WASH. POST (Sept. 29, 2022, 12:06 PM), <https://www.washingtonpost.com/world/2022/09/29/nord-stream-gas-leak-methane-russia/>.

21. See John Ainger, *EU Energy Chief Warns Countries on Scaling Back Methane Rules*, BLOOMBERG (Mar. 2, 2023, 9:21 AM), <https://www.bloomberg.com/news/articles/2023-03-02/eu-energy-chief-warns-countries-on-scaling-back-methane-rules#xj4y7vzkg>.

Can the nation endure policies favoring natural gas if the country is committed to a net zero energy economy by 2050? Natural gas and its associated infrastructure, after all, support home heating,²² home cooking,²³ transportation,²⁴ industrial uses,²⁵ and, finally, electric energy production.²⁶ Indeed, in 2022, the electric power sector used 38% of the consumed natural gas, while industrial use accounted for 32% percent, residential use was 15%, and the commercial and transportation sectors rounded out at 11% and 4%, respectively.²⁷ In 2022, the Energy Information Administration's (EIA's) annual outlook warned that population growth and increased energy demand, absent significant policy changes, would likely require continued reliance on fossil fuels for at least another twenty-five years.²⁸ Even before discussions about replacing lost Russian gas

22. See *Natural Gas Explained: Use of Natural Gas*, U.S. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, <https://www.eia.gov/energyexplained/natural-gas/use-of-natural-gas.php> (Apr. 28, 2023) [hereinafter U.S. EIA, *Natural Gas Explained*] (explaining that most natural gas is used in electric generation and home heating).

23. See Jeremy Dillon, *Energy Bill's Gas Stove Amendment Gets Bipartisan Support*, E&E NEWS (Mar. 30, 2023, 6:20 AM), <https://subscriber.politicopro.com/article/eenews/2023/03/30/energy-bills-gas-stove-amendment-gets-bipartisan-support-00089582>.

24. See U.S. EIA, *Natural Gas Explained*, *supra* note 22.

25. See *Industrial Uses of Natural Gas*, NAT. GAS SUPPLY ASS'N, <https://www.ngsa.org/industrial-uses-of-natural-gas/> (last visited Feb. 1, 2024).

26. See U.S. EIA, *Natural Gas Explained*, *supra* note 22.

27. *Id.*

28. U.S. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2022: WITH PROJECTIONS TO 2050, at 1, 8 (2022); see also Kristi E. Swartz, *Feds: Fossil Fuels Still Dominant in 2050*, E&E NEWS (Mar. 4, 2022, 7:16 AM), <https://subscriber.politicopro.com/article/eenews/2022/03/04/eia-fossil-fuels-still-dominant-in-2050-00013820>. The report prompted one observer to note that, "while economy-wide CO₂ emissions decrease from 2022 to 2037 due primarily to the growth in renewable energy replacing retiring coal plants," EIA projects that "emissions *do* increase after 2037 from increased usage of natural gas . . . in total opposition to the US commitment under the Paris Agreement to achieve a [50 to 52%] emissions reduction below 2005 levels by 2030, and net-zero by 2050." Sandra Sattler, *The EIA Just Released a 30 Year Energy Outlook. It's . . . Not Great*, THE EQUATION (Mar. 16, 2022, 4:20 PM), <https://blog.ucsusa.org/sandra-sattler/eia-energy-outlook-2022/>. These projections, however, predated the IRA. The 2023 outlook describes the projected increase in shifting electric energy production toward renewables, with domestic natural gas consumption likely decreasing through 2050 (albeit not dramatically) but notes how international demand for petroleum products and natural gas will likely support continued production (for export). U.S. ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2023: AEO2023 NARRATIVE, at 5–6, 9 (2023) [hereinafter ANNUAL ENERGY OUTLOOK 2023].

occasioned by the war in Ukraine, energy experts anticipated how natural gas would be necessary possibly beyond 2050 and that the United States ought to continue exporting the fuel to our allies.²⁹ The United States, after all, could not easily object to Russia's Nord Stream 2 pipeline while chilling our interest in exporting liquified natural gas (LNG) and strengthening Europe's energy security.³⁰ President Biden offered some hope for international energy security when he announced support for expanded LNG exports.³¹ The Administration's announced goal at that time was to expand annual LNG exports to Europe to fifty billion cubic meters by 2030.³² EIA expects a 14% increase in exports in 2023 from

29. See Mike Lee, *Moniz, Brouillette: Natural Gas is Here to Stay*, E&E NEWS (June 24, 2021, 7:29 AM), <https://subscriber.politicopro.com/article/eenews/2021/06/24/moniz-brouillette-natural-gas-is-here-to-stay-000352>. In 2021, the International Energy Agency (IEA) projected that natural gas usage would increase and the worldwide effort to reduce greenhouse gas (GHG) emissions by 2050 would mean changes in the life cycle for natural gas. See Mike Soraghan, *Natural Gas Surge May Scuttle IEA Net-Zero Plan*, E&E NEWS (July 6, 2021, 6:55 AM), <https://subscriber.politicopro.com/article/eenews/2021/07/06/natural-gas-surge-may-scuttle-iea-net-zero-plan-179712>. By the summer of 2023, however, natural gas demand began stabilizing. See Mike Soraghan, *IEA: Global Natural Gas Demand Stable-For Now*, E&E NEWS (July 18, 2023, 7:33 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/18/iea-global-natural-gas-demand-stable-for-now-00106660>.

30. See Frank Jordans, *Merkel Doubts Biden Meeting Will Solve Gas Pipeline Dispute*, YAHOO NEWS (July 12, 2021), <https://news.yahoo.com/merkel-doubts-biden-meeting-solve-183711247.html>; Curtis Williams, *US October LNG Exports Climb to Second Highest Level on Record*, REUTERS (Nov. 1, 2023, 12:52 PM), <https://www.reuters.com/business/energy/us-october-lng-exports-climb-second-highest-level-record-2023-11-01/>.

31. Sara Schonhardt & Scott Waldman, *Biden Increases LNG Exports as Europe Faces Energy Crisis*, E&E NEWS (Mar. 25, 2022, 7:25 AM), <https://www.eenews.net/articles/biden-increases-lng-exports-as-europe-faces-energy-crisis/>. Liquified natural gas (LNG) exports in 2022 exceeded that from prior years. See Miranda Willson, *LNG is Surging. Can FERC Reviews Keep Up?*, E&E NEWS (May 11, 2023, 7:03 AM), <https://www.eenews.net/articles/lng-is-surging-can-ferc-reviews-keep-up/>. Not surprisingly, the Administration supported a large LNG terminal in Alaska. Carlos Anchondo, *Biden Admin Backs Contested Alaska LNG Project*, E&E NEWS (Oct. 25, 2022, 6:53 AM), <https://www.eenews.net/articles/biden-admin-backs-contested-alaska-lng-project/>.

32. See Mike Soraghan & Carlos Anchondo, *Biden's LNG Deal with Europe Jolts Gas Critics*, E&E NEWS (Mar. 28, 2022, 7:05 AM), <https://www.eenews.net/articles/bidens-lng-deal-with-europe-jolts-gas-critics/> (describing announcement). The European Commission also is exploring mechanisms for joint gas and hydrogen purchases to avert price competition among the bloc. See John Ainger, *Europe Wants Permanent Gas Buyers Club for Post-Russia Strategy*, BLOOMBERG L. (July 17, 2023, 5:53 AM), <https://news.bloomberglaw.com/environment-and-energy/europe-wants-permanent-gas-buyers-club-for-post-russia-strategy>.

2022 levels, and the Department of Energy (DOE) appears poised to facilitate further LNG development that arguably has a smaller emissions impact.³³ And while the Biden Administration has shepherded gigantic gains in responding to climate change, and the President warned in a September 2023 U.N. speech of the “existential threat” confronting us,³⁴ the Administration also has weathered criticisms for its continued willingness to support some domestic fossil fuel development.³⁵

The Mountain Valley Pipeline (MVP) project demonstrates the inertia propelling our continued investment in natural gas. The MVP project is a 300-plus mile natural gas pipeline that crosses West Virginia and Virginia and passes through at least 300 waterbodies; it required some form of approval from five federal agencies and was mired in litigation at almost every jurisdictional juncture.³⁶ When Congress, as part of a complicated compromise orchestrated by Senator Joe Manchin, blessed MVP,³⁷ the

33. See Brian Dabbs, *DOE Urged to Halt Plans on Climate-Friendly Gas*, E&E NEWS (July 19, 2023, 6:56 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/19/doe-urged-to-halt-plans-on-climate-friendly-gas-00106952> (noting environmental concerns).

34. Robin Bravender, *Biden Warns ‘What Awaits Us’ Without Climate Action*, E&E NEWS (Sept. 19, 2023, 1:09 PM), <https://www.eenews.net/articles/biden-warns-what-awaits-us-without-climate-action/>.

35. Max Bearak, *It’s Not Just Willow: Oil and Gas Projects Are Back in a Big Way*, N.Y. TIMES, (Apr. 6, 2023), <https://www.nytimes.com/2023/04/06/climate/oil-gas-drilling-investment-worldwide-willow.html>. See *infra* note 201.

36. See *Sierra Club v. W. Va. Dep’t of Env’t Prot.*, 64 F.4th 487, 493–94 (4th Cir. 2023) (summarizing previous litigation related to the Mountain Valley Pipeline (MVP) project); see also *Appalachian Voices v. U.S. Dep’t of Interior*, 25 F.4th 259, 263–66 (4th Cir. 2022) (challenging U.S. Fish and Wildlife Services’ Biological Opinion and Incidental Take Statement); *Wild Va. v. U.S. Forest Serv.*, 24 F.4th 915, 920–22 (4th Cir. 2022) (seeking review of decision by the U.S. Forest Service and the Bureau of Land Management (BLM)); *Order Granting Stay*, *Wild Va. v. U.S. Dep’t of Interior*, No. 19-01866 (4th Cir. Oct. 11, 2019); *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199, at *1 (D.C. Cir. Feb. 19, 2019) (challenging the Federal Energy Regulatory Commission’s (FERC’s) determination); *Sierra Club v. U.S. Army Corps of Eng’rs*, 909 F.3d 635, 639–40 (4th Cir. 2018) (requesting that the court set aside a determination by the U.S. Army Corps of Engineers’ in regards to the MVP); *Sierra Club v. U.S. Army Corps of Eng’rs*, 905 F.3d 285 (4th Cir. 2018) (mem.); *Sierra Club v. U.S. Forest Serv.*, 897 F.3d 582, 587–88 (4th Cir. 2018) (indicating that “[m]ultiple agencies may cooperate to issue an [Environmental Impact Statement]”).

37. Fiscal Responsibility Act of 2023, Pub. L. No. 118-5, 137 Stat. 10, 47, § 324, June 3, 2023 (Expediting completion of the MVP); Jarod Facundo, *Manchin’s Pipeline Payoff Strangles Future Permitting Reform Negotiations*, AM. PROSPECT (June 2, 2023), <https://prospect.org/economy/2023-06-02-manchin-pipeline-payoff-future-permitting-reform/>.

pipeline already was about 94% constructed.³⁸ Even after President Biden signed the bill into law and almost assured the pipeline's future, protesters continued their opposition, with one member of Congress voicing concerns that the project "should've never been part of the debt crisis deal."³⁹ Litigation efforts nevertheless persisted, with the Biden Administration supporting the argument that the congressional compromise had precluded any further challenges to the sufficiency of the environmental review accompanying the original proposal.⁴⁰ Perhaps the ultimate irony is that MVP may not be able to operate at even 50% of its capacity once built due to downstream constraints.⁴¹

MVP's success reflects an initial salvo by the industry, with signs that Senator Manchin's victory may foster additional legislative discussions surrounding streamlining natural gas pipeline infrastructure.⁴²

This Essay probes such a favorable bias toward natural gas. Part I briefly explores the regulatory landscape confronting natural gas infrastructure. Here, I focus on interstate natural gas pipelines and their regulation by the Federal Energy Regulatory Commission (FERC), along with the role of the DOE in approving exports of LNG. This transitions into a discussion in Part II of why natural gas continues to capture supporters, including the Biden Administration. The Essay chronicles how natural gas is portrayed as essential for stabilizing the electric grid, furnishing winter heating, as well as, even more importantly, supporting hydrogen—a potentially transformative fuel. It further explains why natural gas proponents suggest that climate change impacts from methane emissions will be diminished by an array of initiatives, counseling against

38. *Sierra Club v. FERC*, 68 F.4th 630, 642–43 (D.C. Cir. 2023).

39. Carlos Anchondo, *Pipeline Protesters Rip Biden as Political Gap Widens*, E&E NEWS (June 9, 2023, 7:15 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/09/pipeline-protesters-rip-biden-as-political-gap-widens-00101107>.

40. Federal Respondents' Response in Support of Emergency Application to Vacate Stays of Agency Authorizations Pending Review at 16, 26, *Mountain Valley Pipeline, LLC v. The Wilderness Soc'y*, No. 23A35 (S. Ct. July 2023). Congress expressly ratified and approved the orders for the pipeline and removed the possibility of judicial review.

41. See Carlos Anchondo, *Mountain Valley Pipeline Will Run Far Below Capacity—Analysis*, E&E NEWS (June 22, 2023, 7:39 AM), <https://subscriber.politicopro.com/eenews> (search "Mountain Valley Pipeline Will Run Far Below Capacity" in search bar) (claiming MVP will likely only operate at 35% capacity).

42. Daniel Moore, *Equitrans CEO Sees Pipeline Quantum Leap With More Permit Reform*, BLOOMBERG L. (June 6, 2023, 6:32 PM), https://www.bloomberglaw.com/bloomberglawnews/environment-and-energy/X43KEE34000000?bna_news-filter=environment-and-energy#jcite.

aggressive programs for reducing continued investment in natural gas infrastructure. But whether this makes sense is discussed in Part III, where I consider the assumptions surrounding those initiatives and the sufficiency of existing programs for adequately testing the existing and future role of natural gas and its accompanying infrastructure. Then, the conclusion offers some observations about what ought to be done. To avoid the likelihood of an expanded and entrenched natural gas infrastructure that becomes a stranded asset or unnecessarily favors natural gas beyond its time, I suggest that our regulatory system for approving new natural gas infrastructure should examine rather than shy away from asking the difficult questions.

I. THE REGULATORY LANDSCAPE

Today's natural gas industry confronts a multi-faceted regulatory process. Regulating the production of natural gas naturally varies by jurisdiction and land ownership and naturally must comply with relevant state and federal environmental controls as well as appropriate land use measures or plans. But once natural gas is extracted from underground plays and en route to some end-user, state public utility commissions, the FERC,⁴³ the EPA,⁴⁴ and the PHMSA⁴⁵ all might have some role in whether, where, or how that gas might be transported or used. Natural gas transportation might foster land use disputes surrounding access to land for easements or right-of-way.⁴⁶ And state or local municipalities might add their voice as well, possibly mirroring Berkely's attempted banning of its use in certain new buildings.⁴⁷

43. See *infra* notes 147–190 and accompanying text.

44. See *infra* notes 115–126 and accompanying text.

45. See *infra* notes 140–142 and accompanying text.

46. See *Bohon v. FERC*, 37 F.4th 663 (D.C. Cir. 2022) (regarding a landowner complaint, but exclusive jurisdiction for the Natural Gas Act (NGA) review in appellate court, not district court), *vacated by* 143 S. Ct. 1779 (2023). Environmental justice concerns are particularly acute for the routing of pipelines. See Carlos Anchondo, *Study Documents Pipeline, Environmental Justice Link*, E&E NEWS (June 30, 2021, 7:14 AM). See generally Heidi Gorovitz Robertson, *Cities and Citizens Seethe: A Case Study of Local Efforts to Influence Natural Gas Pipeline Routing Decisions*, 122 W. VA. L. REV. 881 (2020) (noting barriers to local influence over routing decisions, and particularly with respect to the Nexus-Spectra natural gas pipeline).

