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State Energy Cartels

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James W. Coleman†

Fracking has made America the center of global oil production and the engine of the world's economy. But haste makes waste. America's new oil wells are releasing natural gas as well, which is prized as a clean and reliable fuel around the world but must be simply burned off or "flared" if there are no pipelines to bring it to the customers that need it. The pace of the oil boom and the challenges of building new pipelines have forced oil companies to flare staggering quantities of natural gas. Texas and North Dakota are now flaring—that is, wasting—more gas than many states or even nations consume. This Article shows that to stop this economic and environmental waste, states must develop a new approach to antitrust law. It makes the case for state energy cartels.

One of the few consensus grounds for regulation is preventing abuse of market power—preventing dominant suppliers from increasing their profits by selling less at higher prices. States break up producer cartels so that competition provides consumers with lower prices. But what happens when a state's interest coincides with producers rather than consumers? The economic health of major energy exporters depends on the price of the products they export. That is, these states, provinces, and countries can benefit by increasing the price of the oil and gas. For the first half of the twentieth century, the United States was the world's premier oil exporter; during that time, U.S. states cooperated as a de facto cartel to ensure higher oil prices. When other countries overtook the United States as the world's top oil producers, they formed the Organization of Petroleum Exporting Countries (OPEC) to play a similar role.

This Article explains how state cartels offer the best solution to the flaring crisis and a unique opportunity for productive global cooperation to address climate change. It shows how states can slow production, protect the environment, and increase their industries' profits by adapting and perfecting tools that the United

† Associate Professor, SMU Dedman School of Law. Special thanks to Hillel Bavli, Karen Bradshaw, Jennifer Collins, Monika Ehrman, Ryan Koopmans, Sharon Jacobs, Alexandra Klass, John Lowe, Guillermo Garcia Sanchez, Josh Macey, Nathan Richardson, Paul Rogers, Ann Schwarz, Daniel Sokol, David Spence, Fenner Stewart, and Shelley Welton for helpful comments.

States stumbled upon in the first half-century of oil production. And it shows how these tools can be tailored to protect consumers, industry, and the environment.

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INTRODUCTION

It is difficult to exaggerate the power of OPEC, the Organization of Petroleum Exporting Countries, which coordinates production of oil by many of the world's leading exporters. The world's economies tremble in anticipation of its every communique. When OPEC restricts production, world oil prices rise; and when oil prices rise, the global economy suffers. Since World War II, all but one U.S. recession was preceded by rising oil prices.[1]

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[1] James D. Hamilton, *Historical Oil Shocks* 26 (Nat'l Bureau of Econ. Rsch., Working Paper 16790, 2011); *see also* MICHAEL BRUNO & JEFFREY D. SACHS, ECONOMICS OF WORLDWIDE

Why would these oil-producing countries conspire to cut oil production? The answer is that OPEC is the world's most prominent example of *market power*—the monopolist's ability to raise profits by cutting production.[2] In past decades, these countries together controlled a large enough share of world production that when they cut their production, prices rose enough to more than compensate them for selling less oil.[3] That is, what these countries lost in lower sales volume, they more than made up for in higher sales prices.

But these oil behemoths are also different from a normal monopolist in two ways. First, they are sovereign nations so they must balance the interests of oil consumers in their country with their oil producers' interest in high prices. Second, they are managing a long-term resource: their vast stores of oil wealth. They have to consider the long-term value of this resource, ensuring that prices are high enough that they do not run out of oil and simultaneously making sure prices are low enough that alternatives such as ethanol and electric vehicles do not become too attractive.

How rapidly should these countries produce oil? To answer this delicate and fateful question, the OPEC cartel can rely on the field of conservation economics, developed in the United States in the first half of the twentieth century to manage its own oil wealth, which at the time dominated world supplies.[4] The short answer is that a country with dominant market power should produce oil rapidly enough that the price of oil is affordable but gradually and smoothly rises over time as supplies dwindle.[5]

The United States, unexpectedly, is facing this momentous question again because it is emerging from history's biggest oil boom,

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STAGFLATION (1985) (showing how worldwide economic struggles in the 1970s were driven by OPEC-driven oil price increases); VACLAV SMIL, ENERGY AND CIVILIZATION: A HISTORY 346–47 (2017) (low oil prices "w[ere] a critical ingredient" of post-war expansion, which OPEC stopped with higher oil prices); *id.* at 365 ("[A]ny decisions of a few individuals, particularly those in Saudi Arabia whose enormous oil-production capacity dominated OPEC's directions, will have profound consequences for global prosperity.").

2 *See* William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 937 (1981); Eugene V. Rostow & Arthur S. Sachs, *Entry into the Oil Refining Business: Vertical Integration Re-Examined*, 61 YALE L.J. 856, 905 (1952).

3 *See* DANIEL YERGIN, THE PRIZE: THE EPIC QUEST FOR OIL, MONEY & POWER 615–16 (1991); *see also infra* Section II.B.

4 In 1928, "the United States produced 68% of the world's" oil. J. Howard Marshall & Norman L. Meyers, *Legal Planning of Petroleum Production*, 41 YALE L.J. 33, 33 n.2 (1931). In 1932, its share was sixty-two percent. Donald H. Ford, *Controlling the Production of Oil*, 30 MICH. L. REV. 1170, 1170 n.1 (1932).

5 *See infra* Section II.B.

driven by directional drilling and hydraulic fracturing.[6] This combination of technologies, generally known as "fracking," has more than doubled American oil production in just a few years and turned the United States into one of the world's leading oil and gas exporters.[7]

As an energy exporter, the United States will have to face the central issue that has driven OPEC—what rate of production would maximize the value of its vast, newfound oil and gas reserves? In fact, it may find itself increasingly aligned with the oil-exporting countries in OPEC, with the same interest in smoothing global production of crude oil.[8] That dynamic is already developing as the United States increasingly works with Saudi Arabia to ensure that U.S. sanctions on Iran do not disrupt global oil supplies.[9] And it has accelerated as the March 2020 collapse in global oil prices sparked U.S.-OPEC negotiations on oil prices and production.[10]

As momentous as these oil questions are, there is an even more pressing governance crisis: over-production of natural gas. Fracked oil wells also produce "associated gas"—natural gas molecules that are trapped together with the oil now being produced from shale rock layers.[11] These gas molecules are released along with oil when shale rock

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6 *See* John M. Golden & Hannah J. Wiseman, *The Fracking Revolution: Shale Gas as a Case Study in Innovation Policy*, 64 EMORY L.J. 955, 968–74 (2015) (describing the fracking process); James W. Coleman, *The Third Age of Oil and Gas Law*, 95 IND. L.J. 389, 418–19 (2020); Thomas W. Merrill & David M. Schizer, *The Shale Oil and Gas Revolution, Hydraulic Fracturing, and Water Contamination: A Regulatory Strategy*, 98 MINN. L. REV. 145, 153–54 (2013).

7 James W. Coleman & Alexandra B. Klass, *Energy and Eminent Domain*, 104 MINN. L. REV. 659, 676 (2019). The United States produces more oil and more natural gas than any other country, has become a net oil exporter, and will soon be the world's biggest exporter of liquefied natural gas. Javier Blas, *The U.S. Just Became a Net Oil Exporter for the First Time in 75 Years*, BLOOMBERG (Dec. 6, 2018), https://www.bloomberg.com/news/articles/2018-12-06/u-s-becomes-a-net-oil-exporter-for-the-first-time-in-75-years [https://perma.cc/3VM5-B8Z3]; *Gas 2019: Analysis and Forecasts to 2024*, INT'L ENERGY AGENCY, (June 2019), https://www.iea.org/reports/gas-2019 [https://perma.cc/GR7K-SRVM].

8 *See* Timothy Puko & Rebecca Elliott, *U.S. Considers Intervention in Saudi-Russia Oil Standoff*, WALL ST. J. (Mar. 19, 2020, 8:28 PM), https://www.wsj.com/articles/u-s-considers-intervention-in-saudi-russia-oil-standoff-11584636054 [https://perma.cc/57RS-8XV4].

9 Bernard L. Weinstein, *The U.S. and OPEC Have Unwittingly Become Partners*, INSIDESOURCES (June 7, 2019), https://www.insidesources.com/the-u-s-and-opec-have-unwittingly-become-partners [https://perma.cc/F5EN-UAB7] (As OPEC has fallen from forty-three percent of global production to thirty-one percent, "the United States and OPEC . . . have become partners with both sides understanding the benefits of stability in the oil market.").