47. See *Cal. Rest. Ass'n v. City of Berkeley*, 65 F.4th 1045 (9th Cir. 2023) (invalidating the City's ban); see, e.g., Angel Adegbesan, *California Moves to Ban Natural Gas Furnaces and Heaters by 2030*, BLOOMBERG L. (Sept. 22, 2022, 7:51 PM), <https://www.bloomberg.com/news/articles/2022-09-22/california-moves-to-ban-natural-gas-furnaces-and-heaters-by-2030>. The California restaurant industry argued that a natural gas ban effectively prevented

A proposal for an interstate natural gas pipeline must demonstrate to FERC that the line serves the public interest, warranting a Certificate of Public Convenience and Necessity (a § 7 Certificate).⁴⁸ The Commission accepts preconstruction contract commitments (precedent agreements) when shippers commit to use a set percentage of the pipeline's capacity, demonstrating a market need for the natural gas.⁴⁹

their members' use of natural gas appliances—and that the Energy Policy and Conservation Act preempted the ban. See Maya Earls, *City of Berkeley to Defend New Natural Gas Ban in Ninth Circuit*, BLOOMBERG L. (May 11, 2022, 4:45 AM), https://www.bloomberglaw.com/bloomberglawnews/litigation/XE7G5K0000000?bna_news-filter=litigation#jcite. The Biden Administration disagreed and unsuccessfully argued that Berkeley was not prevented by the Energy Policy and Conservation Act, 42 U.S.C. § 6297(c). See David Iaconangelo, *Biden Admin Urges Court to Uphold First U.S. City Gas Ban*, E&E NEWS (June 13, 2023, 7:22 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/13/biden-admin-throws-weight-behind-berkeley-in-gas-ban-case-00101572> (noting that Administration filed an amicus brief on rehearing supporting the city). Washington State has begun a similar effort to replace natural gas heating in new residences and commercial buildings with heat-pumps. See David Iaconangelo, *Landmark Washington Gas Ban Survives Legal Challenge*, E&E NEWS (Aug. 8, 2023, 6:43 AM); see also Alexander Nieves, *Southern Calif. Air Regulator Approves First-in-the Nation Gas Oven Ban*, E&E NEWS (Aug. 7, 2023, 6:37 AM), <https://subscriber.politicopro.com/article/eenews/2023/08/07/southern-calif-air-regulator-approves-first-in-the-nation-gas-oven-ban-ee-00109940> (discussing regulations that would phase out large natural gas ovens by 2036); David Iaconangelo, *"More Are Sure to Come.": States Fret Over Gas Ban Lawsuits*, E&E NEWS (June 16, 2023, 6:50 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/16/more-are-sure-to-come-states-fret-over-gas-ban-lawsuits-00101936> (noting how several entities weighed in on Berkeley's ban fearing repercussions elsewhere). The Environmental Protection Agency (EPA) received a petition requesting that it ban sales of fossil fuel furnaces and hot water heaters, see David Iaconangelo, *Gas Ban Battle Heats Up with EPA Petition*, E&E NEWS (Aug. 25, 2022, 7:01 AM), <https://subscriber.politicopro.com/article/eenews/2022/08/25/gas-ban-battle-heats-up-with-epa-petition-00053513>, and when noises about possible bans against gas stoves surfaced a fire quickly erupted and chilled any such possibility. See Maxine Joselow, *How the Humble Gas Stove Became the Latest Flash Point in the Culture Wars*, WASH. POST (Jan. 11, 2023, 2:26 PM), <https://www.washingtonpost.com/climate-environment/2023/01/11/gas-stoves-fossil-fuels-climate/>.

48. 15 U.S.C. § 717f(e).

49. See *Appalachian Voices v. FERC*, No. 17-1271, 2019 WL 847199, at *1 (D.C. Cir., Feb. 19, 2019) (allowing a precedent agreement with an affiliated entity); *Sierra Club v. FERC*, 867 F.3d 1357, 1379 (D.C. Cir. 2017). Precedent agreements are preliminary and later become, when consummated, Firm Transportation Service Agreements. FERC, however, may object to some terms in a precedent agreement before approval. See *Mountain Valley Pipeline, LLC*, 161 FERC ¶ 61,043, at paras. 97–106 (2017); *Columbia Gas Transmission Corp.*, 97 FERC ¶ 61,221 (2001) (discussing non-conforming provisions).

If a pipeline serves the public convenience and necessity, the Natural Gas Act (NGA) directs the Commission to issue a certificate—possibly with conditions.⁵⁰ These commitments generally occur during what is called an open season, when the pipeline advertises its project and solicits from prospective shippers a commitment to use a percentage of the pipeline’s capacity. Once shippers commit to enough capacity, companies typically apply for a blanket certificate.⁵¹ This happens after the company has engaged in pre-filing outreach with the appropriate permitting authorities and, hopefully, all interested stakeholders.⁵² A general certificate condition requires documented receipt of all applicable federal environmental authorizations before proceeding with construction.⁵³ Once the Commission issues a § 7 Certificate, § 7(h) entitles the certificate holder to acquire the necessary property interests for construction of approved facilities, including eminent domain authority.⁵⁴

The regulatory authority over exports and imports of natural gas is shared between FERC and the Secretary of Energy. Section 3 of the original NGA delegated authority over both imports and exports of natural gas, or correspondingly LNG, to the FPC.⁵⁵ Congress instructed the Commission to allow an import or export “unless, after opportunity for

50. FERC seemingly treats its obligation as mandatory once it determines that a project serves the public convenience and necessity, although courts suggest the “Commission *may* issue a certificate” if it so finds. *E.g.*, *Myersville Citizens for a Rural Cmty. v. FERC*, 783 F.3d 1301, 1307 (D.C. Cir. 2015) (emphasis added).

51. 18 C.F.R. § 157.204 (2022).

52. *See* Robert Christin, Paul Korman & Michael Pincus, *Considering the Public Convenience and Necessity in Pipeline Certificate Cases Under the Natural Gas Act*, 38 ENERGY L.J. 115, 131 (2017).

53. *E.g.*, *Spire STL Pipeline L.L.C.*, 164 FERC ¶ 61,085 at 5 (2018) (requiring written authorization from Director before construction).

54. A pipeline company may file in federal or state court. 15 U.S.C. § 717f(h). Congress added this provision in 1947. Pub. L. No. 80-245, 61 Stat. 459 (1947). It addressed the problem in states where pipelines were prevented from using state condemnation authority. *Amendments to the Natural Gas Act: Hearings on S. 734 and S.1028 Before a Subcomm. of the Comm. on Interstate & Foreign Com.*, 80th Cong., 1st Sess. 4, 11 (1947). “Courts now generally agree that condemnation proceedings under the NGA should follow Rule 71.1.” *Panhandle E. Pipeline Co. v. Tarralbo*, 2023 WL 3575622 (W.D. Ok. May 19, 2023) (quoting *Transcon. Gas Pipe Line Co. v. Permanent Easements for 2.14 Acres*, 907 F.3d 725, 728–29 (3d Cir. 2018)). Judges generally apply a preliminary injunction standard when assessing whether a pipeline can gain immediate access to a property before a court awards compensation. *E.g.*, *N. Nat. Gas Co. v. Easement*, 2023 WL 4936163 (D. Minn. Aug. 2, 2023) (granting immediate access).

55. 15 U.S.C. § 717(b) (2018), Pub. L. No. 688, 52 Stat. 821, 822 (1938).

hearing, it finds that the proposed exportation or importation will not be consistent with the public interest.”⁵⁶ When Congress passed the Department of Energy Organization Act of 1977 and established FERC (replacing the FPC), it transferred § 3 authority to the newly established Secretary of Energy, “unless the Secretary assigns such a function to the Commission.”⁵⁷ More recently, Congress ensured that FERC would exercise exclusive jurisdiction over the siting, construction, and expansion, as well as the operation, of LNG export and import facilities, and Congress incorporated specific provisions designed to streamline the permitting and environmental review process for LNG facilities.⁵⁸ Congress further instructed the Commission to adopt regulations for complying with the National Environmental Policy Act (NEPA) and to ensure that interested stakeholders would be involved in a pre-filing process for any proposed LNG facility.⁵⁹ The Commission complied by adopting rules encouraging natural gas infrastructure, including LNG terminals.⁶⁰

II. THE BIDEN ADMINISTRATION’S TIGHTROPE

Natural gas poses challenges for reaching a net zero energy economy by 2035 and a corresponding zero emission economy by 2050.⁶¹ New interstate

56. *Id.* Congress also allowed the Commission to “grant such application, in whole or in part, with such modification and upon such terms and conditions as the Commission may find necessary or appropriate.” *Id.*

57. Department of Energy Organization Act, Pub. L. No. 95-91, § 402(f), 91 Stat. 565, 585 (1977). This authority currently resides with the Assistant Secretary for Fossil Energy and Carbon Management. OFF. OF FOSSIL ENERGY & CARBON MGMT, U.S. DEP’T OF ENERGY, S4-DELF-E1-2023, REDELEGATION TO THE ASSISTANT SECRETARY FOR FOSSIL ENERGY AND CARBON MANAGEMENT (2023), <https://www.directives.doe.gov/delegations-documents/s4-del-fe1-2023>.

58. Energy Policy Act of 2005, Pub. L. No. 109-58, § 311, 119 Stat. 594, 685–86 (2005).

59. *Id.* at 689; *see also* Regulations Implementing Energy Policy Act of 2005: Pre-Filing Procedures for Review of LNG Terminals and Other Natural Gas Facilities, 70 Fed. Reg. 60,426, 60,426 (Oct. 18, 2005), *amended by* 77 Fed. Reg. 4,891, 4,894 (Feb. 1, 2012), 77 Fed. Reg. 65,463, 65,475 (Oct. 29, 2012) (codified at 18 C.F.R. § 157.21).

60. *See* CONG. RSCH. SERV., RL33302, ENERGY POLICY ACT OF 2005: SUMMARY AND ANALYSIS OF ENACTED PROVISIONS 20–22 (2006) (summarizing provisions related to natural gas and LNG). *See generally* Jacob Dweck, David Wochner & Michael Brooks, *Liquefied Natural Gas (LNG) Litigation after the Energy Policy Act of 2005: State Powers in LNG Terminal Siting*, 27 ENERGY L.J. 473 (2006) (discussing the impact of the Energy Policy Act on LNG development); Shelia Slocum Hollis, *Liquefied Natural Gas: “The Big Picture” for Future Development in North America*, 2 ENV’T & ENERGY L. & POL’Y J. 5 (2007) (describing 2005 Energy Policy Act provisions governing LNG).

61. Press Release, White House, FACT SHEET: President Biden to Catalyze Global

natural gas pipelines and facilities and new and expanded LNG terminals are exceedingly expensive. The MVP developers are spending almost \$7 billion—up from a projected roughly \$5 billion.⁶² The ill-fated Jordon Cove LNG proposal was that high or higher;⁶³ a much smaller project, the Spire Missouri STL Pipeline, even increased its cost from \$220 million to \$287 million.⁶⁴ These costs further illustrate how the infrastructure associated with these projects likely demands well beyond a twenty-year investment to recoup the capital costs—carrying the project and its accompanying fuel past 2035.

Natural Gas' Necessity Part 1. Despite its potential for undermining pleas for immediately reducing all fossil fuel use, natural gas enjoys numerous allies. The industry and various regulators naturally champion its continued use as a necessity. They question the fuel's moniker as a transition fuel, pointing to surging demand in Europe and not tethered to any technological mitigation such as carbon capture, utilization, and

Climate Action Through the Major Economies Forum on Energy and Climate (Apr. 20, 2023), <https://www.whitehouse.gov/briefing-room/statements-releases/2023/04/20/fact-sheet-president-biden-cto-catalyze-global-climate-action-through-the-major-economies-forum-on-energy-and-climate/> (“President Biden has set an ambitious U.S. goal of achieving a carbon pollution-free power sector by 2035 and net zero emissions economy by no later than 2050.”).

62. News Release, Mountain Valley Pipeline, LLC., Mountain Valley Pipeline Revises Cost Estimate: Continues to Target a Full In-Service for Late 2019 (Sept. 24, 2018), <http://www.mountainvalleypipeline.info/wp-content/uploads/2019/03/MVP-Project-Cost-Update-FINAL3.pdf> (\$4.6 billion); Suzanne Mattei, *Mountain Valley Pipeline Debt Deal Undercuts U.S. Governing Values*, INST. ENERGY ECON. & FIN. ANALYSIS (May 30, 2023), <https://ieefa.org/resources/mountain-valley-pipeline-debt-deal-undercuts-us-governing-values> (\$6.6 billion).

63. See *Jordon Cove LNG Project, Coos Bay, Oregon*, NS ENERGY, <https://www.nsenergybusiness.com/projects/jordan-cove-lng-project-coos-bay-oregon/> (last visited Feb. 1, 2024); Ted Sickinger, *Jordon Cove LNG Slows Spending, Delays Project to Wait for Permits*, THE OREGONIAN/OREGONLIVE (May 5, 2019, 8:00 AM), <https://www.oregonlive.com/business/2019/05/jordan-cove-lng-slows-spending-delays-project-to-wait-for-permits.html>. The fate of the costly Jordon Cove project piqued appellate court review and FERC's consideration of whether to freeze the project it had approved but with skittish developers. See Niina H. Farah & Miranda Willson, *Court Sends Jordon Cove LNG Project Back to FERC*, E&E NEWS (Nov. 2, 2021, 7:19 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2021/11/02/court-sends-jordan-cove-lng-project-back-to-ferc-282681>; Remand Order, *Evans v. FERC*, No. 20-1161, 2021 U.S. App. LEXIS 32494, at *3 (D.C. Cir. Nov. 1, 2021) (per curiam).

64. See Kari Lydersen, *Spire Pipeline Flap in Missouri Reveals Deeper Questions About Natural Gas*, ENERGY NEWS NETWORK (Nov. 22, 2021), <https://energynews.us/2021/11/22/spire-pipeline-flap-in-missouri-reveals-deeper-questions-about-natural-gas/#>.

storage.⁶⁵ Another refrain centers on the role of natural gas as stabilizing the grid, capable of being available for peak demand when electricity needs soar during periods of harsh winters or scorching summers. In 2022, as winter approached, New England's largest energy supplier cautioned the White House that additional natural gas flowing into the region might be necessary to avert a possible shortage.⁶⁶ The Midwestern grid operator triggered criticism when it appeared non-neutral in favoring a new natural gas plant for grid reliability.⁶⁷ In New York, where the state electric grid is slated to become net zero by 2040⁶⁸ —and with the Empire state becoming the first in the union to ban natural gas in some new buildings⁶⁹ — the New York System Operator (NYISO) prior to the summer of 2023 lamented that additional demand from EVs and more heat pumps cannot be supplied by extant renewable resources; and it expressed concern how natural gas retirements could pose a problem.⁷⁰ In California, the state's

65. See Alix Steel & David Wethe, *Chevron Says Natural Gas is More Than Just a Transitional Fuel*, BLOOMBERG L. (June 6, 2023, 11:56 AM), <https://www.bloomberg.com/news/articles/2023-06-06/chevron-says-natural-gas-is-more-than-just-a-transitional-fuel>; Stephen Stapczynski, *Gas is Here to Stay for Decades, Say Fossil Fuel Heavyweights*, BLOOMBERG L. (June 23, 2023, 9:00 PM), <https://www.bloomberg.com/news/articles/2023-06-24/oil-giants-from-shell-to-chevron-say-gas-here-to-stay-for-green-transition?embedded-checkout=true> (recognizing LNG as a “short-term bridge to greener energy sources”).

66. See Jason Plautz, *Northeast Utility Warns of ‘Potentially Severe’ Gas Shortage*, E&E NEWS (Oct. 31, 2022, 6:55 AM), <https://subscriber.politicopro.com/article/eenews/2022/10/31/new-england-utility-warns-of-potential-severe-gas-shortage-00064087>.

67. See Jeffery Tomich, *Midwest Grid Operator Feels Heat As It Signals Need for Gas*, E&E NEWS (Sept. 6, 2022, 6:43 AM), <https://www.eenews.net/articles/midwest-grid-operator-feels-heat-as-it-signals-need-for-gas/>.

68. *Progress to Our Goals*, N.Y. STATE: CLIMATE ACT, <https://climate.ny.gov/Our-Impact/Our-Progress> (last visited Feb. 1, 2024) (stating that the Climate Leadership and Community Protection Act “requires New York to reduce economy-wide greenhouse gas emissions 40% by 2030 and no less than 85% by 2050 from 1990 levels.”).

69. Anna Phillips, *N.Y. Ditches Gas Stoves, Fossil Fuels in New Buildings in First Statewide Ban in U.S.*, WASH. POST (May 3, 2023, 2:27 PM), <https://www.washingtonpost.com/climate-environment/2023/05/03/newyork-gas-ban-climate-change/>.

70. David Iaconangelo, *N.Y. Officials Warn ‘Peaker’ Plant Closures Threaten Grid*, E&E NEWS (June 8, 2023, 7:07 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/08/n-y-officials-warn-peaker-plant-closures-threaten-grid-00100798>. State environmental rules already facilitated gas peaker plant retirements, with more projected by 2025 and with New York Power Authority asked to shutter a number of its peaker plants in the city by 2030 (there is a limited exception under the state rules for reliability). *Id.* Indeed, the state joined the dialogue to phase out natural gas in new buildings and expects more electric generation following its projected phasing out of gasoline powered automobiles by

energy commission also approved short extensions for a few natural gas plants targeted for retirement, leaving them in reserve for extreme weather events.⁷¹ With over 2,000 gas-fired power plants in the country in 2021, and projections of an increase in gas-fired generation as the nation entered the 2023 summer,⁷² the difficulty with confronting natural gas's future seems apparent.

The Biden Administration has addressed the conundrum surrounding natural gas by employing a Queen's Gambit. In the gambit, chess players willingly sacrifice a piece to control the board. By willingly sacrificing pursuing an aggressive immediate stance against natural gas, the Administration seemingly hopes to stabilize Europe, ensure a robust deployment of renewable resources until battery technology or nuclear power can supply grid reliability, load-following services, and furnish peak energy needs. And to be sure, few question the function of natural gas, at the very least, as a transition fuel. A 2019 IEA report observed how "[e]ven with falling battery costs, natural gas is currently the most viable near-term option in most parts of the United States for balancing renewable energy at scale and providing essential load-following services."⁷³ It also remains critical for

2035. *Id.* New York regulators, consequently, fear that renewable resources alone will not be sufficient to support a reliable grid in 2040. FERC's fall 2023 report chronicles what it describes as a reliability gap in the system, focusing on the natural gas system. See Miranda Willson, *FERC Outlines 'Catastrophic' Gas, Grid Threats*, E&E NEWS (Sept. 22, 2023, 6:41 AM), <https://www.eenews.net/articles/ferc-outlines-catastrophic-gas-grid-threats/> (discussing the role of natural gas infrastructure in supporting grid reliability). Even more pressing, one pipeline developer warns that it must receive an air permit soon to ensure sufficient resource availability for the 2025-26 winter. See Marie J. French, *Pipeline Owner Pushes New York Agency to Approve Permits in Climate Law Test*, POLITICALPRO (July 14, 2023, 2:07 PM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/2023/07/pipeline-owner-pushes-dec-to-approve-air-permits-in-test-of-climate-law-00106226>. One component of having a reliable grid might be blue hydrogen, or carbon capture, utilization, and sequestration (CCUS) along with natural gas. David Iaconangelo, *N.Y. Regulator to Consider Hydrogen, CCS for Zero-Carbon Grid*, E&E NEWS (May 22, 2023, 7:14 AM), <https://subscriber.politicopro.com/article/eenews/2023/05/22/n-y-to-consider-hydrogen-ccs-for-zero-carbon-grid-00097864>.

71. Jason Plautz, *Calif. Eyes Keeping 4 Gas Plants Online to Fortify Grid*, E&E NEWS (Aug. 15, 2023, 6:50 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/2020/09/01/water-board-extends-lives-of-four-gas-plants-needed-for-grid-reliability-1314721>.

72. See Sean Reilly, *EPA Agrees to Deal on Gas-Fired Power Plant Regs*, POLITICALPRO (June 12, 2023, 1:18 PM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2023/06/12/epa-agrees-to-deal-on-gas-fired-power-plant-regs-00101510>.

73. INT'L ENERGY AGENCY, THE ROLE OF GAS IN TODAY'S ENERGY TRANSITIONS, at 56 (2019), <https://iea.blob.core.windows.net/assets/cc35f20f-7a94-44dc-a750-41c117517e>

energy security overseas, at least until 2030⁷⁴—and that means also the necessary domestic infrastructure capable of meeting those needs. Here, conversely, our dependence on natural gas justified acting FERC Chair William Phillips, unlikely cognizant of the extreme weather that would confront the nation in the summer of 2023, to warn at summer’s outset how the nation could face a natural gas “reliability gap.”⁷⁵

This seems unlikely to change anytime soon. The 2023 EIA report suggests that energy growth will likely remain stable through 2050, and even though renewable energy will capture an ever-increasing lion share of our energy capacity, “relative to 2022, natural gas generating capacity ranges from an increase of between 20% to 87% through 2050.”⁷⁶ It adds that natural gas heating seems likely to remain the largest source for heating through 2050 as well.⁷⁷ And as the nation witnesses one extreme weather disaster after another, the need for urgent climate action becomes increasingly imperative while immediate safety and geopolitical concerns suggest caution over natural gas.

Natural Gas’ Necessity Part 2: Hydrogen. Years ago, Toyota touted hydrogen-powered vehicles as the next-generation automobile while simultaneously developing the first prominent hybrid vehicle (the Prius). Toyota engaged in at least meaningful hydrogen R&D efforts back in the early 1990s,⁷⁸ but hydrogen soon became eclipsed by the widespread promotion of hybrids and then, more recently, electric vehicles. Now it is back.⁷⁹ And its possibilities

93/TheRoleofGas.pdf.

74. See *supra* note 32 and accompanying text.

75. Miranda Willson, *FERC Chair to Power Plant Owners: “Act Now” to Protect the Grid*, E&E NEWS (June 16, 2023, 6:48 AM).

76. ANNUAL ENERGY OUTLOOK 2023, *supra* note 28, at 5.

77. *Id.*

78. See Toyota Blog, *11 Early Toyota Hydrogen Fuel Cell Concepts*, TOYOTA UK MAG. (Nov. 4, 2014), <https://mag.toyota.co.uk/11-toyota-fuel-cell-concepts/> (noting some of Toyota’s early hydrogen fuel cell concept cars).

79. In the 2005 Energy Policy Act, Congress promoted, in part, hydrogen in Title VIII, as well as demonstrating hydrogen at existing nuclear power plants, employing corridors on public lands for hydrogen pipelines, loan guarantees for facilities affording hydrogen for near-site fuel cell demonstrations, and stimulating fuel cell vehicles and hydrogen energy systems. Pub. L. No. 109-58, §§ 801–816, 119 Stat. 594, 844–55 (2005). Building off earlier targeted plans, the Department of Energy (DOE) developed a more comprehensive hydrogen plan in 2020. U.S. DEP’T OF ENERGY, DOE/EE-2128, DEPARTMENT OF ENERGY HYDROGEN PROGRAM PLAN 1–2 (2020), <https://www.hydrogen.energy.gov/docs/hydrogen-programlibraries/pdfs/hydrogen-program-plan-2020.pdf>. The plan projected that hydrogen by 2050 could “lead to an estimated \$750 billion per year in revenue and a cumulative 3.4 million

expanded considerably. In 2004, the National Academy of Sciences observed how “[a] transition to hydrogen as a major fuel in the next fifty years could fundamentally transform the U.S. energy system”⁸⁰ President Bush’s State of the Union address the year before had encouraged hydrogen fuel cells for the transportation sector, even posing how a child born then might be driving a hydrogen-fueled vehicle.⁸¹ Now, just shy of 20 years later, hydrogen has fast become a fuel de jure. And hydrogen offers the unique potential for bolstering both our electric grid and the transportation sector.⁸² States have been collaborating and vying for Department of Energy money to develop hydrogen hubs, while associations and lobbyists are actively pursuing all manner of funding opportunities.⁸³ The Department of Energy, in July 2023, unveiled a one billion-dollar investment in clean-hydrogen initiatives.⁸⁴

jobs.” *Id.* at 4.

80. NAT’L RSCH. COUNCIL & NAT’L ACAD. OF ENG’G, *THE HYDROGEN ECONOMY: OPPORTUNITIES, COSTS, BARRIERS, AND R&D NEEDS 1* (Nat’l Acad. Press, 2004).

81. *Hydrogen Fuel Technology: A Cleaner and More Secure Energy Future*, WHITE HOUSE, https://georgewbush-whitehouse.archives.gov/infocus/technology/economic_policy200404/chap2.html (last visited Feb. 1, 2024).

82. One hydrogen company testified how his company’s electrolyzers could support ancillary services for the grid. *Hearing on Federal Hydrogen Pipeline Regulatory Authorities Before the S. Comm. on Energy & Nat. Res.*, 117th Cong. (2022) (statement of Andy Marsh, President and CEO, Plug Power, Inc.).

83. Spurred by the bipartisan infrastructure law and the Inflation Reduction Act, in the summer of 2022, states anxiously awaited the Energy Department’s plan for dolling out \$8 billion for the regional hub initiative. See Daniel Moore, *Energy Secretary Sums Up Winning Approach to Hydrogen Hub Pitch*, BLOOMBERG L. (Aug. 26, 2022, 4:54 PM), https://www.bloomberglaw.com/bloomberglawnews/environment-and-energy/X8M4HNDS000000?bna_news_filter=environment-and-energy#jcite. Biden’s senior advisor John Podesta remarked how the Administration is “very optimistic that we can stand up a green hydrogen industry in this country,” although by early 2024 the money for hubs had not yet been distributed. Brian Dabbs, *DOE in 2024: Hydrogen, LNG and Climate*, E&E NEWS (Jan. 5, 2024), <https://www.eenews.net/articles/doe-in-2024-hydrogen-lng-and-climate/>.

84. See David Iaconangelo, *DOE Launches \$1B Plan to Drive Demand for Clean Hydrogen*, E&E NEWS (July 6, 2023, 6:46 AM), <https://www.eenews.net/articles/doe-launches-1b-plan-to-drive-demand-for-clean-hydrogen>. In July 2023, the department issued a request for information to jumpstart the development of the hubs. Press Release, Dep’t of Energy, Biden-Harris Admin. to Jumpstart Clean Hydrogen Econ. with New Initiative to Provide Mkt. Certainty and Unlock Priv. Inv. (July 5, 2023), <https://www.energy.gov/articles/biden-harris-administration-jumpstart-clean-hydrogen-economy-new-initiative-provide-market>. DOE hopes to facilitate the reduction in the cost of clean hydrogen by 80% by 2031. *Hydrogen Shot*, HYDROGEN & FUEL CELL TECH.’S OFF., OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, U.S. DEP’T OF ENERGY, <https://www.energy.gov/eere/fuelcells/>

Hydrogen is a quintessential clean fuel. Many children learn how hydrogen, when burned with air, produces only water.⁸⁵ As such, the Rhodium Group describes it as having “the potential to be a ‘Swiss Army knife’ of long-term decarbonization in the [U.S.]”⁸⁶ It also could serve, according to others, as an opportune “energy vector” capable of decarbonizing “difficult-to-electrify” segments of society such as heaving industry.⁸⁷

Today, as intimated by the IEA, the difficulty with hydrogen is that, first, it is predominantly being produced using fossil fuels and, consequently, contributes to GHG emissions; and second, it is being used worldwide mostly in the refining and chemical sectors.⁸⁸ Hydrogen can be produced in several ways. Hydrogen is generally produced either through steam-

hydrogen-shot (last visited Feb. 1, 2024).

85. See *Six Things You Might Not Know About Hydrogen*, ARGONNE NAT’L LAB’Y (Oct. 7, 2016), <https://www.anl.gov/article/six-things-you-might-not-know-about-hydrogen>.

86. Ben King, Galen Hiltbrand, Marie Tamba, Whitney Jones & John Larsen, *Scaling Green Hydrogen in a Post-IRA World*, RHODIUM GRP. (Mar. 16, 2023), <https://rhg.com/research/scaling-clean-hydrogen-ira/>; see also *The Rise of the Hydrogen Economy*, WOOD MACKENZIE, <https://www.woodmac.com/market-insights/topics/hydrogen-guide/> (last visited Feb. 1, 2024) (recognizing that hydrogen can supplement fuel used in carbon intense industries, like the transportation sector).

87. James Atkin, Drake Hernandez & Nicole Cheung, *Hydrogen Market Development: Lessons from the LNG Sector*, 16 J. WORLD ENERGY L. & BUS. 18, 18–19 (2023).

88. *Hydrogen*, INT’L ENERGY AGENCY, <https://www.iea.org/energy-system/low-emission-fuels/hydrogen> (last visited Feb. 1, 2024). IEA reports that global hydrogen demand grew by 3% in 2022, but its growth remains concentrated in “traditional applications,” although the agency further reports on several recent innovative efforts surrounding low emission hydrogen. *Id.* The agency’s 2022 global hydrogen summary presents an optimistic picture of hydrogen’s growth potential. “If governments implement ambitious policies to meet their climate pledges,” according to the agency, “hydrogen could help avoid 14 [billion cubic meters a year] of natural gas use” INT’L ENERGY AGENCY, GLOBAL HYDROGEN REVIEW 2022 7 (2022), <https://iea.blob.core.windows.net/assets/c5bc75b1-9e4d-460d-9056-6e8e626a11c4/GlobalHydrogenReview2022.pdf>; see also *Hydrogen*, INT’L RENEWABLE ENERGY AGENCY, <https://www.irena.org/Energy-Transition/Technology/Hydrogen> (last visited Feb. 1, 2024) (“As at the end of 2021, almost 47% of the global hydrogen production is from natural gas, 27% from coal, 22% from oil (as a by-product) . . . and only around 4% comes from electrolysis.”). In 2022, the principal uses for hydrogen by the industrial sector were to produce ammonia, methanol, and DRI for the steel industry. INT’L ENERGY AGENCY, GLOBAL HYDROGEN REVIEW 2022 29 (2022), <https://iea.blob.core.windows.net/assets/c5bc75b1-9e4d-460d-9056-6e8e626a11c4/GlobalHydrogenReview2022.pdf>; see also MARTIN C. OFFUTT, CONG. RSCH. SERV., R47487, THE HYDROGEN ECONOMY: PUTTING THE PIECES TOGETHER 3 (2023) (noting that hydrogen’s principal present uses are for refining and producing ammonia).

methane reforming (SMR), the most common method, or electrolysis (splitting water with electricity),⁸⁹ although new technologies are constantly surfacing.⁹⁰ “Green” hydrogen occurs when the process for producing it is generated through renewable energy (by electrolysis) other than nuclear power.⁹¹ Unfortunately, this method is costly and, as such, an emerging challenge is reducing its cost.⁹² This is why SMR predominates today’s hydrogen production, with fossil fuels deployed as the catalyst in industrial processes.⁹³ Traditional fossil fuels can supply the electricity for producing hydrogen as well, but in doing so it is far from clean unless the emissions are captured.⁹⁴ This is generally referred to as “gray” hydrogen when the

89. See OFFUTT, *supra* note 88, at 1–2. Steam-methane reforming (SMR) uses high temperature steam to react with natural gas (methane) with a “catalyst to produce hydrogen, carbon monoxide, and a relatively small amount of . . . (CO₂).” *Hydrogen Explained: Production of Hydrogen*, U.S. ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, <https://www.eia.gov/energyexplained/hydrogen/production-of-hydrogen.php#> (June 23, 2023); see also *Hydrogen Production: Natural Gas Reforming*, HYDROGEN & FUEL CELLS TECH.’S OFF., OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, U.S. DEP’T OF ENERGY, <https://www.energy.gov/eere/fuelcells/hydrogen-production-natural-gas-reforming> (last visited Feb. 1, 2024).

90. *E.g.*, Saranac Hydro Energy LLC, 181 FERC ¶ 62,171 (2022) (waterpower); Turnagain Arm Tidal Energy Corp., 176 FERC ¶ 62,049 (2021). In one DOE workshop, the participants reported how “[w]ater electrolysis is a promising pathway for producing clean hydrogen when utilizing renewable or nuclear energy.” HYDROGEN AND FUEL CELL TECHS. OFF., DEP’T OF ENERGY, HIGH TEMPERATURE ELECTROLYSIS MANUFACTURING WORKSHOP 4 (2022).

91. Hydrogen produced from nuclear energy is considered “pink.” OFFUTT, *supra* note 88, at 2.

92. See E. Lazarczyk Carlson, K. Pickford & H. Nyga-Lukaszewska, *Green Hydrogen and an Evolving Concept of Energy Security: Challenges and Comparisons*, (U.S. Ass’n for Energy Econ., Working Paper No. 22-554, 2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4109303.

93. See OFFUTT, *supra* note 88, at 1. SMR “accounts for nearly all commercially produced hydrogen in the United States.” *Hydrogen Explained: Production of Hydrogen*, U.S. ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, <https://www.eia.gov/energyexplained/hydrogen/production-of-hydrogen.php> (June 23, 2023).

94. Autothermal reforming (ATR) can be employed to produce blue hydrogen by converting natural gas into “syngas through a combination of partial oxidation and steam reforming. Natural gas is mixed with steam and sent into the reformer, where it combines with oxygen at the burner” and the resulting reaction generates heat for the steam reforming process. IDTechEx, *Autothermal Reforming: A Promising Technology for Blue Hydrogen Production*, *Says IDTechEx*, PR NEWswire (Apr. 12, 2023, 7:06 AM), <https://www.prnewswire.com/news-releases/autothermal-reforming-a-promising-technology-for-blue-hydrogen-production-says-idtechex-301795446.html>. Some foresee that ATR will become more

resulting emissions are vented.⁹⁵ If emissions are captured, this hydrogen turns to “blue” hydrogen.⁹⁶

With most existing hydrogen production tethered to natural gas and natural gas infrastructure touted as supporting hydrogen transportation, the gambit with natural gas is pronounced.⁹⁷

Burying it, a Hopeful Assumption? Over a decade has now passed since the allure of carbon, capture, utilization, and sequestration (CCUS) captivated industry leaders and politicians alike.⁹⁸ Touted originally as a lifeline to the coal industry, it offered a promise of continued use of fossil fuels provided the regulatory and property-law issues could be resolved that would allow captured CO₂ from coal-fired power plants to be either used in a production process or stored deep underground in pore space.⁹⁹ Today,

commonplace with natural gas and carbon capture and storage (CCS), possibly increasing its market share from almost zero to 37% by 2030. Minh Khoi Le, *Autothermal Reforming Process Gaining Momentum for Production of Blue Hydrogen Using CCS*, RYSTADENERGY (July 26, 2023), <https://www.rystadenergy.com/insights/production-of-blue-hydrogen-using-ccs>.