10 *See* Timothy Gardner & Jennifer Hiller, *U.S. to Send Envoy to Saudi Arabia; Texas Suggests Oil Output Cuts*, REUTERS (Mar. 20, 2020, 1:37 PM), https://www.reuters.com/article/us-global-oil-usa-saudi-arabia/u-s-to-send-envoy-to-saudi-arabia-texas-suggests-oil-output-cuts-idUSKBN2172YE [https://perma.cc/9CAA-YL2P].

11 David B. Spence, *Federalism, Regulatory Lags, and the Political Economy of Energy Production*, 161 U. PENN. L. REV. 431, 438 (2013). Natural gas is mostly methane, the simplest

is threaded by drilling horizontally and then hydraulically fractured.[12] When this gas reaches the top of the wellhead, the oil company can separate it from the crude oil and ship it by pipeline to natural gas consumers.[13] But if there is not yet a pipeline to bring this natural gas to markets, or if local markets are already over-supplied with gas, an oil company considering drilling a new well faces a difficult choice. In theory, it could wait to drill for oil until a pipeline is built for gas, but oil companies typically need immediate oil production to pay the rotating debt that finances their investments.[14] Or it could drill the well, sell the oil, and simply burn or "flare" off the gas.[15] Oil companies in Texas's Permian Basin and North Dakota's Bakken Shale are increasingly drilling immediately, profiting from shale oil and flaring off more and more associated gas.[16] By 2019, oil wells in each of these formations were flaring more gas than many states consume; together

"hydrocarbon,"—i.e., a molecule made up of carbon and hydrogen atoms. It has just one carbon atom and four hydrogen atoms. Crude oil is composed of longer hydrocarbon chains, generally with six or more carbon atoms in a chain surrounded by fourteen or more hydrogen atoms. H.S. BELL, AMERICAN PETROLEUM REFINING 15–17 (2d ed.1923). These longer, heavier hydrocarbon chains are liquid at room temperature and pressure. Shorter hydrocarbon chains—with two, three, four, or five carbons—are known as "natural gas liquids"; as their name indicates, these intermediate molecules can be either a gas or liquid depending on temperature and pressure. Coleman & Klass, *supra* note 7, at 681 n.119.

12 Spence, *supra* note 11, at 438–39; *see* James W. Coleman, *Pipelines & Power-Lines: Building the Energy Transport Future*, 80 OHIO ST. L.J. 263, 275–76 (2019).

13 *See* Alexandra B. Klass & Danielle Meinhardt, *Transporting Oil and Gas: U.S. Infrastructure Challenges*, 100 IOWA L. REV. 947, 1009 (2015).

14 *See, e.g.*, Coleman, *supra* note 6, at 400; Note, *Administrative Regulation of Petroleum Production*, 59 HARV. L. REV. 1142, 1142–43 (1946) (describing "need of some producers for a speedy return on their drilling investments").

15 Oil can almost always be brought to market because, unlike gas, it can be shipped by many methods including truck, rail, or barge. Coleman, *supra* note 12, at 272–73. Natural gas is flared because venting it directly to the atmosphere is even worse for the global climate. Klass & Meinhardt, *supra* note 13, at 1009–10.

16 There are so many wells flaring in these formations that nighttime satellite images of the United States show what seem to be massive cities in the sparsely populated oil-producing regions of western Texas and North Dakota. Robert Krulwich, *A Mysterious Patch of Light Shows Up in the North Dakota Dark*, NPR (Jan. 16, 2013, 1:58 PM), https://www.npr.org/sections/krulwich/2013/01/16/169511949/a-mysterious-patch-of-light-shows-up-in-the-north-dakota-dark?ft=3&f=111787346&sc=nl&cc=es-20130120 [https://perma.cc/WE37-WFMD]; *Visualizing the Oil Boom in the Permian Basin*, POL. CALCULATIONS (May 10, 2018), https://politicalcalculations.blogspot.com/2018/05/visualizing-oil-boom-in-permian-basin.html [https://perma.cc/V72A-HPRF]; *see also* Klass & Meinhardt, *supra* note 13, at 1009–15 (describing extensive flaring in North Dakota as a result of lack of transport options to bring natural gas to markets in need of gas).

these two formations are flaring more gas than is consumed by all 49 million people in Colombia.[17]

This tremendous economic and environmental waste is just a more severe and localized version of the age-old oil exporter dilemma: a race for production often fails to maximize the long-term value of the hydrocarbon resource. Oil companies cannot solve this dilemma by themselves. If a single oil and gas producer slowed its drilling, it would do nothing to raise gas prices; it would only delay its profit from oil production. But if oil companies tried to band together and slow production so all companies could benefit from higher natural gas prices, they would be criminally liable for price-fixing under the Sherman Act.[18]

By contrast, states and nations have tools for maximizing the long-term value of their oil and gas resources. These tools were developed in the United States in the first half-century of the oil industry when

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17 Jennifer Hiller, *Natural Gas Flaring Hits Record High in First Quarter in U.S. Permian Basin*, REUTERS (June 4, 2019, 11:38 AM), https://www.reuters.com/article/us-usa-shale-flaring/natural-gas-flaring-hits-record-high-in-first-quarter-in-u-s-permian-basin-idUSKCN1T5235 [https://perma.cc/T9N6-6BZX] ("Together, the two oil fields on a yearly basis are burning and venting more than the gas demand in countries that include Hungary, Israel, Azerbaijan, Colombia and Romania, according to the report."); Shale Upstream Analytics, *Permian Natural Gas Flaring Exceeds 500 MMcfd in 4Q18*, RYSTAD ENERGY (Feb. 21, 2019), https://www.eenews.net/assets/2019/05/06/document_pm_02.pdf [https://perma.cc/4MRN-NHME] ("[N]atural gas flaring in the Permian basin reached an all-time high of approximately 530 MMcfd in the fourth quarter of 2018, driven by persistent gas takeaway capacity constraints and increasing basin-wide gas production."); Brandon Evans, *Gas Capture Issues Continue to Prevent North Dakota from Setting Oil Production Records*, S&P GLOBAL (July 16, 2019, 9:20 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/071619-gas-capture-issues-continue-to-prevent-north-dakota-from-setting-oil-production-records [https://perma.cc/GD8C-RU4S] (detailing challenges of building pipelines and hiring workers quickly enough to use gas); Brandon Evans, *North Dakota Operators Flare Record 671 MMcf/d of Natural Gas in July*, S&P GLOBAL (Sept. 16, 2019, 8:26 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/091619-north-dakota-operators-flare-record-671-mmcf-d-of-natural-gas-in-july [https://perma.cc/K8YH-ASZF]. It is possible that even more gas than this is being flared. Katherine Ann Willyard & Gunnar W. Schade, *Flaring in Two Texas Shale Areas: Comparison of Bottom-Up with Top-Down Volume Estimates for 2012 to 2015*, 691 SCI. TOTAL ENVT. 243, 243 (2019) (finding that satellite-based measures show twice as much flaring as Texas reports for 2012–2015).

18 United States v. Socony-Vacuum Oil Co., 310 U.S. 150, 223 (1940) ("Under the Sherman Act a combination formed for the purpose and with the effect of raising, depressing, fixing, pegging, or stabilizing the price of a commodity in interstate or foreign commerce is illegal *per se*." (emphasis added)); John C. Peppin, *Price-Fixing Agreements Under the Sherman Anti-Trust Law*, 28 CAL. L. REV. 297 (1940); Sherman Antitrust Act, 15 U.S.C. §§ 1–7 (1970). For a description of criminal prosecutions under this statute, see JOHN M. CONNOR, GLOBAL PRICE FIXING: OUR CUSTOMERS ARE THE ENEMY 360 (2013).

American oil ruled the world.[19] These tools fell into disuse in the past half-century as the United States became a net-energy importer, identifying its interests with consumers in need of cheap energy and not with producers looking to prop up the value of their goods.[20] Now, as history's biggest commodity boom returns America to its place as a leading global energy exporter, the United States must adapt these old tools to ensure maximum benefit from the new boom.[21]

This Article shows how the nation and its fifty states can maximize the long-term benefit from the unprecedented oil and gas boom by minimizing environmental and economic waste. It examines antitrust law from a novel angle, showing what happens when the state's interest is aligned with producers rather than consumers.[22] It develops the theory of state cartels, showing how jurisdictions can maximize the long-term value of their natural resources by slowing production and banding together with other producing jurisdictions. And it shows how this novel theory both increases the economic value and decreases the environmental cost of energy production and could be employed to address the nation's crisis of natural gas flaring.