95. See OFFUTT, *supra* note 88, at 2.

96. *Id.*

97. Reportedly, about three-fourths of new worldwide hydrogen development planning is for green hydrogen, but actual development will be influenced by shifting policies and costs. See David Iaconangelo, *Low-Carbon Hydrogen Projects Could Still Go Bust, Report Warns*, E&E NEWS (Sept. 22, 2023, 7:00 AM), <https://subscriber.politicopro.com/article/eenews/2023/09/22/low-carbon-hydrogen-projects-could-still-go-bust-report-warns-00117341> (discussing IEA 2023 annual hydrogen report).

98. In 2003, industry and the George Bush Administration began to collaborate on FutureGen, an experimental project combining an integrated (coal-fired) gasification combined cycle power plant with CCS. PETER FOLGER, CONG. RSCH. SERV., R43028, *THE FUTUREGEN CARBON CAPTURE AND SEQUESTRATION PROJECT: A BRIEF HISTORY AND ISSUES FOR CONGRESS* (2014). The first iteration of the project faltered, only to be resuscitated by FutureGen 2.0, and then later abandoned. *Id.*

99. See Dean Scott, *‘Tangled Web’ of Laws, Regulations Stifle Carbon Capture Push*, BL: ENV’T & ENERGY (Apr. 18, 2022, 5:30 AM), <https://www.bloomberglaw.com/product/blaw/bloombergtterminalnews/bloomberg-terminal-news/RAJ3RVDWLU6J>. CCUS proponents claim the well permitting regime for injecting the CO₂ into pore space, pursuant to the Safe Drinking Water Act Class VI program, ought to be swifter—principally by hastening the process for states to assume primacy over well permitting. See Jeremy Dillon, *House Republicans Float Bill to Ease Carbon Capture*, E&E DAILY (May 25, 2023, 6:36 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2023/05/25/house-republicans-float-bill-to-ease-carbon-capture-00098677>. Even DOE agrees. See Carlos Anchondo & Camille Bond, *DOE Outlines Plans to Ease CCS Permitting Crunch*, E&E NEWS (Feb. 10, 2022, 7:18 AM), <https://subscriber.politicopro.com/article/eenews/2022/02/10/doe-outlines-plans-to-ease-ccs-permitting-crunch-00007378>. Wyoming and North

conversations about CCUS have morphed away from coal but escalated in championing its possibilities,¹⁰⁰ including developing direct air capture

Dakota already enjoy primacy and Louisiana is in the process of securing it as well. Sequestration requires ensuring sufficient CO₂ pipeline capacity and navigating any accompanying hurdles. PHMSA recently clarified that regulating the location of these lines lies within states' authority. See Mike Soraghan, *Feds Say States Can Regulate Path of CO₂ Pipelines*, E&E NEWS (Sept. 19, 2023, 7:07 AM), <https://subscriber.politicopro.com/article/eenews/2023/09/19/feds-say-states-can-regulate-path-of-co2-pipelines-00116578>; Jeffrey Tomich, *Federal Court Rules Iowa County Can't Regulate CO₂ Pipeline*, E&E NEWS (July 14, 2023, 7:19 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/14/court-says-iowa-county-cant-regulate-co2-pipeline-00106125> (discussing Summit Carbon Sols., Inc. v. Shelby Cty., No. 1:22-cv-00020-SMR-SBJ, 2023 U.S. Dist. LEXIS, 217541 (S.D. Iowa July 10, 2023), that Pipeline Safety Act preempts local regulation). As such, can, for example, a CO₂ pipeline company exercise eminent domain authority, or must it secure all necessary land rights? See Leah Douglas, *US Carbon Pipeline Faces Setback as Residents Refuse to Cede Land Rights*, U.S. NEWS (Mar. 9, 2023), <https://www.usnews.com/news/top-news/articles/2023-03-09/us-carbon-pipeline-faces-setback-as-residents-refuse-to-cede-land-rights>. And it may not obtain any necessary state permit. See Jillian Frankel & Alex Tabet, *A Local Struggle Over Carbon Pipelines in Iowa Is Becoming a 2024 Presidential Flashpoint*, NBC NEWS (Sept. 18, 2023, 5:00 AM), <https://www.nbcnews.com/politics/2024-election/local-struggle-carbon-pipeline-iowa-becoming-2024-presidential-flashp-rcna105198>; Jeffrey Tomich, *South Dakota Denies Permit for CO₂ Pipeline*, E&E NEWS (Sept. 7, 2023, 7:27 AM), <https://subscriber.politicopro.com/article/eenews/2023/09/07/south-dakota-denies-permit-for-co2-pipeline-00114280> (Heartland Greenway pipeline). Exxon reportedly is interested in operating what would be currently the largest network of CO₂ pipelines. Shelby Webb, *Exxon to Get Largest U.S. CO₂ Pipeline Network in \$4.9B Deal*, E&E NEWS (July 14, 2023, 7:17 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/14/exxon-to-get-largest-u-s-co2-pipeline-network-in-4-9b-deal-00106211>. For survey articles, see generally OFF. OF FOSSIL ENERGY, U.S. DEP'T OF ENERGY, DOE/NETL-2014/1681, A REVIEW OF THE CO₂ PIPELINE INFRASTRUCTURE IN THE U.S. (2015); Alexandra B. Klass & Elizabeth J. Wilson, *Climate Change and Carbon Sequestration: Assessing a Liability Regime for the Long-Term Storage of Carbon Dioxide*, 58 EMORY L. J. 103 (2008); Joel Mack & Chelsea Muñoz-Patchen, *CO₂ Pipeline Infrastructure for Sequestration Projects*, 17 TEX. J. OIL, GAS, & ENERGY L. 101 (2022); Robert R. Nordhaus & Emily Pitlick, *Carbon Dioxide Pipeline Regulation*, 30 ENERGY L. J. 85 (2009); Tara K. Righetti, *Siting Carbon Dioxide Pipelines*, 3 OIL & GAS, NAT. RES. & ENERGY J. 907 (2017).

100. See generally Wendy B. Jacobs & Michael Craig, *Legal Pathways to Widespread Carbon Capture and Sequestration*, 47 ENV'T L. REP. 11022 (2017) (superb review and noting importance for NGCC plants). See, e.g., Carlos Anchondo & David Iaconangelo, *Energy Company Plans Massive W.Va. Hydrogen Plant with CCS*, E&E NEWS (Aug. 17, 2023, 7:00 AM), <https://subscriber.politicopro.com/article/eenews/2023/08/17/energy-company-plans-massive-w-va-hydrogen-plant-with-ccs-00111515>; Carlos Anchondo & Jason Plautz, *Power Company Eyes First Gas CCS Plant in California*, E&E NEWS (July 14, 2023, 7:15 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/14/power-company-eyes-first>

projects.¹⁰¹ Former Obama Administration Secretary of Energy Ernest Moniz endorsed a CCUS plan for further infrastructure necessary to achieve significant GHG reductions.¹⁰² During the Biden Administration's first year, the Council on Environmental Quality issued a report promoting CCUS.¹⁰³ And Biden Administration Secretary of Energy Jennifer

gas-ccs-plant-in-california-00106112; Carlos Anchondo, *Climate Law Spurs CCS at New West Virginia Gas Plant*, E&E NEWS (Sept. 19, 2022, 6:59 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2022/09/19/climate-law-spurs-new-west-virginia-gas-plant-with-ccs-00057278>; Carlos Anchondo & Edward Klump, *CO₂-Free Natural Gas? CCS Project Powers Grid for First Time*, E&E NEWS (Nov. 17, 2021, 7:07 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2021/11/17/co2-free-natural-gas-ccs-project-powers-grid-for-first-time-283304>. Of course, some coal fired CCUS projects remain. In 2023, for instance, Minnkota Power Cooperative proposed Project Tundra to capture CO₂ from its coal-fired station in North Dakota. Carlos Anchondo, *Landmark North Dakota CCS Project Adds 3 New Developers*, E&E NEWS (June 29, 2023, 6:43 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/29/landmark-north-dakota-ccs-project-adds-3-new-developers-00104087>. And CCS is still being discussed for the Four Corners power plant on the Navajo Nation, while Petra Nova may reboot its Texas project. See Carlos Anchondo & Jason Plautz, *CCS 2.0: Company Reboots Bid to Save N.M. Coal Plant*, E&E NEWS (Aug. 18, 2023, 6:54 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2023/08/18/ccs-2-0-company-reboots-bid-to-save-n-m-coal-plant-00110498>.

101. The proposed Bison Project in Wyoming, for instance, would eventually remove five million metric tons of CO₂ annually by 2030, if all goes as planned. See Corbin Hiar, *Project Bison, A Large Carbon Removal Proposal, Faces Delay*, E&E NEWS (June 1, 2023, 6:50 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2023/06/01/project-bison-a-large-carbon-removal-proposal-faces-delays-00099066>. Doubtless capitalizing on the 45q tax subsidy, J.P. Morgan recently invested millions in a project that would remove about 25,000 metric tons. Avery Ellfeldt, *J.P. Morgan Inks \$200M Carbon Removal Deal*, E&E NEWS (May 24, 2023, 6:25 AM), <https://subscriber.politicopro.com/article/eenews/2023/05/24/jpmorgan-inks-200m-carbon-removal-deal-00098448>. And one company is exploring direct air capture to create a clean synthetic natural gas. See Bloomberg, *Company Eyes Cheap Direct Air Capture for 'Green Methane'*, E&E NEWS (May 19, 2023, 6:47AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2023/05/19/santos-eyes-cheap-direct-air-capture-for-green-methane-00097690>.

102. See Carlos Anchondo, *Moniz-led Group Releases CCS, Pipeline Blueprint*, E&E NEWS (June 30, 2021, 7:14 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2021/06/30/moniz-led-group-releases-ccs-pipeline-blueprint-000123>.

103. COUNCIL ON ENV'T QUALITY, REPORT TO CONGRESS ON CARBON CAPTURE, UTILIZATION, AND SEQUESTRATION (2021) ("Delivered to the Committee on Environment and Public Works of the Senate and the Committee on Energy and Commerce, the Committee on Natural Resources, and the Committee on Transportation and Infrastructure of the House of Representatives, as directed in Section 102 of Division S of the Consolidated

Granholm echoed the importance of CCUS, when she observed how “[t]hese kinds of technologies will help . . . the oil and gas sector . . . be able to ramp up production, but in a way that’s clean.”¹⁰⁴ With the expansion of the 45Q tax subsidy for CCUS,¹⁰⁵ the modern gold rush is upon us, with companies rapidly exploring how to take advantage of the economic opportunity.¹⁰⁶ The White House even formed a federal task force designed to explore and likely facilitate the use of our public lands for a massive build out of available underground storage space.¹⁰⁷ Promoters of

Appropriations Act, 2021.”); *cf.* Carbon Capture, Utilization, and Sequestration Guidance, 87 Fed. Reg. 8,808 (Feb. 16, 2022) (notice of interim guidance); *see* Carlos Anchondo, Lesley Clark & Kelsey Brugger, *White House Releases CCS Plan*, E&E NEWS (July 1, 2021, 7:18 AM), <https://subscriber.politicopro.com/article/eenews/2021/07/01/white-house-releases-ccs-plan-000107>.

104. Simon Casey & Lisa Abramowicz, *Carbon Capture Could Help U.S. Fossil-Fuel Growth*, *Granholm Says*, BLOOMBERG L.: ENV’T & ENERGY (June 25, 2021, 8:54 AM), <https://news.bloomberglaw.com/environment-and-energy/carbon-capture-could-help-u-s-fossil-fuel-growth-granholm-says>; *see also* Stephen Lee, *White House Offers Menu of Policy Fixes to Boost Carbon Capture*, BLOOMBERG L.: ENV’T & ENERGY (June 30, 2021, 3:01 PM), <https://news.bloomberglaw.com/environment-and-energy/white-house-offers-menu-of-policy-fixes-to-boost-carbon-capture>. Some LNG companies believe that investing in CCUS will enhance their competitive advantage for selling their product overseas. *See* Jean Chemnick, *Why So Many LNG Terminals are Adopting Carbon Capture*, E&E NEWS (Sept. 8, 2022, 6:42 AM), <https://subscriber-politicopro-com.eu1.proxy.openathens.net/article/eenews/2022/09/08/why-so-many-lng-terminals-are-adopting-carbon-capture-00054977>.

105. *See* 26 U.S.C. § 45Q.

106. The Clean Air Task Force tracks projects, and reports that “[j]ust one year after passage, we’re already seeing” a commitment toward capturing emissions with “40% of the current projects that are in the development pipeline . . . announced after the passage of the IRA.” Eliza Sheff & Darryle Ulama, *From Act to Action: How the Inflation Reduction Act is Accelerating Decarbonization in the United States with Carbon Capture and Storage*, CLEAN AIR TASK FORCE (Aug. 18, 2023), <https://www.catf.us/2023/08/from-act-action-inflation-reduction-act-accelerating-decarbonization-united-states-carbon-capture-storage/>. The 45Q tax credit is prompting research into decarbonizing hard to reach industrial sectors, where the captured carbon can be used, for instance, for creating methanol or turned into carbon fibers. *See* Lamar Johnson, *Cheapest Way to capture CO2? Turn it Into Methanol*, *DOE Says*, E&E NEWS (Mar. 22, 2023, 7:01 AM), <https://subscriber.politicopro.com/article/eenews/2023/03/22/cheapest-way-to-capture-co2-turn-it-into-methanol-doe-says-00083349>.

107. Press Release, The White House, CEQ Announces Members of Task Forces to Inform Responsible Development and Deployment of Carbon Capture, Utilization, and Sequestration (Mar. 24, 2023), <https://www.whitehouse.gov/ceq/news-updates/2023/03/24/ceq-announces-members-of-task-forces-to-inform-responsible-development-and-deployment-of-carbon-capture-utilization-and-sequestration/>. The Interior Department released

CCUS, after all, cross political and sectional divides, with politically divergent states, such as Colorado and Wyoming, joining together on developing CCUS technologies.¹⁰⁸ To be sure, some admittedly lament a possible future where nations rely too much on CCUS as a savior.¹⁰⁹ Yet without CCUS, any fossil fuel future seems surely bleak.

CCUS, therefore, expectedly enjoys a prominent role centrally situated in current conversations surrounding blue hydrogen. As interest in hydrogen appears to be growing exponentially,¹¹⁰ the natural gas industry proclaims how it can produce large volumes of hydrogen; and if it can do so utilizing CCUS technologies, it can assume the mantle as hydrogen's progenitor. The need to deploy renewables in the endeavor consequently dissipates. Natural gas then becomes tethered to emerging hydrogen markets in two ways. First, it strengthens the electric grid and offers an opportunity to produce hydrogen without compromising reliability.¹¹¹ Second, the natural gas pipeline infrastructure purportedly can morph into

guidance on how to treat requests for using pore space on public lands. U.S. DEP'T OF THE INTERIOR, BUREAU OF LAND MGMT., IM 2022-041, NATIONAL POLICY FOR THE RIGHT-OF-WAY AUTHORIZATIONS NECESSARY FOR SITE CHARACTERIZATION, CAPTURE, TRANSPORTATION, INJECTION, AND PERMANENT GEOLOGIC SEQUESTRATION OF CARBON DIOXIDE IN CONNECTION WITH CARBON SEQUESTRATION PROJECT (2022). *See generally* Tara Righetti, Jesse Richardson, Kris Koski & Sam Taylor, *The Carbon Storage Future of Public Lands*, 38 PACE ENV'T L. REV. 181 (2021); U.S. DEP'T OF THE INTERIOR, U.S. GEOLOGICAL SURV., CIRCULAR 1386, NATIONAL ASSESSMENT OF GEOLOGIC CARBON DIOXIDE STORAGE RESOURCES—RESULTS (2013).

108. Sharon Udasin, *Wyoming, Colorado to Partner on Developing Carbon Capture Technologies*, THE HILL: EQUILIBRIUM & SUSTAINABILITY (June 28, 2023, 2:17 PM), <https://thehill.com/policy/equilibrium-sustainability/4071844-wyoming-colorado-to-partner-on-developing-carbon-capture-technologies/>.

109. *See* Fiona Harvey, *Carbon Capture and Storage is 'No Free Lunch', Warns Climate Chief*, GUARDIAN (June 6, 2023, 11:52 AM), <https://www.theguardian.com/environment/2023/jun/06/carbon-capture-and-storage-is-no-free-lunch-warns-climate-chief-hoesung-lee> (“IPCC Chair Hoesung Lee says over-reliance on the technology could mean the world misses 1.5C target.”).

110. Chevron, for instance, reportedly invested heavily in a large hydrogen project. *See* David Iaconangelo, *Chevron Bets Big on Massive U.S. 'Green' Hydrogen Project*, E&E NEWS (Sept. 13, 2023, 6:51 AM), <https://subscriber.politicopro.com/article/eenews/2023/09/13/chevron-bets-big-on-massive-u-s-green-hydrogen-project-00115209>.

111. The United States is not alone, as Canada, for instance, is promoting green energy investment, including, following the U.S. model, for hydrogen from natural gas. *See* Brian Platt, *Trudeau to Lean on Carbon Capture in Green-Subsidy Race with US*, BLOOMBERG: POL. (Mar. 28, 2023, 9:02 AM), <https://www.bloomberg.com/news/articles/2023-03-27/energy-firms-heavy-industry-to-get-billions-in-canada-budget>.

a future network of pipelines and infrastructure capable of transporting at least some share of the new clean fuel. Indeed, in 2021, Secretary Granholm told an audience that “We want to build more pipes,” adding that natural gas pipelines could be employed to transport hydrogen.¹¹² And the next year the Administration and the EU discussed how new natural gas infrastructure eventually could be constructed to adapt to carrying hydrogen.¹¹³ These two assumptions about the relationship of natural gas to hydrogen, coupled with policies promoting CCUS and a refrain of how natural gas remains essential for stabilizing our domestic grid and reducing worldwide GHG emissions, implicitly animate the Biden Administration’s reticence to question natural gas and its infrastructure’s future.

*Don’t Worry.*¹¹⁴ Yet the Biden Administration’s apparent embrace of natural gas assumes that policy initiatives will reduce the adverse consequences flowing from a possible continued natural gas future. To begin with, the oil and gas development/production industry appears poised to confront a new frontier where methane releases seem likely to be reduced greatly. Shortly after assuming office, President Biden instructed EPA to explore regulations for methane releases from the oil and gas sector.¹¹⁵ Then, mirroring the Obama Administration, the White House released a November 2021 Methane Reduction Plan, outlining future agency initiatives, the principal ones described below.¹¹⁶ And President

112. Lesley Clark, *Granholm on Pipelines: ‘We Want to Build More’*, E&E NEWS (June 1, 2021), <https://www.abralliance.org/wp-content/uploads/2021/06/Granholm-on-pipelines-We-want-to-build-more.pdf>.

113. See Jennifer A. Dlouhy & David R. Baker, *Biden Eyes Long-Term Hydrogen Breakthrough in Plan for Gas to EU*, BLOOMBERG L. (Mar. 25, 2022, 4:57 PM), <https://www.bloomberglaw.com/product/blaw/bloomberglawnews/bloomberglaw-news/X7RGSJCS000000>.

One impending issue is whether hydrogen from natural gas will qualify under any new EU regulations focused on green hydrogen. See, e.g., Sarah Steffen & Stuart Braun, *Germany Bets on Global Green Hydrogen Economy*, INT’L INST. FOR SUSTAINABLE DEV. (Nov. 15, 2022), <https://www.iisd.org/articles/iisd-news/germany-bets-global-green-hydrogen-economy>.

114. BOBBY MCFERRIN, DON’T WORRY, BE HAPPY (Manhattan Records 1988).

115. Exec. Order No. 13,990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, 2021 DAILY COMP. PRES. DOC. 1 (Jan. 21, 2021).

116. THE WHITE HOUSE OFFICE OF DOMESTIC CLIMATE POLICY, U.S. METHANE EMISSIONS REDUCTION ACTION PLAN: CRITICAL AND COMMONSENSE STEPS TO CUT POLLUTION AND CONSUMER COST, WHILE BOOSTING GOOD-PAYING JOBS AND AMERICAN COMPETITIVENESS, NOV. 2021 (2021), <https://www.whitehouse.gov/wp-content/uploads/2021/11/US-Methane-Emissions-Reduction-Action-Plan-1.pdf>. The plan outlined possible actions I discuss by EPA, Bureau of Land Management, and PHMSA, principally. But it also included initiatives to reduce methane emissions from the agricultural sector, industrial

Biden augmented the plan on August 16, 2022, when he signed the IRA.¹¹⁷ Often described as the largest climate legislation passed by Congress,¹¹⁸ the IRA includes a host of programs targeting emissions.¹¹⁹ One report suggests it might allow the United States to achieve President Biden's goal of an 80% carbon-free electric grid by 2030.¹²⁰ Congress appropriated about \$1.5 billion toward methane reductions: DOE is investing \$47 million to reduce methane emissions from oil and gas sector,¹²¹ as EPA has geared up to deploy \$700 million in funds for methane reductions.¹²²

Notably, several other EPA initiatives could curb GHG emissions associated with natural gas infrastructure. Most prominently, EPA is once again crafting a CAA NSPS applicable to natural gas plants.¹²³ The

applications, and from commercial and residential buildings. In 2022, international efforts focusing on methane became more pronounced as well. *E.g.*, Valerie Volcovici, *Forty Countries to Unveil Methane Plans at UN Climate Summit, U.S. Official Says*, REUTERS (Nov. 3, 2022, 2:50PM), <https://www.reuters.com/business/cop/forty-countries-unveil-methane-plans-un-climate-summit-us-official-says-2022-11-03/>. At the summit, Biden pledged to reduce methane emissions (following 100 other nations) 30% by 2030 from 2020 levels. Matthew Daly & Seth Borenstein, *Biden Tightens Methane Emissions Rule Amid Push for More Oil*, AP NEWS (Nov. 11, 2022, 3:17 PM), <https://apnews.com/article/biden-business-prices-oil-and-gas-industry-climate-environment-3a5b7049478ec7161fcbd18f1ebdb0ba>.

117. Inflation Reduction Act, Pub. L. No. 117-169, 136 Stat. 1818 (2022).

118. *E.g.*, *Inflation Reduction Act of 2022*, DEP'T OF ENERGY, <https://www.energy.gov/lpo/inflation-reduction-act-2022> (Sept. 22, 2023) (“[The IRA] makes the single largest investment in climate and energy in American history . . .”).

119. *See* Inflation Reduction Act, Pub. L. No. 117-169, 136 Stat. 1818 (2022).

120. *See* Jean Chemnick, *Report: Biden Power Plant Carbon Reduction Pledge Within Reach*, E&E NEWS (Sept. 12, 2023, 1:37 PM), <https://subscriber.politicopro.com/article/eenews/2023/09/12/report-biden-power-plant-carbon-reduction-pledge-within-reach-00115252> (describing EPA report).

121. *DOE Invests \$47 Million to Reduce Methane Emissions from Oil and Gas Sector*, DEP'T OF ENERGY (Mar. 13, 2023), <https://www.energy.gov/articles/doe-invests-47-million-reduce-methane-emissions-oil-and-gas-sector>.

122. Jean Chemnick, *EPA Unveils Grants to Help States, Industry Curb Methane*, E&E NEWS (July 24, 2023, 1:34 PM), <https://subscriber.politicopro.com/article/eenews/2023/07/24/epa-unveils-grants-to-help-states-industry-curb-methane-00107826>. In November 2023, the Biden Administration joined an international working group to “develop a shared framework to measure and report [GHG] emissions from natural gas.” Carlos Anchondo & Brian Dabbs, *US Unveils Effort to Track Natural Gas Emissions. Will It Work?*, E&E NEWS (Nov. 16, 2023, 6:48 AM), <https://subscriber.politicopro.com/article/eenews/2023/11/16/us-unveils-effort-to-track-natural-gas-emissions-will-it-work-00127399>.

123. New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; Emission

proposal optically appears progressive and would require carbon capture and storage, effectively decreasing the competitive posture of natural gas for electricity.¹²⁴ But most new natural gas plants are what we generally describe as peaking plants, only used during times of extremely high electricity demand. Yet these plants would escape having to comply with the NSPS, naturally causing environmentalists to ponder the utility of EPA's proposed NSPS in the first place.¹²⁵ EPA also has accepted a consent decree that would require, by November 2025, it to examine and—if necessary—issue final revised NSPSs for new stationary combustion engines and continue to do so every eight years.¹²⁶

And both EPA and BLM are embarking on regulatory programs for reducing methane emissions from the oil and gas industry. In April 2022,

Guidelines for Greenhouse Gas Emissions from Existing Fossil Fuel-Fired Electric Generating Units; and Repeal of the Affordable Clean Energy Rule, 88 Fed. Reg. 33,240 (proposed May 23, 2023) (to be codified at 40 C.F.R. pt. 60).

124. Some question whether CCUS is a legitimate best system of emission reduction, the standard for purposes of establishing a New Source Performance Standard (NSPS). Jennifer Hijazi, *Carbon Capture, Coal's Demise Face Scrutiny in Power Plant Rule*, BLOOMBERG L. (May 11, 2023, 3:57 PM), <https://news.bloomberglaw.com/environment-and-energy/carbon-capture-coals-demise-central-to-climate-rule-scrutiny>; Jean Chemnick, *'Betrayal': EPA Power Plant Proposal Faces Backlash*, E&E NEWS (June 14, 2023, 7:02 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/14/betrayal-epa-power-plant-proposal-faces-backlash-00101620>.

125. See Jean Chemnick, *EPA Climate Rule Covers 36% of Gas Plant Emissions-Analysis*, E&E NEWS (Sept. 5, 2023, 6:32 AM), <https://subscriber.politicopro.com/article/eenews/2023/09/05/epa-climate-rule-covers-36-of-gas-plant-emissions-analysis-00113691>; Jennifer A. Dlouhy, *Biden Campaign to Cut Power Emissions Spares Most Gas Plants*, BLOOMBERG L. (May 11, 2023, 1:34 PM), <https://www.bloomberg.com/news/articles/2023-05-11/biden-s-plan-to-cut-planet-warming-pollution-spare-most-gas-plants#xj4y7vzkg>; Jason Plautz, *EPA Power Plant Rules Are Coming. Are Utilities Ready?*, E&E NEWS (May 5, 2023, 6:58 AM), <https://www.eenews.net/articles/epa-power-plant-rules-are-coming-are-utilities-ready/>; see also Jean Chemnick, *Hundreds of Gas Plants Could Escape EPA Climate Rules*, E&E NEWS (May 3, 2023, 6:49 AM), <https://www.eenews.net/articles/hundreds-of-gas-plants-could-escape-epa-climate-rules/> (“Hundreds of gas plants could escape EPA climate rules.”).

126. EPA, National Emission Standards for Hazardous Air Pollutants: Reciprocating Internal Combustion Engines and New Source Performance Standards: Internal Combustion Engines; Electronic Reporting, 88 Fed. Reg. 41,361 (proposed June 26, 2023) (to be codified in 40 C.F.R. pt. 60) (addressing primarily hazardous air pollutants, nitrogen oxide and reducing the current 15 parts per million rate). See generally Sean Reilly, *EPA Agrees to Deal on Gas-Fired Power Plant Regs*, E&E NEWS (June 12, 2023, 1:18 PM), <https://subscriber.politicopro.com/article/eenews/2023/06/12/epa-agrees-to-deal-on-gas-fired-power-plant-regs-00101510>.

GAO released its report on federal actions necessary to address methane emissions from the oil and gas industry.¹²⁷ It further observed how the Interior Department, for fiscal year 2020, calculated that roughly 13.3 trillion cubic feet of gas had been produced off federal lands and that while most of that had been captured, just not all of it.¹²⁸ The report recommended that (1) EPA provide sufficient flexibility for operators to use alternative technologies to detect methane emissions and (2) that BLM consider whether to require gas capture plans possibly mirroring states plans for federal lands.¹²⁹ Each agency previously attempted regulations targeting methane reductions, which for different reasons faltered during the Trump Administration.¹³⁰ Now, once again, EPA finalized updated standards at the end of 2023.¹³¹ As it was doing this, it announced how it

127. U.S. GOV'T ACCOUNTABILITY OFF., GAO-22-104759, OIL AND GAS: FEDERAL ACTIONS NEEDED TO ADDRESS METHANE EMISSIONS FROM OIL AND GAS DEVELOPMENT (2022). Over 70 democratic senators requested that EPA ban flaring at oil wells. Jean Chemnick, *70+ Democrats Press EPA to Ban Methane Flaring at Oil Wells*, E&E NEWS (Feb. 22, 2023, 1:41 PM), <https://subscriber.politicopro.com/article/eenews/2023/02/22/70-democrats-press-epa-to-ban-methane-flaring-at-oil-wells-00083980>.

128. U.S. GOV'T ACCOUNTABILITY OFF., *supra* note 127.

129. *Id.*

130. EPA's 2016 oil and gas regulations, modified by 2020 technical amendments, Oil and Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35,824 (June 3, 2016) (to be codified at 43 C.F.R. pts. 3100, 3160 & 3170); 87 Fed. Reg. 74,702 (Dec. 6, 2022) (to be codified at 40 C.F.R. pt. 60) (updating Nov. 2021 proposed standards). BLM published a methane waste prevention rule in 2016, prompting litigation and a course change by the Trump Administration. 81 Fed. Reg. 83,008 (Nov. 18, 2016) (to be codified at 43 C.F.R. pts. 3100, 3160 & 3170).

131. EPA, Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review, https://www.epa.gov/system/files/documents/2023-12/eo12866_oil-and-gas-nsps-eg-climate-review-2060-av16-final-rule-20231130.pdf (pre-publication version, finalized on Dec. 3, 2023). Some in Congress fear EPA is not diligent enough in monitoring emissions. See Kelsey Brugger, *Democrats Float Bill Pushing EPA on Methane Reduction*, E&E NEWS (June 15, 2023, 7:03 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/15/dems-float-bill-pushing-epa-on-methane-reduction-00102039>. The EPA, however, reportedly is updating its methane reporting rules as a precursor for collecting methane emission charges under the IRA. See Jean Chemnick, *Oil and Gas Methane Rule Enters White House Review*, E&E NEWS (Sept. 29, 2023, 2:08 AM), <https://subscriber.politicopro.com/article/eenews/2021/09/14/epa-methane-plan-under-white-house-review-280574>; Jean Chemnick & Carlos Anchondo, *EPA Methane Reporting Proposal Sets Stage for Emission Fees*, E&E NEWS (July 7, 2023, 6:39 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/07/reporting-proposal-lays-foundation-for-ira-methane-fee-1-00105031>. One study suggests

would prioritize enforcement efforts geared toward reducing methane emissions from oil and gas facilities and from landfills.¹³²

Public Lands and Policy. BLM similarly hopes to ratchet down emissions from oil and gas activities on public (federal) lands. Although criticized for approving the Willow Project in Alaska,¹³³ overall the Biden Administration has deployed the nation's public lands to facilitate a green economy—emphasizing both onshore and offshore renewable energy projects.¹³⁴ After failed efforts to pause onshore and offshore oil and gas leasing,¹³⁵ it has embarked on other efforts to reduce threats from federal oil and gas activities—but principally in areas involving threats to species or cultural resources.¹³⁶ This is coupled with modifications to the federal onshore oil and gas leasing program that include increased royalty rates, rental fees, and ensuring competitive bidding.¹³⁷ And now, for the second time, BLM

that the lion share of emissions from oil and gas infrastructure can be attributed to 20 firms. See Carlos Anchondo, *20 Oil and Gas Firms Emit Half of Industry Methane—Report*, E&E NEWS (Apr. 23, 2023, 6:58 AM), <https://subscriber.politicopro.com/article/eenews/2023/05/23/ceres-and-catf-report-00098166>.

132. Memorandum from David M. Uhlmann, Assistant Administrator for Enforcement and Compliance Assurance, FY 2024-2027 National Enforcement and Compliance Initiatives (Aug. 17, 2023).

133. See Max Bearak, *It's Not Just Willow: Oil and Gas Projects Are Back in a Big Way*, N.Y. TIMES (Apr. 6, 2023), <https://www.nytimes.com/2023/04/06/climate/oil-gas-drilling-investment-worldwide-willow.html>.

134. See generally Mark Squillace & Sam Kalen, *Climate Change and Public Natural Resources*, in MICHAEL B. GERRARD, JODY FREEMAN, AND MICHAEL BURGER, GLOBAL CLIMATE CHANGE AND U.S. LAW (3d ed. 2023). The Biden Administration, for instance, has promoted critical mineral development from public lands, facilitated streamlining of wind and solar projects onshore, as well as favored approvals for offshore wind farms.

135. Section 50265 of the IRA ties awarding rights-of-way for renewable energy projects to offering oil and gas leases. Pub. L. No. 117-169, 136 Stat. 1818 (2022). In response, the department has issued guidance. See, e.g., BUREAU OF LAND MGMT., U.S. DEP'T OF INTERIOR, IM 2023-006, IMPLEMENTATION OF SECTION 50265 IN THE INFLATION REDUCTION ACT FOR EXPRESSIONS OF INTEREST FOR OIL AND GAS LEASES (2022); BUREAU OF LAND MGMT., U.S. DEP'T OF INTERIOR, IM-2023-010, OIL AND GAS LEASING – LAND USE PLANNING AND LEASE PARCEL REVIEWS (2022).

136. Press Release, U.S. Dep't of the Interior, Biden-Harris Administration Protects Chaco Region, Tribal Cultural Sites from Development (June 2, 2023), <https://www.doi.gov/pressreleases/biden-harris-administration-protects-chaco-region-tribal-cultural-sites-development>.