This Article also shows why state cartels create a unique opportunity to harness the self-interest of the world's oil and gas superpowers to slow global climate change. State cartels increase the profits of oil and gas producers, but they also dramatically slow production and use of fossil fuels. If the United States can use its new dominance of global energy to coordinate production cuts that raise global oil and gas prices, it will increase cash flow to Saudi Arabian, Russian, and American oil companies, while making concrete progress on climate change and encouraging cleaner technology.

Even if U.S. states only cut back production enough to stop flaring, they can still win huge environmental benefits. Natural gas burns much more cleanly than dirtier fuels, such as oil and coal, that provide heating

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19 *See* J. Howard Marshall & Norman L. Meyers, *Legal Planning of Petroleum Production: Two Years of Proration*, 42 YALE L.J. 702, 702–26 (1933) (describing history of state production limits); Thomas W. Shelton, *The Police Power Versus Property Rights*, 7 VA. L. REV. 455 (1921).

20 See *infra* notes 135–45; YERGIN, *supra* note 3, at 664.

21 See *infra* notes 184–214; Blas, *supra* note 7.

22 Other scholars have noted the tensions between antitrust law's focus on increasing output and environmental conservation's focus on restricting output. BRUCE YANDLE, CTR. FOR PRIVATE CONSERVATION, ANTITRUST AND THE COMMONS: COOPERATION OR COLLUSION?, (1997), https://cei.org/studies-issue-analysis/antitrust-and-commons-cooperation-or-collusion [https://perma.cc/4CLL-ZAJQ]. This Article shows why states may have an economic interest in enforcing cartels and how that interacts with their policies to protect the environment and their consumers.

and power to much of the world.[23] When natural gas is flared at the well, it is just an environmental liability. If natural gas can be saved and transported to the markets that need it to replace oil and coal, it will be an environmental asset, providing cleaner air around the globe.

The argument unfolds as follows. Part I explains the economic theory of state energy cartels—showing why exporting states can profit more by producing less energy and explaining how they can optimize the pace of production. Part II unearths the history of state oil cartels, showing how, at first, states such as Texas, and then later, OPEC and Saudi Arabia, worked to moderate the pace of oil extraction. Part III explains how the Texas Railroad Commission and the Interstate Oil and Gas Compact Commission, a product of the first U.S. oil boom, can resume their crucial role and work to limit natural gas flaring, increasing the economic benefit from America's huge oil and gas bounty. Part III also explains how its proposal secures significant environmental benefits, provides a unique opportunity for global cooperation on climate change, and prepares the United States for its future as an oil exporter.

I. THE THEORY OF STATE CARTELS

Breaking up monopolistic cartels is one of the fundamental justifications for the modern regulatory state.[24] A cartel that can coordinate to lower production will do so to raise prices above the marginal cost of production, so that it can make more money even as it sells less.[25] This output restriction means consumers must pay more

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23 Rana Sabouni, Hossein Kazemian, & Sohrab Rohani, *Carbon Dioxide Capturing Technologies: A Review Focusing on Metal Organic Framework Materials (MOFs)*, 21 ENV'T SCI. & POLLUTION RSCH. 5427, 5428 (2014) (burning gas emits just 56% the carbon dioxide of coal and almost no air pollution—just 0.04% the sulfur dioxide and 0.3% the particulate matter).

24 ROBERT COOTER & THOMAS ULEN, LAW & ECONOMICS 38-39 (6th ed. 2011); Andrei Shleifer, *Understanding Regulation*, 11 EUR. FIN. MGMT. 439, 440 (2005) (describing the "public interest theory of regulation," "the cornerstone of modern public economics," which is premised on two "market failures"—"monopoly or externalities"); Paul L. Joskow & Roger G. Noll, *Regulation in Theory and Practice: An Overview*, *in* STUDIES IN PUBLIC REGULATION 10 (Gary Fromm ed., 1981) ("Because economic theory is firm in concluding that monopolies create economic inefficiency, social intervention to prevent, undo, or control monopoly is potentially attractive."). *See generally* RUDOLPH J.R. PERITZ, COMPETITION POLICY IN AMERICA: HISTORY, RHETORIC, LAW (1996).

25 Robert H. Bork, *The Rule of Reason and the Per Se Concept: Price Fixing and Market Division II*, 75 YALE L.J. 373, 375, 375 n.2 (1965) (explaining that the fundamental evil forbidden by the "rule of reason" in antitrust law is "reducible to restriction of output"). Even the most skeptical viewers of antitrust law take a hard line against cartels. Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1, 3, 20 (1984). ("Enforcement of the rule against naked horizontal

money to producers and reduces the economy's efficiency by pricing out customers who would be happy to buy goods at their cost of production.[26] But in the unusual case when a state produces much more than it consumes, exporting commodities for consumers elsewhere, the state's interests tend to align with producers. Its citizens get swept up in the supply chain of commodity production as landowners, manufacturers, investors, laborers, and service workers, so that they benefit more from high prices than they lose from low prices. As a result, the state may gain more from higher prices that make its producers more profitable than it loses by harming its consumers or reducing the efficiency of the economy.[27]

In this counterintuitive situation, the state can function somewhat like a cartel, coordinating and constraining production of independent producers to maximize their long-term profits. Such a cartel only works when the state is a dominant producer in the commodity market or can form an alliance with other major producing states. But dominant producers are common within natural gas commodity markets because transport constraints divide global markets into many smaller markets, many of which are served by a dominant gas-producing state. These gas markets are ripe for a rise of new state energy cartels.[28]

A. *The Case for State Cartels*

Monopolies have costs for consumers and the economy, but they benefit producers. If a state is dominated by producers, a monopoly's benefits may sometimes outweigh its costs. In these counterintuitive circumstances, the maxims of antitrust and competition law are turned on their head. To know when the state should allow, encourage, or even enforce a cartel, it must measure and compare the costs and benefits of monopoly.

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restraints appears to be beneficial."). For this reason, the Supreme Court has referred to cartels as "the supreme evil of antitrust." Verizon Commc'ns, Inc. v. L. Offs. of Curtis V. Trinko, LLP, 540 U.S. 398, 408 (2004); *see also* Vivek Ghosal & D. Daniel Sokol, *The Rise and (Potential) Fall of U.S. Cartel Enforcement*, 2020 U. ILL. L. REV. 471, 472 (2020).

26 Herbert Hovenkamp, *Antitrust's Protected Classes*, 88 MICH. L. REV. 1, 5–7 (1989); Landes & Posner, *supra* note 2, at 937, 954, 991–92; RICHARD A. POSNER, THE ECONOMICS OF JUSTICE 91–92 (1981). *See generally* RICHARD A. POSNER, ANTITRUST LAW (2d ed. 2001).

27 *See infra* Section I.A.1.

28 *See infra* Section I.A.2.

1. The Costs and Benefits of Monopoly

In a competitive marketplace companies aim to sell as many items as they can produce at a profit because their profits fall when they sell less. "Market power," by contrast, is the ability of a dominant player, or group of players, to raise its profits by cutting production—the monopolist controls so much of the market that when it cuts production and prices rise, it gains more from higher prices than it loses from fewer sales.[29] This price rise harms consumers, as can be seen in the standard supply-and-demand charts contrasting efficient markets with a monopoly.

Take the market for gasoline. Imagine an efficient market with an equilibrium price of $3 a gallon. Low-cost producers and eager buyers split the large surplus in the market. If a producer can make a gallon of gasoline for $1 per gallon, it will make a profit of $2 per gallon. A more marginal producer who can make a gallon of gasoline for $2.50 makes $0.50 per gallon. The area between the supply curve and the equilibrium price on the supply-and-demand chart shows this producer surplus.[30] (See Figure 1.) Buyers get a big surplus from the market too: if a consumer would have been willing to pay up to $7 per gallon, she receives a surplus of $4 per gallon when she is able to purchase it for just $3 per gallon. A more price sensitive consumer that would only have been willing to pay $4 for a gallon gets a surplus of $1 per gallon. The area between the demand curve and the equilibrium price shows this consumer surplus.[31]

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29 Landes & Posner, *supra* note 2, at 937 ("'[M]arket power' [is] . . . "the ability of a firm (or a group of firms, acting jointly) to raise price above the competitive level without losing so many sales so rapidly that the price increase is unprofitable and must be rescinded."); A. P. Lerner, *The Concept of Monopoly and the Measurement of Monopoly Power*, 1 REV. ECON. STUD. 157 (1934). If a non-dominant seller, such as a single gas station, cuts its sales, it would have little impact on market prices and any marginal rise in prices would mostly accrue to all the other sellers. Phillip Areeda & Donald F. Turner, *Predatory Pricing and Related Practices Under Section 2 of the Sherman Act*, 88 HARV. L. REV. 697, 702–03 (1975).