137. See Fluid Mineral Leases and Leasing Process, Proposed Rule, 88 Fed. Reg. 47,562 (proposed July 24, 2023) (to be codified at 43 C.F.R. pts. 3000 & 3100–3180); Press Release, U.S. Dep't of the Interior, Interior Department Takes Steps to Modernize Oil and Gas

is poised to regulate methane emissions from public lands.¹³⁸ Finally, BLM recently proposed a “conservation” rule that could facilitate greater emphasis on protecting lands from development; if implemented, some say it could impact oil and gas leasing on public lands.¹³⁹

PIPES Safety. On September 13, 2018, Columbia Gas of Massachusetts’ natural gas pipeline exploded and caused at least 40 homes in Merrimack Valley, MA, to catch fire. Congress responded by passing the Pipelines and Enhancing Safety Act of 2020, or the 2020 PIPES Act.¹⁴⁰ The act continued funding the pipeline safety program and amended the program administered by the PHMSA. Along with requiring updated and expanded safety standards, the PIPES Act imposed an obligation on PHMSA to address methane releases. In PHMSA’s Spring 2023 regulations implementing the 2020 PIPES Act, the agency observed how “[t]he amendments would reduce both “fugitive emissions” (meaning unintentional emissions resulting from leaks and equipment failures) and “vented emissions” (meaning those emissions resulting from blowdowns, equipment design features, and other intentional releases, also called “intentional emissions”) from over 2.7 million miles of gas transmission, distribution, and gathering pipelines and other gas pipeline facilities as well as 403 underground natural gas storage facilities (UNGSWFs) and 165 liquefied natural gas (LNG) facilities, thereby improving public safety, promoting environmental justice, and addressing the

Leasing on Public Lands, Ensure Fair Return to Taxpayers (July 20, 2023), <https://www.doi.gov/pressreleases/interior-department-takes-steps-modernize-oil-and-gas-leasing-public-lands-ensure-fair>.

138. Prevention, Production Subject to Royalties, and Resource Conservation, 87 Fed. Reg. 73,588 (proposed Nov. 30, 2022) (to be codified at 43 C.F.R. pts. 3160 & 3170). BLM proposed new waste prevention rule is designed “to reduce the waste of natural gas from venting, flaring, and leaks during oil and gas production activities.” *Id.* The proposal includes leak detection requirements and caps the amount of gas that companies can flare, for instance, without paying a royalty. *See generally* Carrie Jenks, Sara Dewey, & Abby Husselbee, *BLM Methane Waste Prevention Rule Summary*, HARV. L. SCH.: ENV’T & ENERGY L PROGRAM (Jan. 3, 2023), <http://eelp.law.harvard.edu/wp-content/uploads/BLM-Methane-Rule-Summary.pdf>.

139. *See* Bobby Magill, *Oil, Gas, Renewables at Stake as BLM Revamps Land Use Rule*, BLOOMBERG L.: ENV’T & ENERGY (Apr. 7, 2023, 5:30 AM), <https://news.bloomberglaw.com/environment-and-energy/oil-gas-renewables-at-stake-as-interior-reconsiders-land-use>.

140. Consolidated Appropriations Act, 2021, Pub. L. No. 116-260, 134 Stat. 1182 (2020). The agency recently proposed updates to address ongoing safety concerns. *See* Carlos Anchondo & Mike Soraghan, *Feds Seek Tougher Gas Line Rules After Fatal Massachusetts Blast*, E&E NEWS (Aug. 25, 2023), <https://pstrust.org/feds-seek-tougher-gas-line-rules-after-fatal-massachusetts-blast/>.

climate crisis.”¹⁴¹ Many in the natural gas industry have responded by accusing the agency of overreaching—threatening to impose unnecessary and unreasonable costs on pipelines.¹⁴²

Long Since Abandoned Development. Finally, in the last few years, increased attention has focused on addressing methane emissions from abandoned wells. Public and private lands are sprinkled with abandoned oil and gas wells, along with old, abandoned coal mines, which collectively contribute significantly to methane emissions.¹⁴³ The Natural Resources Defense Council even posted how these abandoned wells “[a]re [t]hreatening [l]ives and the [c]limate,” possibly according to a Reuters’ investigation, emitting almost several hundred thousand tons of methane a year.¹⁴⁴ The IRA responded to this lingering problem by including almost \$5 billion to help fund the closing of what could be many thousands of abandoned oil and gas wells.¹⁴⁵

141. Pipeline Safety: Gas Pipeline Leak Detection and Repair, 88 Fed. Reg. 31,890, 31,891 (proposed May 18, 2023) (to be codified at 49 C.F.R. pts. 191–193); *see also* Mike Soraghan, *Federal Pipeline Agency Rolls Out Methane Proposal*, E&E NEWS PM (May 5, 2023, 4:00 PM), <https://subscriber.politicopro.com/article/eenews/2023/05/05/federal-pipeline-agency-rolls-out-methane-proposal-00095624>.

142. *See* Mike Soraghan, *Gas Industry Blasts Biden Pipeline Methane Proposal*, E&E NEWS (Aug. 21, 2023, 6:47 AM), <https://subscriber.politicopro.com/article/eenews/2023/08/21/gas-industry-blasts-biden-methane-pipeline-proposal-00111919>.

143. The Interior Department reports that in 2019 “fugitive U.S. emissions from abandoned wells” roughly the equivalent of 7.1 million metric tons of CO₂. U.S. DEPT OF INTERIOR, ASSESSING METHANE EMISSIONS FROM ORPHANED WELLS TO MEET REPORTING REQUIREMENTS OF THE 2021 INFRASTRUCTURE INVESTMENT AND JOBS ACT (BIL): FEDERAL PROGRAM GUIDELINES 5 (Apr. 11, 2022), <https://www.doi.gov/sites/doi.gov/files/federal-orphaned-wells-methane-measurement-guidelines-final-for-posting-v2.pdf>; *see also* Daniel Raimi, *Plugging Abandoned Wells: Effects of the Draft Energy Infrastructure Act: Issue Brief 21-06*, RES. FOR THE FUTURE (July 2021), https://media.rff.org/documents/IB_21-06_v3.pdf; James P. Williams, Amara Regehr & Mary Kang, *Methane Emissions from Abandoned Oil and Gas Wells in Canada and the United States*, 55 ENV’T SCI. & TECH. 563 (2020). For a report about abandoned wells in California, *see* CAL. ENERGY COMM’N, CEC-500-2020-052, QUANTIFYING METHANE FROM CALIFORNIA’S PLUGGED AND ABANDONED OIL AND GAS WELLS: FINAL PROJECT REPORT (2020).

144. Jeff Turrentine, *Millions of Leaky and Abandoned Oil and Gas Wells Are Threatening Lives and the Climate*, NAT. RES. DEF. COUNCIL (July 26, 2021), <https://www.nrdc.org/stories/millions-leaky-and-abandoned-oil-and-gas-wells-are-threatening-lives-and-climate> (discussing 2020 *Reuters*’ report that looked at 2018).

145. *See* Brady Dennis, *There Could Be Millions of Abandoned Wells in the U.S. Plugging Them Is a Monumental Task*, WASH. POST (Apr. 11, 2023, 7:00 AM), <https://www.washingtonpost.com/climate-solutions/2023/04/11/plugging-abandoned-oil-wells/>; Shelby Webb, *States Struggle to Plug Oil Wells with Infrastructure Law Cash*, E&E NEWS (July 14, 2023, 7:12 AM),

III. ESCAPING AN ESCHER PRINT

Our continued embrace of natural gas congers images of an Escher print, a never-ending strange loop that optically obscures embedded anomalies. To avert a scenario where, in 2050, we have billions invested in natural gas infrastructure that becomes a stranded asset or continues to produce GHG emissions, we must assume—

* Natural gas remains essential for the modern electric grid and for home heating, at least for the next decade or so;

* Continued investment in natural gas infrastructure can be utilized to support the build-out of future robust hydrogen energy systems (for both producing and transporting hydrogen);

* Natural gas-powered electric generating stations will be coupled with CCUS technologies within a meaningfully significant time-frame; and

* Interim policies will be implemented swiftly enough to offset sufficiently the risk of meaningfully significant methane emissions.

Each assumption, unfortunately, contains a myriad of factors, leaving a wide margin of error. Before exploring a few critical ones, it is worth acknowledging that we must presume the political winds will remain calm enough to continue the present policies ushered in during the Biden Administration.¹⁴⁶ Then, we must accept that regulatory programs will be fashioned to account for market changes.¹⁴⁷

Arguably, more significantly, we must agree that new natural gas infrastructure is indispensable for a reliable electric grid and national supply of heating capacity. Projections seemingly suggest it is. Our electricity needs will grow between now and 2050;¹⁴⁸ and the transition to electric vehicles only intensifies the urgency of shoring up a reliable electric grid. Of course, even the EIA predicts that, by the early 2030s, the majority of natural gas produced in the United States will be exported either by

<https://www.eenews.net/articles/states-struggle-to-plug-oil-wells-with-infrastructure-law-cash/>.

146. Two top Republican presidential candidates, for instance, might promote more fossil fuel production and consumption. See Timothy Cama, *'Drill, Baby, Drill' Redux: Ahead of Debate, GOP Hopefuls Hone Energy, Climate Pitches*, E&E NEWS (Aug. 23, 2023, 1:32 PM), <https://subscriber.politicopro.com/article/eenews/2023/08/23/drill-baby-drill-redux-ahead-of-debate-gop-hopefuls-hone-energy-climate-pitches-00112289>.

147. See Mike Soraghan, *Biden Energy Agenda Exposes Regulatory Gap*, E&E NEWS (Feb. 6, 2023, 6:56 AM), <https://subscriber.politicopro.com/article/eenews/2023/02/06/biden-energy-agenda-exposes-regulatory-gap-00080259> (discussing need for regulatory modernization, principally for safety related to pipelines).

148. ANNUAL ENERGY OUTLOOK 2023, *supra* note 28, at 5 (“[W]e see stable growth in U.S. electric power demand through 2050 . . .”).

pipeline or as LNG: it “will become larger than any domestic end-user sector, including residential, commercial, industrial, and electric generation.”¹⁴⁹ Although we are the world’s largest consumer of natural gas and became a natural gas exporter in 2017 (and now the third largest exporter), as exports rose so, did production and a corresponding decrease in price, fueling additional consumption but not enough to offset the production increase.¹⁵⁰ And at least as of spring 2022, a Pew research report suggests the majority of Americans do not oppose funneling natural gas to overseas markets.¹⁵¹

This Essay cannot wade into the dialogue over whether renewable energy will be sufficient and, if so, when that might occur, but any assumption that natural gas will be essential for the electric grid for beyond another twenty years is problematic.¹⁵² Technological change occurs too rapidly to offer a sound prognosis for a future beyond, say, a decade. Projections about peak oil never materialized. High noon for natural gas faded into the sunset as horizontal drilling and hydraulic fracturing became economical.¹⁵³ Even without the Clean Power Plan, utilities shuttered their coal-fired power plants faster than would have been necessary under the plan. Battery technologies could improve dramatically, for storing electricity

149. Issues in Focus: Effects of Liquefied Natural Gas Exports on the U.S. Natural Gas Market, U.S. ENERGY INFO. ADMIN. (Mar. 16, 2023), https://www.eia.gov/outlooks/aeo/IIIF_LNG/ (last visited Feb. 1, 2024).

150. CONG. RSCH. SERV., R46723, U.S. ENERGY IN THE 21ST CENTURY: A PRIMER, 9–10 Cong. Res. Serv., (2021) at 9–10; *see also* ANNUAL ENERGY OUTLOOK 2023, *supra* note 28; EIA, AEO2023, *supra* note 149, at 23 (describing how United States’ natural gas consumption will remain relatively flat through 2040 and it will be a net exporter through 2050). One report relays how gas production soared in 2022 as a result of increased LNG demand, up 33% from 2017. Wolf Richter, *US Natural Gas Production Surges to Record in 2022, up 33% from 2017. LNG Exports Hit Record Despite Freeport Terminal Shutdown*, WOLF STREET (Mar. 3, 2023), <https://wolfstreet.com/2023/03/03/us-natural-gas-production-surges-to-record-in-2022-up-33-from-2017-lng-exports-hit-record-despite-freeport-terminal-shutdown/>.

151. Alec Tyson & Alison Spencer, *A Majority of Americans Favor Expanding Natural Gas Production to Export to Europe*, PEW RSCH. CTR. (May 12, 2022), <https://www.pewresearch.org/science/2022/05/12/a-majority-of-americans-favor-expanding-natural-gas-production-to-export-to-europe/>.

152. Twenty years may seem arbitrary, but meaningful technological changes can occur within a seven-to-ten-year range, and I simply doubled it to make the point more believable.

153. *See Natural Gas: U.S. Dry Natural Gas Production*, U.S. ENERGY INFO. ADMIN. (Sept. 29, 2023), <https://www.eia.gov/dnav/ng/hist/n9070us2m.htm>.

on the grid (married to renewables) and for automobiles. Notably, the automobile industry champions a transition to electric vehicles likely quicker than when anyone expected a decade ago. Widespread adoption of small modular reactors could transform the electric grid, and electric heat pumps could eclipse natural gas heating, while new homes could enjoy induction ranges rather than gas burners. After all, today, many enjoy talking on their Apple Watch, while ten years ago, it would be three years before Apple's Tim Cook would announce its arrival. A survey of senior business leaders in 2017 suggested that less than 20% were aware of artificial intelligence;¹⁵⁴ and today, one would be quite ill-informed to have not heard of ChatGPT. Consequently, while perhaps we lack confidence to profess that natural gas will be unnecessary for another twenty years (or less), we should be equally cautious to pronounce it will remain indispensable.

One significant assumption involves examining how much our natural gas pipeline infrastructure will support future robust hydrogen systems. Currently, the meager miles of hydrogen-dominant pipelines are concentrated in the Gulf Coast, and worldwide “most hydrogen pipelines are owned by merchant hydrogen producers who sell their hydrogen to industry in bulk.”¹⁵⁵ It seems somewhat trite to tout that new natural gas infrastructure should accommodate fuel switching,¹⁵⁶ when nothing currently demands it. No consensus even exists on the applicable regulatory program for hydrogen pipelines and accompanying infrastructure—some suggest hydrogen pipelines should be regulated under the Interstate Commerce Act; others promote the NGA.¹⁵⁷ And while FERC may employ the NGA when exploring tariffs that include other constituents flowing through a pipeline that could affect a line's integrity, such as renewable natural gas (or biogas),¹⁵⁸

154. Darrell M. West & John R. Allen, *How Artificial Intelligence Is Transforming the World*, BROOKINGS INST. (Apr. 24, 2018), <https://www.brookings.edu/articles/how-artificial-intelligence-is-transforming-the-world/>.

155. OFFUTT, *supra* note 88, at 7.

156. *See supra* note 112 and accompanying text. When examining green hydrogen as an alternative to approving additional natural gas infrastructure, the Commission indicated that “considerable uncertainty surround[s] forecasts for future penetration of non-pipeline alternatives such as renewable natural gas and green hydrogen given infrastructure, economic, safety, and feedstock-related challenges.” Transcon. Gas Pipe Line Co., 182 FERC ¶ 61,006 ¶ 31 (2023), *reh'g denied*, 182 FERC ¶ 61,148 (2023).

157. Compare William G. Bolgiano, *FERC's Authority to Regulate Hydrogen Pipelines Under the Interstate Commerce Act*, 43 ENERGY L.J. 1, 67 (2022) (favoring ICC regulation), with Michael Diamond, *Jurisdiction Over Hydrogen Pipelines and Pathways to an Effective Regulatory Regime*, EBA BRIEF, Fall 2022, at 1 (favoring NGA regulation).

158. *See, e.g.*, Dominion Energy Transmission, Inc., 175 FERC ¶ 61,091, at n.2 (2021).

using hydrogen as a justification for investing billions of dollars in new natural gas pipelines appears questionable. Some percentage of hydrogen and natural gas can safely be blended in existing natural gas pipelines and blending is not new, but just how much blending is possible remains uncertain—and the same is true for the accompanying compressors and equipment.¹⁵⁹ A late 2022 report by the National Renewable Energy Laboratory encouraged that “additional research across the entire hydrogen and natural gas supply chain will be needed to fill current knowledge gaps and better inform [decisionmakers] on future blending projects.”¹⁶⁰ And the Energy Department cautions that a blending percentage will “depend on the design and condition of current pipeline materials, of infrastructure equipment, and of applications that utilize natural gas.”¹⁶¹ In Europe, therefore, conversations focused on proposed new natural gas infrastructure include exploring its blending capabilities.¹⁶²

Case included Commission’s policy on examining gas quality, *see* Policy Statement Provisions Governing Gas Quality and Interchangeability in Interstate Natural Gas Pipeline Company Tariffs, 115 FERC ¶ 61,325 (2006).

159. Companies are testing the capacity for fuel switching using existing infrastructure. *See Federal Hydrogen Pipeline Regulatory Authorities: Hearing Before the S. Comm. on Energy & Nat. Res.*, 117th Cong. 2 (2022) (prepared statement of Dr. Holly Krutka, Executive Director, School of Energy Resources, University of Wyoming, at 2), <https://www.energy.senate.gov/services/files/634AB478-04F4-4B52-9B4F-6DD52BE5E19B>.

160. KEVIN TOPOLSKI, EVAN P. REZNICEK, BURCIN CAKIR ERDENER, CHRIS W. SAN MARCHI, JOSEPH A. RONEVICH, LISA FRING, ET AL., NAT. RENEWABLE ENERGY LAB’Y, HYDROGEN BLENDING IN NATURAL GAS PIPELINE INFRASTRUCTURE: REVIEW OF THE STATE OF TECHNOLOGY, at vi (2022), <https://www.nrel.gov/docs/fy23osti/81704.pdf>. Other studies suggest that existing infrastructure is capable of contributing toward upwards of 5% emissions reductions by blending. *See Blending Hydrogen With Natural Gas Could Help Fuel Energy Transition*, HYDROGEN CENT. (Feb. 9, 2023), <https://hydrogen-central.com/blending-hydrogen-natural-gas-could-help-fuel-energy-transition/>. The Department of Energy has a HyBlend program exploring blending opportunities. *See HyBlend: Opportunities for Hydrogen Blending in Natural Gas Pipelines*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, DEP’T OF ENERGY, <https://www.energy.gov/eere/fuelcells/hyblend-opportunities-hydrogen-blending-natural-gas-pipelines> (last visited Feb. 1, 2024) [hereinafter *HyBlend*]. Meanwhile, the IEA acknowledges that natural gas infrastructure is being repurposed to support 100% hydrogen, “[h]owever, practical experience is limited and significant reconfiguration and adaptation will be necessary.” Global Hydrogen Review 2022, INT’L ENERGY AGENCY (2022), <https://iea.blob.core.windows.net/assets/c5bc75b1-9e4d-460d-9056-6e8e626a11c4/GlobalHydrogenReview2022.pdf>.

161. *HyBlend*, *supra* note 160.

162. *See, e.g., How Hydrogen Blending Can Help Towards Decarbonizing Gas Systems*, MARCOGAZ (May 9, 2022), <https://www.marcogaz.org/how-hydrogen-blending-can-help->

Sadly, this question and others escape meaningful inquiry here in the United States. This is despite that companies like Southern California Gas Co., one of the nation's largest local gas distribution companies, is following an ASPIRE 2045 program for net zero emissions by 2045, highlighting hydrogen as a component—but principally green hydrogen from renewable energy.¹⁶³ While, therefore, any examination seemingly should be encouraged when considering any new natural gas infrastructure, FERC's program for considering new proposals abjures it. This is despite warnings in 2022 regarding how “FERC is under heightened pressure this year to reform the way it greenlights new pipelines, following recent court rulings and criticism that it has not done enough to analyze the environmental effects of natural gas infrastructure.”¹⁶⁴

FERC's Abdication. FERC exudes a penchant for approving new natural gas infrastructure absent compelling reasons counseling otherwise. Indeed, the Commission's approach toward reviewing natural gas projects has been plagued by various elemental concerns, most of which I chronicled earlier.¹⁶⁵ The Commission clings to an outdated 1999 policy for addressing NGA certificate applications.¹⁶⁶ When it attempted to update these policies that have since proven problematic, including the byzantine way the Commission and the pipeline companies employ NGA's eminent domain authority, often to the detriment of landowners, the fierce backlash stalled the effort.¹⁶⁷ Notably, however, three issues inform our present

towards-decarbonizing-gas-systems/.

163. See *One Year Later: Where We Are on Our Climate Goals*, SOCALGAS (Apr. 21, 2022), <https://newsroom.socalgas.com/stories/one-year-later-where-we-are-on-our-climate-goals>. Xcel Energy hopes to achieve net zero by 2050, along with net zero methane emissions by 2030, and it announced how it would focus on certified low emission natural gas and testing of renewable natural gas. Dave Kovaleski, *Xcel Energy Sets Goal of Net-Zero Carbon Emissions from Natural Gas Business by 2050*, DAILY ENERGY INSIDER (Nov. 2, 2021), <https://dailyenergyinsider.com/news/32540-xcel-energy-sets-goal-of-net-zero-carbon-emissions-from-natural-gas-business-by-2050/>. Even oil and gas giant British Petroleum, along with others in industry, accept a net zero requirement by 2050 (or sooner). *Getting to Net Zero: Climate Advocacy in the US*, BP, https://www.bp.com/en_us/united-states/home/who-we-are/advocating-for-net-zero-in-the-us.html (last visited Feb. 1, 2024).

164. See Niina H. Farah, Miranda Willson & Carlos Anchondo, *How FERC, Courts May Change Pipeline Industry in 2022*, E&E NEWS (Jan. 20, 2022, 7:14 AM), <https://www.eenews.net/articles/how-ferc-courts-may-change-pipeline-industry-in-2022/>.

165. See generally Kalen, *supra* note 4.

166. See Certification of New Interstate Natural Gas Pipeline Facilities, 88 FERC ¶ 61,227 (1999), *clarified*, 90 FERC ¶ 61,128 (2000), *further clarified*, 92 FERC ¶ 61,094 (2000).

167. See Miranda Willson, *FERC Rejects Challenges to Gas Climate Reviews*, E&E NEWS

discussion. First, the Commission employs a rate of return for newly constructed interstate natural gas pipelines that affords a rate of return that is arguably too enticing from a short-term business perspective.¹⁶⁸ This could favor capital investments in pipelines when the investment might appear profitable in the short-term, regardless of future regulatory initiatives that might shorten the economic life of a project—and possibly produce a stranded investment.¹⁶⁹

Second, FERC's examination of whether a project is in the public interest and, as such, a need for the natural gas is anything but searching. FERC exhibits an affinity for approving a proposed natural gas infrastructure project, absent strong evidence questioning the merits of a particular project.¹⁷⁰ In her analysis of FERC's approval of 125 pipeline projects between 2014 and 2018, Romany Webb concluded that FERC generally avoids examining environmental issues in any depth—focusing more on economic analysis.¹⁷¹ Its 1999 Certificate Policy skews the deck: it emphasizes an economic test that balances the beneficial and adverse

(Apr. 13, 2022), <https://subscriber.politicopro.com/article/eenews/2022/04/13/ferc-projects-challenges-to-gas-climate-reviews-00024814>; Miranda Willson, *FERC Retreats on Gas Policies as Chair Pursues Clarity*, E&E NEWS (Mar. 25, 2022, 8:55 AM), <https://www.eenews.net/articles/ferc-retreats-on-gas-policies-as-chair-pursues-clarity/>; see also Kalen, *supra* note 4, at 357–58; Sam Kalen & Shi-Ling Hsu, *Natural Gas Infrastructure: Locking in Emissions?*, NAT. RES. & ENV'T, Spring 2020, at 3, 5–6.

168. See Kalen, *supra* note 4, at 363–64.

169. See Kalen & Hsu, *supra* note 167. For new or expanded facilities, pipelines can charge either a negotiated rate or an incremental rate (imposing the added costs associated solely with expanding or improving facilities for those who would benefit). See *Fairless Energy LLC v. FERC*, 77 F.4th 1140, 1144 n.3 (D.C. Cir. 2023) (FERC applied a higher incremental rate rather than a rolled in rate over shipper's objection, due to lack of negotiated rate).

170. See, e.g., *Alliance Pipeline, L.P.*, 184 FERC ¶ 61,024 (2023) (on rehearing, approving Three Rivers Interconnection Project); *Columbia Gas Transmission, LLC*, 182 FERC ¶ 61,171 (2023) (increasing capacity for system in Virginia); *West Texas Gas, Inc.*, 182 FERC ¶ 61,019 (2023) (authorizing U.S./Mexico pipeline); *Cameron LNG, LLC*, 182 FERC ¶ 61,173 (2023) (amending authorization for LNG project); *Commonwealth LNG, LLC*, 181 FERC ¶ 61,143 (2022) (authorizing LNG project); *Tennessee Gas Pipeline Co., LLC*, 181 FERC ¶ 61,051 (2022) (on rehearing, approving natural gas compression facilities); *Chesapeake Utilities Corp.*, 180 FERC ¶ 62,098 (2022) (extending service area); *Iroquois Gas Transmission System, L.P.*, 178 FERC ¶ 61,200 (2022) (approving compression and gas cooling facilities).

171. Romany M. Webb, *Climate Change, FERC, and Natural Gas Pipelines: The Legal Basis for Considering Greenhouse Gas Emissions Under Section 7 of the Natural Gas Act*, 28 N.Y.U. ENV'T L. J. 179, 208–09 (2020).

economic effects, and only when the former outweighs the latter will it proceed with an environmental analysis.¹⁷² And the economic analysis, as noted above, is often skewed because FERC merely relies on precedent agreements with little scrutiny unless forced.¹⁷³ If existing customers are not being asked to subsidize a new project, no adverse effects would exist; if the project is a greenfield project, FERC similarly expresses little economic concern because it considers the risk of subsidization or degradation of existing customers unlikely.¹⁷⁴ For instance, the D.C. Circuit chastised FERC for not examining the adequacy of the precedent agreements for the NEXUS Gas Transmission project that were designed, according to the City of Oberlin, Ohio, for exporting gas to Canada.¹⁷⁵ FERC responded to the court's remand by concluding that, regardless of the precedent agreements, shipping gas to Canada was in the public interest in accordance with its 1999 policy statement.¹⁷⁶ Perhaps so, but the outcome

172. See *Spire STL Pipeline LLC*, 181 FERC ¶ 61,232, at 10 (2022).

173. See *supra* note 49 and accompanying text.

174. See *Spire STL Pipeline LLC*, 181 FERC ¶ 61,232, at 10 (2022).

175. See *City of Oberlin v. FERC*, 937 F.3d 599, 606 (D.C. Cir. 2019). The court noted that FERC could have approved the project without even relying on the export precedent agreements (for about 17% of the pipeline's capacity), but FERC never so justified its decision. See *City of Oberlin v. FERC*, 39 F.4th 719, 723–24 (D.C. Cir. 2022). Section 7 Certificates apply to Canadian border crossing pipelines. *Id.* at 723 n.1.

176. *City of Oberlin*, 39 F.4th at 725. Similarly, for the Spire STL Missouri pipeline, after the D.C. Circuit held that FERC failed to employ its policy and examine the need for the natural gas (the pipeline had secured only one binding precedent agreement with an affiliate company for 87.5% of its capacity.) *Env't Def. Fund v. FERC*, 2 F.4th 953, 959 (D.C. Cir. 2021). The Commission issued a temporary certificate allowing the company to continue operating, and then, on remand, it issued a certificate once again. *Spire SLT Pipeline LLC*, 181 FERC ¶ 61,232, at 1 (2022). It rejected the Niskanen Center's objection to the temporary certificate, including the company's accompanying use of eminent domain authority, and it rejected the need for any supplemental briefing or possibly initiating a new proceeding. The Commission accepted it erred by relying on a singular precedent agreement (with an affiliated company) without any further inquiry, but its further inquiry focused principally on the fact that the company had been operating under a temporary certificate with that singular shipper and those subsequent facts suggested a sufficient demand for the natural gas. *Id.* at 7. Commissioners Danly and Clements' concurring opinions in *Spire STL* suggests that the Commission will be more vigilant in the future in examining precedent agreements, particularly when they involve affiliated entities. FERC's reliance on precedent agreements with affiliated companies became a matter of some concern. See Miranda Willson, 'Self-Dealing' Loophole Could Upend FERC Pipeline Reviews, E&E NEWS (May 28, 2021, 7:11 AM), <https://www.eenews.net/articles/self-dealing-loophole-could-upend-ferc-pipeline-reviews/>.

seemed preordained. Not surprisingly, the Commission's environmental analysis also occasionally appears slim upon review—ostensibly diminishing a project's impact on the environment, aside from on the climate.¹⁷⁷

Finally, the Commission openly struggles with whether or how to examine GHG emissions associated with a proposed project. The Commission's somewhat mercurial approach toward addressing GHG emissions associated with a project is possibly the most pronounced instance of where meaningful climate change policy is avoided.¹⁷⁸ It became part of the floundering play by the Commission to update its 1999 Certificate Policy, only to cost its then-acting Chairman his job.¹⁷⁹ FERC generally avoids examining upstream (indirect) effects of possibly inducing more natural gas development.¹⁸⁰ And when it can, it relegates the importance of downstream GHG emission effects as well.¹⁸¹ During the 2023 summer, FERC Commissioner Allison Clements lamented how the Commission not only ought to revisit updating its Certificate Policy but should also comply with the requirement to consider and assess GHG emissions associated with a project approval.¹⁸² The D.C. Circuit soon

177. *See, e.g.*, *Sierra Club v. FERC*, 68 F.4th 630, 636 (D.C. Cir. 2023) (disagreeing with Commission's judgment that additional supplemental analysis of erosion and sedimentation was unnecessary for the MVP project environmental document), *vacated*, 2023 WL 5537562 (D.C. Cir. Aug. 25, 2023). The environmental review process for Endangered Species Act compliance is occasionally unique. In one instance, only after the Commission issued its order, in October 2022, did the Commission staff request formal consultation with the U. S. Fish and Wildlife Service. The Service extended the period for preparing the Biological Opinion, until March 2023. The Biological Opinion for the Project was issued on April 5, 2023 after FERC's record of decision, and in a June 8, 2023 letter, FERC just asked the company to commit to all its terms and conditions to avoid any potential for taking federally listed bats. Environmental Information Request, Texas Gas Transmission, LLC, No. CP21-467-000 (Off. of Energy Projects, FERC June 8, 2023).

178. *See* Kalen, *supra* note 4, at 352.

179. *See* Ethan Howland, *FERC Chairman Glick to Exit Agency by Early January, Setting up Possible Tied-Vote Deadlocks*, UTIL. DIVE (Dec. 16, 2022), <https://www.utilitydive.com/news/ferc-glick-retain-leave-deadlock/638944/>; Catherine Morehouse, *FERC's Murky Leadership Future Could Derail U.S. Climate Goals*, POLITICO (Sept. 16, 2022, 12:00 PM), <https://www.politico.com/news/2022/09/16/renewables-policies-ferc-richard-glick-00056402>.

180. *See* *Del. Riverkeeper Network v. FERC*, 45 F.4th 104, 109 (D.C. Cir. 2022).

181. *Id.* at 109–10 (explaining FERC can exercise its expertise to assess to what degree downstream emissions are reasonably foreseeable); *see id.* at 110–12 (stating that the D.C. Circuit refused to allow the petitioner to raise issues about GHG emissions, including whether to use the social cost of carbon, not adequately raised below). *See generally* Webb, *supra* note 171.

182. Daniel Moore, *Gas Approvals Lack Emissions Reviews, FERC Commissioner Says*, BLOOMBERG L. (June 15, 2023, 1:05 PM), <https://news.bloomberglaw.com/environment->

thereafter suggested in an oral argument that perhaps the Commission ought to delay approving new projects until it updates its policy.¹⁸³

When the Commission considered the Henderson County Expansion Project, a roughly twenty-four-mile pipeline from Kentucky to Indiana, it refused to announce any judgment on whether the environmental analysis should have employed the social cost of carbon as a metric for assessing GHG emissions.¹⁸⁴ When announcing the availability of the environmental impact statement (EIS), it noted how the document “is not characterizing the Project’s greenhouse gas emissions as significant or insignificant because the Commission is conducting a generic proceeding to determine whether and how the Commission will conduct significance determinations going forward.”¹⁸⁵ During scoping for the project, the EPA expressed its concerns with the purpose of and need for the project, as well as its possible climate change impacts (including from methane leakage) and potential impact to wetlands.¹⁸⁶ It later repeated aspects of these concerns when commenting on the final EIS.¹⁸⁷ The Citizens Action Coalition of Indiana, however, requested rehearing of the Commission’s October 20, 2022 Order granting the necessary authorizations, specifically objecting to an allegedly deficient EIS.¹⁸⁸ In a controversial move, the Commission denied

and-energy/gas-approvals-lack-emissions-reviews-ferc-commissioner-says; Daniel Moore, *Gas Projects in Limbo as Energy Regulators Split on Emissions*, BLOOMBERG L. (Sept. 19, 2023, 5:30 AM), <https://news.bloomberglaw.com/environment-and-energy/gas-projects-in-limbo-as-energy-regulators-split-on-emissions>.

183. Niina H. Farah, *D.C. Circuit Case Could Transform FERC’s NEPA Reviews*, E&E NEWS (Sept. 6, 2023, 6:41 AM), <https://subscriber.politicopro.com/article/eenews/2023/09/06/d-c-circuit-case-could-transform-nepa-reviews-at-ferc-00114062>.

184. *See* Texas Gas Transmission, LLC, Notice of Availability of Environmental Impact Statement for the Proposed Henderson County Expansion Project, 87 Fed. Reg. 53,470 (Aug. 31, 2022). The project would deliver “up to 220,000 dekatherms per day of new firm transportation to” southern Indiana. *Id.*

185. Texas Gas Transmission, LLC, Notice of Availability of Environmental Impact Statement for the Proposed Henderson County Expansion Project, 87 Fed. Reg. 53,470. Of course, the Commission referenced its 2022 notice (Consideration of Greenhouse Gas Emissions in Natural Gas Infrastructure Project Reviews, 178 FERC ¶ 61,108 (2022); 178 FERC ¶ 61,197 (2022)), that has been delayed for political reasons, as discussed.

186. EPA Region 4 to FERC, EPA Comments on the Final Environmental Impact Statement for the Henderson County Expansion Project, FERC CP21-467-000. CEQ No. 20220124, Oct. 3, 2022.