30 N. GREGORY MANKIW, PRINCIPLES OF ECONOMICS 134–38 (8th ed. 2018).

31 *Id.* at 139–41.

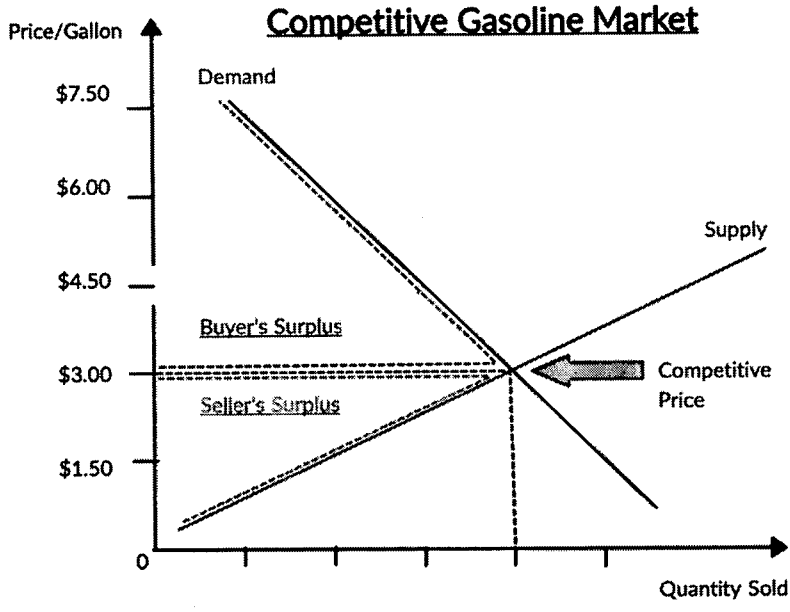

Figure 1. Buyer and Seller Surplus in an Efficient Market

When a single seller takes over a market, however, it can win more than the usual seller surplus by reducing production. So, imagine that a single seller corners the gasoline market and cuts supply 25%. (See Figure 2.) As buyers scramble to secure gasoline in this artificial shortage, the equilibrium price rises sharply—imagine a rise from $3 a gallon to $4.50 a gallon.

The monopolist receives higher prices for its product and lowers its costs by shutting down its highest-cost production facilities. True, it foregoes some marginal sales by restricting supply. If it kept operating all the facilities that operated in the efficient market, it could turn a small profit on running facilities that cost $2.50 a gallon to produce gasoline for that $3 a gallon market. But the monopolist gains more from higher prices and lower costs than it loses from forgoing a few marginal sales. In other words, the area between its supply curve and the market price has increased.[32] (See Figure 2.) Accordingly, the buyer surplus is reduced by higher prices—the area between the demand curve and the market price has decreased.

32 If the monopolist restricted supply more, at some point it would lose more from reduced sales than it would gain from higher prices. Areeda & Turner, *supra* note 29, at 701–02 (monopolist will restrict supply until its marginal revenue equals its marginal cost).

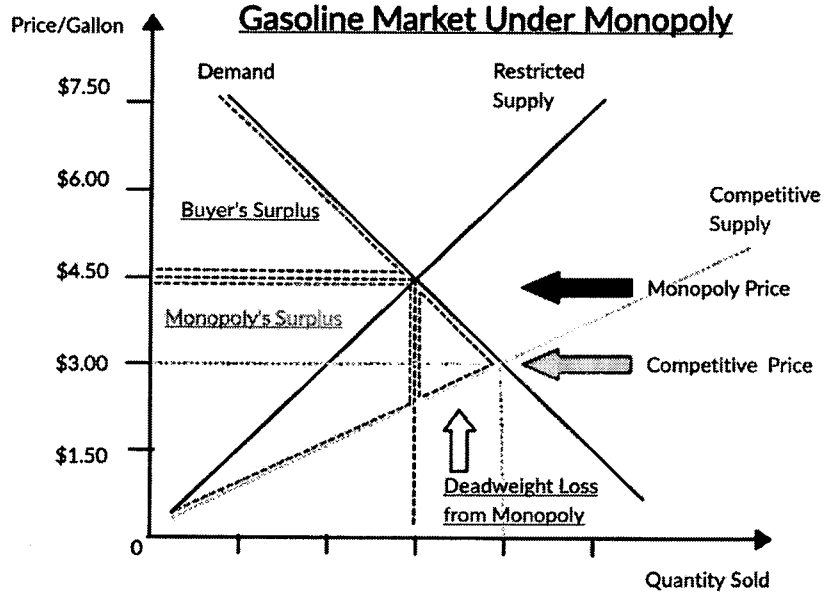

Figure 2. The Effect of Monopoly: Higher Seller Surplus, Lower Buyer Surplus, and Deadweight Loss

Absent distributional concerns, the main cost of monopoly is the reduction in sales that results from the monopolist restricting supply to marginal consumers. Although we often think of excess profits taken from consumers as the problem of monopoly, the extra money that consumers pay for gasoline goes to the monopolist, so at least someone benefits.[33] But the foregone gasoline sales are simply a deadweight loss—no one benefits. If a seller could have produced a gallon of gasoline for $2.50 and sold it for $3 to a consumer that would have been willing to pay $4, then the seller would have been better off by $0.50 and the buyer would have been better off by $1. When a monopolist restricts supply to raise prices, this trade can no longer happen, and society is poorer.[34]

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33 Informal discussion of monopoly often focuses on how it raises consumer prices above the competitive level. But from the perspective of Kaldor-Hicks efficiency, the high prices are not the problem: less consumer surplus just means more producer surplus. *See* POSNER, THE ECONOMICS OF JUSTICE, *supra* note 26, at 91–92; J. R. Hicks, *The Foundations of Welfare Economics*, 49 ECON. J. 696 (1939). The true deadweight loss is the supply restriction. When the monopolist raises prices above the competitive level, it refrains from selling some quantity of goods at prices that would benefit both consumer and producer.

34 Landes & Posner, *supra* note 2, at 954.

Apart from this deadweight loss from foregone sales, most politically responsive governments also share the consumer's distributional preference for lower prices to ensure a large buyer surplus. That is, the government usually favors lower prices to ensure that consumers receive a reasonable share of the market surplus. So, in practice, monopoly regulation often focuses on lowering prices as well as increasing supply.[35] Governments generally try to limit market power by breaking up monopolies or prescribing the prices that monopolists can charge.[36]

2. When Cartels Serve the State Interest

Sometimes, however, the government is the monopolist. Almost everywhere other than the United States, oil, gas, and other minerals under private landowners' land are owned by the government, so higher prices for oil and gas would maximize government revenue.[37] Of course, the government may benefit politically from lower prices for consumers.[38] But if the government produces oil and gas for export to consumers in other countries, it will prefer higher prices to extract more revenue from those foreign consumers.[39]

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35 One situation in which these concerns diverge is discriminatory pricing. If a monopolist can identify marginal consumers that are unwilling to pay the monopoly price but would be willing to pay more than its marginal cost of production, it can simply offer them a different price. If the monopolist could identify each customer's willingness to pay, it could charge each consumer nearly that price, and capture almost all surplus in the market. This would solve the problem of deadweight loss. Einer Elhauge, *Tying, Bundled Discounts, and the Death of the Single Monopoly Profit Theory*, 123 HARV. L. REV. 397, 405 (2009) ("Perfect price discrimination, which charges each buyer precisely how much each values the product, reduces consumer welfare compared to a uniform monopoly price, but increases ex post total welfare, which includes the welfare benefit to the seller of earning additional monopoly profits."). The only remaining issue would be purely distributional: the company would have taken the surplus that, in an efficient market, would be split with consumers. One sign that governments take these distributional issues seriously are the wide-ranging laws that have been adopted to prevent price discrimination. Herbert Hovenkamp, *The Rationalization of Antitrust*, 116 HARV. L. REV. 917, 932 (2003) (reviewing RICHARD A. POSNER, ANTITRUST LAW (2d ed. 2001)); George J. Stigler, *Law or Economics?*, 35 J.L. & ECON. 455, 455–56 (1992).

36 Richard A. Posner, *The Chicago School of Antitrust Analysis*, 127 U. PA. L. REV. 925, 944–48 (1979); Shelley Welton, *Grasping for Energy Democracy*, 116 MICH. L. REV. 581, 594–95 (2018).

37 BERNARD F. CLARK, JR., OIL CAPITAL: THE HISTORY OF AMERICAN OIL, WILDCATTERS, INDEPENDENTS AND THEIR BANKERS 12 (2016).

38 And, of course, modern laws against monopoly had their birth in cutting down oil monopolies on behalf of customers. RON CHERNOW, TITAN: THE LIFE OF JOHN D. ROCKEFELLER, SR. 537–39 (1998).

39 Consistent with this prediction, energy exporters generally offer oil and gas at a lower price to domestic consumers than to foreign importers. Thomas Sterner, *Oil Products in Latin*

Even in jurisdictions like the United States, where private landowners own most oil and gas and it is produced by private companies,[40] governments may enforce a cartel to raise oil and gas prices.[41] That is, individual states can and do control the overall rate of oil production, so they can make all companies slow their oil production simultaneously.[42] If a state's companies, in aggregate, enjoy market power, the state may raise their profits by forcing all companies to cut back production to ensure higher prices.

If oil companies agreed among themselves to cut back production, they would violate the Sherman Act, but industry compliance with state limits on production does not.[43] The state may not simply authorize companies to cooperate in raising prices as much as they like.[44] But the state may set its own production limits or even authorize industry-set limits so long as these limits are "clearly articulated and affirmatively expressed as state policy" and are "actively supervised."[45]

When would a state want to take advantage of its ability to enforce a cartel to raise prices? Roughly, a state would want slower production when its producers have more to gain from high oil prices than its consumers and its economy have to lose. So, raising prices helps a state when its producers gain so much from their increased surplus that it more than makes up for the diminished surplus of its consumers.[46]

America: The Politics of Energy Pricing, 10 ENERGY J. 25, 43 (1989); Sanjeev Gupta, Benedict Clements, Kevin Fletcher, & Gabriela Inchauste, *Issues in Domestic Petroleum Pricing in Oil-Producing Countries* 3 (Int'l Monetary Fund, Working Paper No. 02/140, 2002) ("Domestic price controls are prevalent, especially in countries that are net exporters of oil.").

40 Monika U. Ehrman, *One Oil and Gas Right to Rule Them All*, 55 HOUS. L. REV. 1063, 1064–65 (2018).

41 John C. Jacobs, *Unit Operation of Oil and Gas Fields*, 57 YALE L.J. 1207, 1208–10 (1948); Wm. E. Colby, *The Law of Oil & Gas: A Consideration of Landowners' Rights, Particularly as Developed in California*, 31 CALIF. L. REV. 357, 369 (1943); Coleman, *supra* note 6, at 410–11; Kristen van de Biezenbos, *Where Oil Is King*, 85 FORDHAM L. REV. 1631, 1647–48 (2017).

42 *See infra* Part II. In fact, cartels are hard to hold together without government enforcement. Richard A. Posner, *Theories of Economic Regulation*, 5 BELL J. ECON. & MGMT. SCI. 335, 344–45 (1974).

43 Parker v. Brown, 317 U.S. 341, 351–52 (1943); David B. Spence & Robert Prentice, *The Transformation of American Energy Markets and the Problem of Market Power*, 53 B.C. L. REV. 131, 137–38 (2012).

44 *Parker*, 317 U.S. at 351 ("[A] state does not give immunity to those who violate the Sherman Act by authorizing them to violate it.").

45 Cal. Retail Liquor Dealers Ass'n. v. Midcal Aluminum, Inc., 445 U.S. 97, 105 (1980) (quoting City of Lafayette v. La. Power & Light Co., 435 U.S. 389, 410 (1978) (opinion of Brennan, J.)).

46 This is not possible to represent on a typical supply and demand chart such as Figure 2, which pictures a closed market representing all consumers and producers; on such a chart, it is mathematically impossible that restricting supply would increase the area of producer surplus

Thus, even when the government does not own a country's oil, if the country is an oil exporter, it may want to maximize the value of the nation's oil when it believes its landowners and oil companies have more to gain from high oil prices than its consumers have to lose. More precisely, a government that seeks to maximize utility for its own citizens will favor a cartel when gains to its producers outweigh the costs to its consumers. In these circumstances, the valence of antitrust and competition law is flipped on its head and a utility-maximizing government may tolerate, sponsor, or even enforce a cartel or other form of supply restriction.[47]

B. *How States Optimize Oil and Gas Production Rate*

When a state has an interest in sponsoring or enforcing an energy cartel, it faces a second question: How much should it restrict supply? This is a question that monopolies face every day. A monopoly will restrict supply to maximize its producer surplus, regardless of the impact on consumer surplus, or the increase in deadweight loss, but mindful of the danger that huge profits could induce other producers to compete with it.[48] As a result, it will restrict supply, selling less at higher prices, until further restriction would cost it more money from lower sales than it would gain from higher prices.[49] That is, it will cut supply until the marginal revenue that it would lose from cutting another unit is equal to its marginal cost of production.[50]

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more than it would decrease the area of buyer surplus. In fact, deadweight loss means that restricted supply lowers buyer surplus *more* than it raises producer surplus. To think about state cartels with such a chart, the appropriate intuition is that an energy-exporting state captures almost all of the increase in producer surplus area, but only a fraction of the consumer surplus area because most consumers are in other states.

47 This is very different from other exceptions to normal antitrust theories such as natural monopoly, which argue that monopoly can provide lower prices for consumers. RICHARD A. POSNER, NATURAL MONOPOLY AND ITS REGULATION 1 (1991) (a natural monopoly occurs when "the entire demand within a relevant market can be satisfied at lowest cost by one firm"). A country enforcing a state cartel need not reduce the number of firms, and it is not looking to lower prices for consumers; it is seeking to raise prices. A closer analogy would be Daniel Sokol's suggestion that the government might favor cartels when higher prices redistribute wealth away from rich consumers. *See* D. Daniel Sokol, *Rethinking the Efficiency of the Common Law*, 95 NOTRE DAME L. REV. 795, 829 (2019).

48 Timothy F. Bresnahan & Peter C. Reiss, *Entry in Monopoly Markets*, 57 REV. ECON. STUD. 531 (1990). Of course, a monopoly may wish to consider consumer surplus and deadweight loss to some extent for non-pecuniary reasons or to limit the costs it imposes, which could motivate anti-monopoly regulation.

49 Areeda & Turner, *supra* note 29, at 701–02.

50 *Id.*

For states managing oil and gas cartels, the question is more complicated in two respects. First, the state must also consider its consumers, so it will take reduced consumer surplus and deadweight loss into account to the extent that they fall on consumers within the state. Second, the state is managing a long-term, finite oil and gas resource, so it must also consider how changing the rate of production will change the value of this resource over time.

First, how should a net commodity-exporting nation balance the interests of producers, consumers, and the economy? Like a monopoly, it knows that restricting supply until marginal revenue equals marginal cost would maximize its producers' surplus. But the state will also consider consumer surplus to the extent that those consumers are citizens, which means that it will not want to restrict supply as much as a monopoly would. To maximize domestic surplus, it will want to maximize its producers' surplus plus its consumers' surplus, restricting supply somewhat but less than a monopoly would.

Another approach is to expressly distinguish domestic consumers from foreign consumers, restricting exports only. This is the approach taken by many oil producers in the developing world: making oil available to domestic and foreign markets at different prices.[51] In this situation, the government could, in theory, restrict exports to the same extent that its exporting industry would choose, maximizing producer surplus from these exports. But all price discrimination is imperfect—there is some leakage between sets of consumers paying different prices.[52] For one thing, if foreign markets are paying higher prices, domestic consumers will be tempted to illegally export fuel to benefit from those higher prices.[53]

Second, how fast should a major oil and gas exporter extract and export its finite resources? This question was urgent in the United States in the years between the world wars, when it produced two-thirds of the world's oil.[54] An associate professor of mathematics at Stanford

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51 Sterner, *supra* note 39, at 42–43.