187. *Id.* EPA suggested that FERC address its concerns in the Record of Decision and as part of approving the project’s final design. *Id.*

188. Texas Gas Transmission, LLC, 181 FERC ¶ 61,049 (Oct. 20, 2022), appeal filed D.C. Circuit, Feb. 21, 2023; *cf.* Miranda Willson, *FERC Meeting: Glick Warning, ‘Self-Dealing’*

rehearing in June 2023 without addressing the principal argument about analyzing GHG emissions.¹⁸⁹ And the Commission’s spokesperson deflected criticism by observing how “[t]he Commission has made tremendous progress clearing the backlog of natural gas infrastructure projects needed for reliability” and Chairman Phillips “remains consistent and cooperative” in “mov[ing] orders forward.”¹⁹⁰

LNG: FERC and DOE. LNG export projects must wade through a labyrinth regulatory process that includes DOE as well as FERC, but the cards generally remain in their favor. For the most part, LNG export decisions by DOE are presumptively considered as in the public interest.¹⁹¹ After 1992, countries with a free trade agreement (FTA) with the United States “shall be deemed to be consistent with the public interest” and, as such, granted the authority to export “without modification or delay.”¹⁹² Similarly, the presumption also applies to “small-scale” natural gas exports to non-FTA countries.¹⁹³ Then, for larger export projects in countries without an FTA, DOE conducts any relevant environmental inquiry and seemingly examines whether approving the export would serve the public interest.¹⁹⁴ As of April 2023, DOE had existing authorizations under forty-one long-term orders for exporting 49.83

and Pipeline Win, E&E NEWS (Oct. 21, 2022, 6:55 AM), <https://www.eenews.net/articles/ferc-meeting-glick-warning-self-dealing-and-pipeline-win/>.

189. Miranda Willson, *FERC Pipeline Battle Erupts Over Social Cost of Carbon*, E&E NEWS (June 9, 2023, 7:14 AM), <https://subscriber.politicopro.com/article/eenews/2023/06/09/ferc-pipeline-battle-erupts-over-social-cost-of-carbon-00101098>.

190. *Id.*; see also Jason Plautz & Zach Bright, *FERC Approves Wave of Gas Projects as Democrats Fume*, E&E NEWS (Oct. 20, 2023, 6:59 AM), <https://www.eenews.net/articles/ferc-approves-wave-of-gas-projects-as-democrats-fume/>.

191. See *Panhandle Producers & Royalty Owners Ass’n v. Econ. Regul. Admin.*, 822 F.2d 1105, 1111 (D.C. Cir. 1987); *W. Va. Pub. Serv. Comm’n v. U.S. Dep’t of Energy*, 681 F.2d 847, 856 (D.C. Cir. 1982).

192. 15 U.S.C. § 717b(c).

193. 10 C.F.R. § 590.102(p); 10 C.F.R. § 590.208(a); DOE, *Small Scale Natural Gas Exports: Final Rule*, 83 Fed. Reg. 35,106 (July 25, 2018) (to be codified at 10 C.F.R. pt. 590). DOE explained it was providing its policy to exports of up to 51.75 billion cubic feet (Bcf) per year (equivalent to 0.14 Bcf per day) when doing so would not require preparing any National Environmental Policy Act document. *Id.* This policy responded to emerging markets, particularly in the Caribbean, Central America, and South America, where transportation costs are less and the policy would “allow for greater diversity and competition in the natural gas market, consistent with the public interest under NGA section 3(a).” *Id.* at 35,107.

194. See DOE, *Policy Statement on Export Commencement Deadlines in Authorizations to Export Natural Gas to Non-Free Trade Agreement Countries*, 88 Fed. Reg. 25,272, 25,274 (Apr. 26, 2023).

Bcf/d, excluding FTA and small-scale exports.¹⁹⁵

Recent DOE authorization orders suggest the department follows President Biden's earlier commitment to promote LNG exports, primarily for Europe.¹⁹⁶ And, analogously, Europe correspondingly has, for the first time, received more natural gas from LNG imports than from pipelines.¹⁹⁷ The 2022 Environmental Integrity Project suggests that, as of that year, the DOE's "role in the LNG permitting process is largely one of a rubber stamp."¹⁹⁸ In 2022, for instance, DOE expanded the volume authorized for export from two Gulf Coast terminals.¹⁹⁹ And in DOE's listing of its

195. *Id.* Of the amount authorized, though, at least in 2022 exports were only at 10.6 Bcf/d, up from almost zero in 2016. See Ben Cahill & Sophie Coste, *Subtle Shift in U.S. LNG Export Authorizations*, CTR. FOR STRATEGIC & INT'L STUD. (July 28, 2023), <https://www.csis.org/analysis/subtle-shift-us-lng-export-authorizations>.

196. See *supra* note 31 and accompanying text. EIA's 2023 annual report projects that, in its reference case, U.S. natural gas production will increase by 15% from 2022 to 2050, while consumption will decrease by 6%, with the demand for production responding to the need for exports that could continue through 2050. ANNUAL ENERGY OUTLOOK 2023, *supra* note 28, at 22–29.

197. See Priscila Azevedo Rocha & Anna Shiryayevskaya, *Europe's LNG Imports Overtake Pipeline Gas for First Time*, BLOOMBERG L. (June 26, 2023, 5:03 AM), <https://news.bloomberglaw.com/international-trade/europes-lng-imports-overtake-pipeline-gas-for-first-time>. Greenpeace accuses the United States of inappropriately employing Europe's gas shortage crisis as a justification for increasing LNG exports. See Ed Reed, *US LNG May Take Top Billing, But the Future is Uncertain*, ENERGY VOICE (Apr. 28, 2023, 4:58 PM), <https://www.energyvoice.com/oilandgas/europe/lng-europe/499789/us-lng-may-take-top-billing-but-the-future-is-uncertain/>.

198. Claire Krebs & Patrick Anderson, *The Advocate's Guide to Effective Participation in Environmental Permit Proceedings: For New and Expanded Liquefied Natural Gas (LNG) Export Facilities*, ENV'T INTEGRITY PROJECT, at 128 (2022), https://environmentalintegrity.org/wp-content/uploads/2022/05/LNG-guide-5_4_22.pdf; see also Alexandra Shaykevich, Courtney Bernhardt & Griffin Bird, *Playing with Fire: The Climate Impact of the Rapid Growth of LNG*, ENV'T INTEGRITY PROJECT (2022), <https://environmentalintegrity.org/wp-content/uploads/2022/07/FINAL-LNG-REPORT-7.27.22-REVISION.pdf>. DOE nevertheless is considering employing new metrics when analyzing LNG projects. See Brian Dabbs, *DOE Urged to Halt Plans on Climate-Friendly Gas*, E&E NEWS (July 19, 2023, 6:56 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/19/doe-urged-to-halt-plans-on-climate-friendly-gas-00106952>. Some in the environmental community are encouraging DOE to be more careful when considering approving even projects with arguably a smaller environmental footprint. See *id.*

199. See OFF. OF FOSSIL ENERGY & CARBON MGMT., U.S. DEP'T. OF ENERGY, NEW ORDERS GRANT EXPANDED EXPORTS TO NON-FREE TRADE AGREEMENT COUNTRIES FROM TWO PREVIOUSLY AUTHORIZED PROJECTS IN TEXAS AND LOUISIANA (APR. 27, 2022),

178 orders in 2022, it appears the department generally accepts the industry's requests.²⁰⁰ The Administration's support for an LNG project in Alaska further illustrates its cautious approach toward chilling any LNG investment.²⁰¹ When, moreover, the D.C. Circuit upheld the \$39 billion Alaska LNG project, the FERC Chairman observed how it reflected "the fact [that] we're moving in the right direction" for energy policy.²⁰²

To be sure, DOE seemingly strengthened its approval policy by announcing how a company will have only up to seven years from an order granting the authorization to commence construction (or, before ninety days prior to the seven-year expiration period, apply for an extension).²⁰³ The industry perceived this as tightening standards

<https://www.energy.gov/fecm/articles/us-department-energy-issues-export-authorizations-two-lng-projects>; see also Timothy Gardner & Valerie Volcovici, *Biden Administration Approves More LNG Exports to Europe*, REUTERS (Mar. 17, 2022, 5:39 PM), <https://www.reuters.com/world/us/biden-administration-approves-more-exports-major-us-lng-terminals-2022-03-16/>; Sara Schonhardt & Scott Waldman, *Biden Increases LNG Exports as Europe Faces Energy Crisis*, E&E NEWS (Mar. 25, 2022, 7:41 AM), <https://www.eenews.net/articles/biden-increases-lng-exports-as-europe-faces-energy-crisis-2/>; Mike Soraghan & Carlos Anchondo, *Biden's LNG Deal with Europe Jolts Gas Critics*, E&E NEWS (Mar. 28, 2022, 7:05 AM), <https://www.eenews.net/articles/bidens-lng-deal-with-europe-jolts-gas-critics/>; Benjamin Storrow, *More LNG Is About to Be Exported. Here's the Climate Impact*, E&E NEWS (Mar. 18, 2022, 6:54 AM), <https://subscriber.politicopro.com/article/eenews/2022/03/18/more-lng-is-about-to-be-exported-heres-the-climate-impact-00018353>.

200. Excluding errata's and a change in control, see OFF. OF FOSSIL ENERGY & CARBON MGMT., U.S. DEP'T OF ENERGY, Listing of DOE Authorization/Orders Issued in 2022 (Dec. 20, 2022), <https://www.energy.gov/fecm/articles/listing-doe-authorizationsorders-issued-2022>.

201. See generally Rachel Franzin, *Biden Administration OKs Alaska Natural Gas Exports, Drawing Progressive Ire*, THE HILL (Apr. 14, 2023, 7:30 PM), <https://thehill.com/policy/energy-environment/3951485-biden-administration-oks-alaska-natural-gas-exports-drawing-progressive-ire/>. In 2024, the Administration appears poised to alter its apparent embrace of LNG. See Ari Natter and Ruth Lia, *Biden Mulls Tougher Climate Test for New LNG Projects*, BLOOMBERG L.: ENV'T & ENERGY (Jan. 10, 2024, 9:20 AM), <https://news.bloomberglaw.com/environment-and-energy/white-house-assembles-climate-advisers-on-lng-export-approvals>.

202. See Daniel Moore, *US Regulator Applauds Alaska LNG Ruling, Backs Energy Projects*, BLOOMBERG L.: ENV'T & ENERGY (May 18, 2023, 2:09 PM), https://www.bloomberglaw.com/bloomberglawnews/environment-and-energy/XD3C1P8400000?bna_news_filter=environment-and-energy#jcite.

203. DOE, Policy Statement on Export Commencement Deadlines in Authorizations to Export Natural Gas to Non-Free Trade Agreement Countries, 88 Fed. Reg. 25,272, 25,274 (Apr. 26, 2023).

surrounding LNG approvals.²⁰⁴ Yet, as DOE explained, this policy reflects LNG orders since 2011, and most of what DOE is concerned with is allowing companies to stretch out too long by continuing to seek extensions (sometimes at the last minute) when they commence construction. This appears unlikely to chill LNG proposals.²⁰⁵

CONCLUSION

How the United States confronts the natural gas gambit is quintessentially a role for energy experts capable of canvassing the panoply of factors informing how at least the United States can reach net zero by 2050. Whether that means continuing FERC's approach toward considering new or modified interstate natural gas projects or DOE's presumption toward approving LNG export projects remains a complicated matter. Perhaps too, at least for now, natural gas is fundamental to stabilizing the electric grid, and there is little we should do. After all, EIA projects that even if a natural gas moratorium were imposed in 2024, it would merely reduce CO₂ emissions from all sectors by a paltry 1% by 2050.²⁰⁶ And whether natural gas infrastructure ought to remain tethered to the burgeoning hydrogen-centric energy push is a query still in its infancy. Answering it, in part, naturally requires addressing whether existing and future efforts will target green or blue hydrogen.²⁰⁷ The former might diminish the role of existing natural gas

204. See Alan Kovski, *DOE Tightens Policy on Extensions for LNG Export Approvals*, OIL & GAS J. (Apr. 25, 2023), <https://www.ogj.com/general-interest/government/article/14292850/doe-tightens-policy-on-extensions-for-lng-export-approvals>.

205. Two observers describe the change as “subtle” and “relatively small” but important for sending a clear message for the timeline for constructing LNG facilities. Cahill & Coste, *supra* note 195. FERC too is being questioned, likely unsuccessfully, on its approach toward approving of extensions to timelines for companies to begin construction. See Niina H. Farah, *D.C. Circuit Leans Toward FERC in Gas Project Brawl*, E&E NEWS (Sept. 19, 2023, 7:06 AM), <https://www.eenews.net/articles/d-c-circuit-leans-toward-ferc-in-gas-project-brawl/>.

206. Camille Bond, *Pipeline Ban May Not Cut CO₂ Much, Feds Say*, E&E NEWS (Apr. 1, 2022, 7:25 AM), <https://subscriber.politicopro.com/article/eenews/2022/04/01/pipeline-ban-may-not-cut-co2-much-feds-say-00022065>.

207. Brian Dabbs, *White House Launches Task Force to Boost ‘Clean’ Hydrogen*, E&E NEWS (Aug. 21, 2023, 6:46 AM), <https://subscriber.politicopro.com/article/eenews/2023/08/21/white-house-launches-task-force-to-boost-clean-hydrogen-00111870>. The article explained that DOE's apparent focus is on green hydrogen, but it remains unclear whether it will be so limited. If Europe favors green hydrogen, that too could diminish the U.S.'s impetus toward blue hydrogen coupled with CCUS. See David Iaconangelo, *EU's ‘Green’ Hydrogen Rules May Shape American Industry*, E&E NEWS (July 7, 2023, 6:38 AM), <https://subscriber.politicopro.com/article/eenews/2023/07/07/e-u-s-green-hydrogen->

infrastructure, consequently. But that, of course, could, in turn, be tempered by how the Internal Revenue Service deploys the 45V tax credit and whether that credit will be available for marrying other renewable resources, such as small modular reactors, with hydrogen or whether the credit (for purposes of “additionality”) will favor marrying hydrogen to natural gas.²⁰⁸

No crystal ball can project regulatory changes, technological advances, and market changes that could steer us along the foremost path forward. Instead, we must develop institutional procedural mechanisms sufficiently comprehensive and flexible enough to monitor trends and, correspondingly, render efficacious decisions from gathered information. Our existing regulatory structure arguably does the opposite. Each participant, whether state or local entities, FERC or some other federal agency, contributes in some measure to energy choices, but their regulatory or other charge narrows their focus to what is before them. Each year EIA may project twenty-five years into the future, but transformations occur rapidly, and little about EIA’s efforts impact the choices made by the energy-related actors, such as FERC. To confront all facets of climate change, particularly the prospects for natural gas and how to eliminate methane emissions, that must change.

We should construct appropriate institutional mechanisms capable of asking the right questions. This suggests state regulatory commissions and FERC ought to appreciate how their decisions today can solidify possibly problematic natural gas infrastructure long after the immediate need for natural gas has faded. To avert this scenario, they should be capable of probing whether any proposal involving natural gas is absolutely necessary, not only today or the following year but five or more years hence as well. Regional entities could be formed to aid the endeavor; and those entities should be tasked with combining EIA’s analyses with similar regional assessments and projections on the need for natural gas not just immediately but for the entire physical and economic life of the infrastructure. This ought to include requiring any proposal for new natural gas infrastructure to accept a decommissioning or transition plan. FERC, for instance, should demand

rules-may-shape-american-industry-00104594 (describing EU’s approach, albeit with a broader approach toward green hydrogen capable of being created off a grid with fossil fuels, and possible US exports of green hydrogen).

208. Dabbs, *supra* note 207; see also David Iaconangelo, *Treasury to Miss Deadline for IRA Clean Hydrogen Guidance*, E&E NEWS (Aug. 11, 2023, 6:23 AM), <https://subscriber.politicopro.com/article/eenews/2023/08/11/treasury-to-miss-deadline-for-ira-clean-hydrogen-guidance-00110763>. The Administration floated proposed hydrogen tax guidance in December 2023, precipitating dialogues about whether the tax incentive will be sufficient. See Christian Robles, *3 Questions Will Shape Biden’s Hydrogen Plan*, E&E NEWS (Jan. 4, 2024), <https://www.eenews.net/articles/3-questions-will-shape-bidens-hydrogen-plan/>.

from applicants an enforceable timeline for achieving zero emissions: when will the project proponent commit to CCUS, agree to transition away from natural gas and toward hydrogen, or otherwise agree to shutter the infrastructure? A commitment, in short.

Climate change is propelling us into a perilous future, and yet we continue to promote natural gas with unverified assumptions about how we can arrest methane emissions. Those assumptions may well prove our prescience. Natural gas may well provide a catalyst capable of transitioning our energy systems toward a much more dominant hydrogen-based economy. But a gambit with natural gas is risky. Our future, consequently, warrants being cautious and charging our institutions with the obligation to prevent natural gas from becoming a proverbial sword of Damocles preventing our transition to a zero-carbon economy sooner rather than later.