52 Christopher S. Yoo, *Copyright and Public Good Economics: A Misunderstood Relation*, 155 U. PA. L. REV. 635, 648 (2007) ("Perfect price discrimination is a practical impossibility . . . .").

53 *See* FABBY TUMIWA, TARA LAAN, KERRYN LANG, & DAMON VIS-DUNBAR, INT'L INST. FOR SUSTAINABLE DEV., A CITIZENS' GUIDE TO ENERGY SUBSIDIES IN INDONESIA 19 (2011) (describing similar arbitrage in nations that subsidize domestic fuel sales—"retail price disparity has increased fuel smuggling and illegal selling of subsidized fuel"). The challenge of maintaining artificially different prices in different markets also arises in the contexts of trademarks for exclusive distribution in certain markets. David A. Malueg and Marius Schwartz, Parallel imports, demand dispersion, and international price discrimination, 37 J. INT'L ECON. 167 (1994).

54 Marshall & Meyers, *supra* note 4, at 33; Coleman, *supra* note 6, at 392, 397–98 (describing U.S. dominance of oil production during this time period).

University, Harold Hotelling, produced the answer in 1931: a monopolist should produce more at first and less over time.[55] To understand this result, imagine that you held all the oil in the world in a warehouse and could sell it whenever you wanted to: selling more oil at first and less over time ensures that the price of oil rises smoothly over time, in parallel with the overall growth rate of the economy.[56] This means low prices at first, which ensures that consumers find uses for oil and also discourages consumers from finding alternative sources of energy.[57]

Hotelling showed that this price path strategy was optimal because if oil prices rose slower than the overall economy, then a producer could profit by simply selling more oil immediately and investing in the wider economy.[58] On the other hand, if oil prices were set to rise more rapidly than the economy, then the producer could benefit by withholding some oil and selling it later at higher prices.[59] Thus, a rational oil monopolist would ensure smoothly rising prices over time.[60] This is the logic that has driven the dominant oil powers over the past century of oil production.

C. *When State Oil and Gas Cartels Work*

Recall that a large producer can only increase its profits by restricting supply when it has "market power"—when it controls so much of the market that producing less increases prices enough to outweigh the cost of fewer sales. No single state can exercise market power in the world's oil market that connects our global oceans'

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55 Harold Hotelling, *The Economics of Exhaustible Resources*, 39 J. POL. ECON. 137, 138 (1931) ("[C]ertain technical conditions most pronounced in the oil industry lead to great wastes of material and to expensive competitive drilling, losses which may be reduced by systems of control which involve delay in production."); *id.* at 144 ("Consequently great forests of tall derricks rise overnight at a cost of $50,000 or more each; whereas a much smaller number and a slower exploitation would be more economic.").

56 *Id.* at 139 ("If a mine-owner produces too rapidly, he will depress the price, perhaps to zero. If he produces too slowly, his profits, though larger, may be postponed farther into the future than the rate of interest warrants.").

57 In particular, Hotelling's rule means that if alternative technology suggests that alternatives to oil might be viable, lowering the long-term price of oil, prices should fall immediately, which, not coincidentally, undercuts the competitiveness of alternative technology. Ujjayant Chakravort, Andrew Leach, & Michel Moreaux, *Would Hotelling Kill the Electric Car?*, 61 J. ENV'T ECON. & MGMT. 281 (2011).

58 Jeffrey A. Frankel, *The Natural Resource Curse: A Survey* 6–7 (Nat'l Bureau of Econ. Rsch., Working Paper No. 15836, 2010), https://www.nber.org/papers/w15836.pdf [https://perma.cc/3SS3-5NDA].

59 *Id.*

60 Hotelling, *supra* note 55, at 138.

countless ports of call, because no country produces more than an eighth of the world's oil.[61] If Russia unilaterally cut its oil companies' production by twenty percent, other countries would take advantage of these higher prices by shipping more oil. The final result would be slightly higher world oil prices but not enough to compensate Russian companies for producing twenty percent less oil.

Oil and gas market power can still emerge in two ways. First, enough producing states can band together to restrict supply, creating an international cartel that can benefit all members by raising prices. As explained in Part II of this Article, that is the path taken by OPEC over the last half century; and OPEC is modeled on the United States' Interstate Oil and Gas Compact Commission, which played the same role in the middle of the twentieth century.[62] When OPEC's share diminished in recent years, it formed a temporary alliance with Russia to cooperate in raising world oil prices.[63] With the early 2020 fall in global oil prices, there is now talk of coordinating production cuts between the United States, OPEC, and Russia, which together dominate global oil production.[64]

Second, transport constraints can isolate individual markets so that local producers have market power within these local markets. This is uncommon in oil markets because oil can be transported in so many ways: by rail, truck, or ship.[65] If prices are higher in one port, producers in other ports will take advantage by shipping more oil until prices roughly equalize.[66] And shipping oil by tanker is cheap, so the price of oil in port markets around the world generally stays in a range of, at most, a few dollars.[67] But at times there are still significant geographical

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61 Coleman, *supra* note 6, at 398 n.49 ("Today, the world's biggest oil producers—Saudi Arabia, the United States, and Russia—each only produce about twelve percent of the world's oil.").

62 Marshall & Meyers, *supra* note 19, at 736–40 (describing why a single state cannot benefit by cutting production but a coalition of states can); *see infra* Section II.A.

63 Rania El Gamal, Alex Lawler, & Olesya Astakhova, *OPEC's Pact with Russia Falls Apart, Sending Oil into Tailspin*, REUTERS (Mar. 6, 2020, 3:42 AM), https://www.reuters.com/article/us-opec-meeting/opecs-pact-with-russia-falls-apart-sending-oil-into-tailspin-idUSKBN20T0Y2 [https://perma.cc/67RP-Y89H].

64 Timothy Gardner & Jennifer Hiller, *U.S. to Send Envoy to Saudi Arabia; Texas Suggests Oil Output Cuts*, REUTERS (Mar. 21, 2020, 1:37 PM), https://www.reuters.com/article/us-global-oil-usa-saudi-arabia/us-to-send-envoy-to-saudi-arabia-texas-suggests-oil-output-cuts-idUSKBN2172YE [https://perma.cc/4DCW-ZZG8].

65 Klass & Meinhardt, *supra* note 13, at 950; Coleman, *supra* note 12, at 292.

66 Coleman, *supra* note 12, at 273.

67 JOHN FRITTELLI, CONG. RSCH. SERV., R43563, SHIPPING U.S. CRUDE OIL BY WATER: VESSEL FLAG REQUIREMENTS AND SAFETY ISSUES (2014) (showing U.S. marine shipping costs at between $1.20 and $6 per barrel). Transporting oil by pipeline is also affordable when pipeline capacity is

differentials in oil prices, especially in landlocked markets when pipeline capacity is constrained so that oil producers that cannot find space on a pipeline must pay substantially higher prices to ship their product by rail or truck.[68] In these circumstances, one jurisdiction's oil producers can, if they act in concert, exercise market power.[69]

Significant geographic differentials are far more commonplace in natural gas markets because gas is always expensive to transport—it can only be moved by pipeline or as liquefied natural gas.[70] Both of these options require multibillion dollar facilities and years of regulatory approvals, so marginal production may not be able to reach neighboring markets for years.[71] Even if two markets are connected by a relatively inexpensive pipeline, they may act as separate markets for long periods of time if the pipeline reaches capacity before a new pipeline can be built.[72] And even if there is adequate transport between two natural gas markets, the high cost of shipping gas means that distant markets always operate somewhat independently.[73] As a result, if they are allowed or compelled to act together, it is extremely common for one jurisdiction's natural gas producers to have market power within their local natural gas market.[74]

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not constrained. VACLAV SMIL, ENERGY AND CIVILIZATION: A HISTORY 277 (2017) (pipelines made possible by "seamless steel pipes" have "turned oil into an affordable global commodity").

68 Klass & Meinhardt, *supra* note 13, at 974, 974 n.167 ("Shipping crude oil by rail costs $10 to $15 per barrel (varying by destination); shipping via pipeline costs $5 per barrel."); James W. Coleman, *Beyond the Pipeline Wars: Reforming Environmental Assessment of Energy Transport Infrastructure*, 2018 UTAH L. REV. 119, 143 (citing U.S. Department of State analysis showing it costs $8 more per barrel to ship oil by rail).

69 *See infra* Section II.C.

70 *See* Jacqueline L. Weaver, *Implied Covenants in Oil and Gas Law Under Federal Energy Price Regulation*, 34 VAND. L. REV. 1473, 1518 n.169 (1981) ("Gas is not easily stored above ground and can be transported only by pipeline. Moreover, gas pipelines require large capital investments and can be justified only if the pipeline owner has secure sources of supply under long-term gas purchase contracts."); Mark P. Gergen, *The Use of Open Terms in Contract*, 92 COLUM. L. REV. 997, 1018 n.68 (1992).

71 Coleman & Klass, *supra* note 7, at 66–67 nn.100–01.

72 *See* Adebola S. Kasumu, Vivian Li, James W. Coleman, Jeanne Liendo, & Sarah M. Jordaan, *Country-Level Life Cycle Assessment of Greenhouse Gas Emissions from Liquefied Natural Gas Trade for Electricity Generation*, 52 ENV'T SCI. & TECH. 1735, 1739 (2018) (showing a spike in natural gas prices in Mexico in mid-2013 from under $5 per million British Thermal Units (MMBTU) to over $15 per MMBTU while U.S. Gulf Coast prices remained low).

73 *See id.* at 1744; ANDY FLOWER & JANE LIAO, THE PRICING OF INTERNATIONALLY TRADED GAS: LNG PRICING IN ASIA 1–3 (2012).

74 *See infra* Section II.C.

II. STATE ENERGY CARTELS, HERE AND ABROAD

Although the theory of state cartels has, until now, remained inchoate, states have, in practice, been enforcing and coordinating de facto cartels since the beginning of the modern oil industry.[75] OPEC is the most famous example; its decisions have shaped the world economy for the past half century.[76] But the first state cartel was created by the Railroad Commission of Texas in the 1930s, which then expanded to coordinate with other states through the Interstate Oil Compact Commission.[77] Most recently, with even faster-shifting energy markets, the Canadian province of Alberta has adopted short-term cartel restrictions to make use of a case of temporary market power in its landlocked oil markets.[78] This new approach, combined with this Article's theory of state cartels, could allow innovative jurisdictions to flexibly use short-term restrictions to maximize the economic and environmental benefits of their energy production.

A. *The Railroad Commission and the Oil Compact*

The modern era began on January 10, 1901, when the Spindletop well in Beaumont, Texas, blew out and doubled global oil production overnight.[79] As Spindletop's historical marker puts it: "On this spot, on the tenth day of the twentieth century, a new era of civilization began."[80] At the dawn of the century, this gusher would fuel the automobiles,

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75 FLOWER & LIAO, *supra* note 73, at 1–3.

76 Robert McNally, *Commentary: Welcome Back to Boom-Bust Oil Prices*, COLUM. CTR. ON GLOB. ENERGY POL'Y (Dec. 2015). The Interstate Oil Compact Commission is, since 1991, now known as the Interstate Oil and Gas Compact Commission.

77 *Id.* The Interstate Oil Compact Commission is, since 1991, now known as the Interstate Oil and Gas Compact Commission. *See infra* notes 120–27.

78 Province of Alberta, Order In Council No. 375, Curtailment Rules (2018), http://www.qp.alberta.ca/documents/orders/Orders_in_Council/2018/1218/2018_375.pdf [https://perma.cc/8JF8-FRC6]; Michelle Bellefontaine, *Alberta Premier Announces 8.7% Oil Production Cut to Increase Prices*, CBC (Dec. 2, 2018, 4:30 PM), https://www.cbc.ca/news/2252dmont/2252dmonton/alberta-premier-oil-differential-announcement-1.4929610 [https://perma.cc/T8R9-VWU5].

79 JUDITH WALKER LINSLEY, ELLEN WALKER RIENSTRA, & JO ANN STILES, GIANT UNDER THE HILL: HISTORY OF THE SPINDLETOP OIL DISCOVERY AT BEAUMONT, TEXAS, IN 1901, at 3 (2002) ("[T]he first six gushers in the Spindletop field produced more oil per day than all the rest of the fields in the world put together."); CLARK, *supra* note 37, at 52–54.

80 LINSLEY ET AL., *supra* note 79, at 216.

trucking, railroad engines, electrification, and shipping that would build the world we now share.[81]

The problem of oil overproduction, however, first came to the fore after the discovery of the East Texas oil field on October 5, 1930.[82] By the next summer, this single massive oil field was producing almost a million barrels of oil per day—ten times as much as Spindletop and forty-two percent of all U.S. production.[83] At the same time, the ongoing Great Depression was reducing demand for oil, so as Texas production ramped up, the price of oil dropped further and further—prices fell from $0.99 per barrel in October 1930 to $0.13 per barrel in July 1931.[84] By the end of the year a barrel—forty-two gallons of oil[85]—cost less than a dime.[86] Some barrels sold for as little as two cents.[87] This was a massive waste of Texas's oil and the Railroad Commission of Texas began a years-long struggle to conserve its long-term value.[88]

The Railroad Commission of Texas is economic history's most important, and most poorly named, regulator. In 1917, the Railroad

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81 SMIL, *supra* note 67, at 247–49, 276; Coleman, *supra* note 6, at 392. This boom was also enabled by the oil and gas lease, which soon spread across the world to enable oil development. *Id.* at 398–407. With apologies to President Butler, this lease—not the limited liability corporation—proved to be the greatest legal invention of modern times. Theresa A. Gabaldon, *The Lemonade Stand: Feminist and Other Reflections on the Limited Liability of Corporate Shareholders*, 45 VAND. L. REV. 1387, 1398 (1992) (citing WILLIAM M. FLETCHER, 1 CYCLOPEDIA OF THE LAW OF PRIVATE CORPORATIONS § 21 (1917) (quoting Nicholas Murray Butler, President of Columbia University, 1911: "[I]n my judgment the limited liability corporation is the greatest single discovery of modern times. . . . Even steam and electricity are far less important than the limited liability corporation, and they would be reduced to comparative impotence without it.")).

82 DIANA DAVIDS HINTON & ROGER M. OLIEN, OIL IN TEXAS: THE GUSHER AGE, 1895–1945 170 (2002); Julia Cauble Smith, *East Texas Oil Field*, TEX. STATE HIST. ASS'N: HANDBOOK OF TEX., https://www.tshaonline.org/handbook/entries/east-texas-oilfield [https://perma.cc/7C4B-APGK].

83 Cauble Smith, *supra* note 82 ("By mid-summer of 1931 operators were producing approximately 900,000 barrels of oil per day from about 1,200 wells."); U.S. Energy Info. Admin., *Petroleum & Other Liquids: U.S. Field Prod. Of Crude Oil* (Mar. 5, 2021), https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mcrfpus2&f=a [https://perma.cc/X64T-3WPW] (detailing that the United States produced 2,332,000 barrels per day in 1931).

84 Northcutt Ely, Symposium, *Legal History of Conservation of Oil and Gas*, 53 HARV. L. REV. 1070, 1072 (1940) (reviewing papers by ten authors and outlining the history of legislation governing oil and gas production in nine of the oil states); Cauble Smith, *supra* note 82.

85 Since the early years of the industry, forty-two gallon barrels have been oil's standard unit of measurement because Pennsylvania's early oil prospectors used extra whiskey barrels to store their new oil wealth. YERGIN, *supra* note 3, at 12. Natural gas, by contrast, is measured in many diverse units—such as cubic feet, cubic meters, metric tons, and British Thermal Units—in part because transport constraints have, thus far, prevented a global market that might lead to standard measures. *See* Section II.C.

86 DAVID F. PRINDLE, PETROLEUM POLITICS AND THE TEXAS RAILROAD COMMISSION 26 (1981).

87 JAMES A. CLARK & MICHEL T. HALBOUTY, THE LAST BOOM 151 (1972).

88 *Id.* at 19–40.

Commission was given authority over pipelines because, like railroads, they transport oil.[89] In 1919, then, it seemed natural to give the Commission authority to regulate oil production as well.[90] In the years that followed, it assumed a never-to-be-repeated control over the world's economies. In 1931, the first full year of production from the East Texas oil field, Texas production jumped to twenty-four percent of world production.[91] Texas maintained this dominant role for decades, producing a quarter of the world's oil from 1931 to 1953.[92] Nowadays, the world's most dominant oil *nations* only produce about twelve percent of world supply.[93] No nation has ever approached the global dominance that the State of Texas enjoyed during these crucial years when the world's economy, and then the future of democracy itself, hinged on Texas's oil wells.[94]

As East Texas oil field production ramped up in early 1931, the Railroad Commission stepped in, trying to slow production to raise prices for the benefit of all producers. The Railroad Commission imposed limits on daily production in April 1931.[95] These limits on how much daily production is allowed, known as "allowable limits" or

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89 *Id.* at 20.

90 *Id.*

91 For Texas production, see *Historical Crude Oil Production and Well Counts*, R.R. COMM'N OF TEX., https://www.rrc.state.tx.us/oil-and-gas/research-and-statistics/production-data/historical-production-data/crude-oil-production-and-well-counts-since-1935 [https://perma.cc/NFA3-WTR4]. For earlier years, see U.S. Mineral Yearbooks. *E.g.*, O.E. KIESSLING, U.S. DEPT. OF COMM., BUR. OF MINES, MINERAL RESOURCES OF THE UNITED STATES: 1931 (1932) at A-65 (showing Texas production in 1930 and 1931). For U.S. production, see *Petroleum & Other Liquids: U.S. Field Production of Crude Oil*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx? n=PET&s=MCRFPUS1&f=M [https://perma.cc/8HMT-CGED]. For global production, see 2006 ENERGY INFO. ADMIN. ANN. ENERGY REV. 309 tbl. 11.5. For world production, see BOUDA ETEMAD & JEAN LUCIANI, WORLD ENERGY PRODUCTION: 1800–1985 (1998), https://theshiftdataportal.org/energy#Oil [https://perma.cc/L26D-HCEG]. *See* Hamilton, *supra* note 1, at 8 '("Texas . . . accounted for 40% of the crude petroleum produced in the United States between 1935 and 1960.").

92 *Id.* Northcutt Ely, *The Conservation of Oil*, 51 HARV. L. REV. 1209, 1211 (1938) (noting that Texas produced "about 40 per cent" of American oil in 1937 and concluding that "[t]he growing dominance of Texas is the prevailing characteristic of the oil production problem, and hence of the oil legislation").

93 Candace Dunn & Tim Hess, *The United States Is Now the Largest Global Crude Oil Producer*, U.S. ENERGY INFO. ADMIN.: TODAY IN ENERGY (Sept. 12, 2018), https://www.eia.gov/todayinenergy/detail.php?id=37053 [https://perma.cc/2XHX-2LMA].

94 Herbert Feis, *The Anglo-American Oil Agreement*, 55 YALE. L.J. 1174, 1174 (1946) (describing how oil was essential to strategic thinking about the war effort with countries lacking oil forced to "bargain or barter" for oil, leaving them "dependent on the will or bounty of others"). *See generally* ROBERT GORALSKI & RUSSELL W. FREEBURG, OIL & WAR: HOW THE DEADLY STRUGGLE FOR FUEL IN WWII MEANT VICTORY OR DEFEAT (1987).

95 PRINDLE, *supra* note 86, at 31.

simply "allowables," serve two purposes.[96] First, allowable limits maximize the amount of oil that can ultimately be produced from the underground reservoir, which would be damaged by too-rapid pumping.[97] Second, allowable limits can raise prices for all producers if they are imposed by a regulator that controls production from enough producers to form a cartel with market power.[98]

A federal court quickly struck down the Commission's new allowables, holding that state law did not allow the Commission to set limits to raise prices.[99] The court believed the Commission could set limits to protect the oil reservoir itself from damage by a race to production, but it rejected the notion of allowables to raise prices.[100] The Texas legislature added to the confusion by passing a law against waste but simultaneously codifying the court's holding against limits to raise prices.[101]

In the meantime, Oklahoma, with much less production at stake and correspondingly less market power, decided it could not wait for Texas to act; its Governor, Alfalfa Bill Murray, sent troops to close two of the state's most productive oil fields until prices recovered to a dollar per barrel.[102] Thirty-seven East Texas oil companies sent a telegram praising Governor Murray's "leadership and courage" and contrasted it with the situation in Texas, where the Chamber of Commerce was

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96 *Id.* at 30 ("[T]he fact is that prorationing is both a means of conservation and a stratagem for price-fixing."); Coleman, *supra* note 6, at 410–11; Ely, *supra* note 84, at 1071–72; Bruce Kramer, *Conflicts Between the Exploitation of Lignite and Oil and Gas: The Case for Reciprocal Accommodation*, 21 HOUS. L. REV. 49, 100 n.315 (1984); P.H. FRANKEL, ESSENTIALS OF PETROLEUM: A KEY TO OIL ECONOMICS 20 (1969).

97 YERGIN, *supra* note 3, at 205 ("To dissipate gas through helter-skelter production was to lose that essential pressure, and thus to leave large amounts of petroleum unrecovered underground."); Coleman, *supra* note 6, at 396; Howard R. Williams, *Conservation of Oil and Gas*, 65 HARV. L. REV. 1155, 1159 (1952) (overdrilling caused "dissipation of native reservoir energy").

98 Coleman, *supra* note 6, at 397–98. Early scholars often criticized this use of allowables as "price fixing." Marshall & Meyers, *supra* note 19, at 755.

99 DAVIDS HINTON & OLIEN, *supra* note 82, at 184; MacMillan v. R.R. Comm'n of Tex., 51 F.2d 400, 405 (W.D. Tex. 1931) (holding that Texas law forbid "artificial forcing of prices by governmental action, in co-operation with those in the oil industry interested in raising prices"). This was actually the second time within a year that the Railroad Commission had tried to restrain production and been rebuffed by the courts. CLARK & HALBOUTY, *supra* note 87, at 151.

100 Ely, *supra* note 92, at 1220; Coleman, *supra* note 6, at 396 (explaining why "too many wells or extracting too quickly can mean producing less oil overall" as "reservoir pressure drops" and "too much water may become mixed into the oil[,]" which, given the expense of removing it, "may no longer be worth producing"); Note, *supra* note 14, at 1142 ("Poor production methods and excessive production rates, through dissipation of reservoir energy and drowning of oil strata by water encroachment, result in leaving a large percentage of oil inert in the ground with recovery possible only at prohibitive cost.").

101 PRINDLE, *supra* note 86, at 31.

102 CLARK & HALBOUTY, *supra* note 87, at 166.

begging the Governor to impose martial law to limit production.[103] Of course, the companies could not simply agree to cut production themselves—that would be illegal price fixing—so they waited for Texas's Governor Sterling to act.[104]

By August 16, Governor Sterling had seen enough; he declared martial law and sent in the national guard and the Texas Rangers to stop production and enforce whatever new limits the Railroad Commission would set.[105] As this action raised prices, more and more Texans moved to drill wells to take advantage of the price rebound and make sure they won their share of oil before their neighbors' wells drained it from the common reservoir.[106] As a result, the Railroad Commission was forced to keep cutting the daily allowable further and further.[107] Its first allowable level, in April, was 1,000 barrels per day, but that was struck down by the courts.[108] Now, ignoring the court, with the Governor on its side and boots on the ground, the Railroad Commission was enforcing much stricter limits: when the troops let wells reopen, they were limited to 225 barrels per day.[109] Within a week, the Commission cut allowables to 165 barrels per day.[110] As more wells came online in just three weeks, the Commission cut them further to 145 barrels to keep the East Texas oil field's overall production at 1,000,000 barrels per day, less than half of what the field had produced before Governor Sterling sent in the troops.[111]

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103 *Id.*; DAVIDS HINTON & OLIEN, *supra* note 82, at 185.

104 DAVIDS HINTON & OLIEN, *supra* note 82, at 181; Thomas J. DiLorenzo, *The Origins of Antitrust: An Interest-Group Perspective*, 5 INT'L REV. L. & ECON. 73 (1985); Robert L. Bradley, Jr., *On the Origins of the Sherman Antitrust Act*, 9 CATO J. 737 (1990).

105 DAVIDS HINTON & OLIEN, *supra* note 82, at 166–72; PRINDLE, *supra* note 86, at 31.

106 Cauble Smith, *supra* note 82.

107 LAWRENCE GOODWYN, TEXAS OIL, AMERICAN DREAMS: A STUDY OF THE TEXAS INDEPENDENT PRODUCERS AND ROYALTY OWNERS ASSOCIATION 97–101 (1996) (describing the Railroad Commission's use of allowables to manage statewide production); Coleman, *supra* note 6, at 411.

108 PRINDLE, *supra* note 86, at 31.

109 *Id.*; CLARK & HALBOUTY, *supra* note 87, at 172.

110 CLARK & HALBOUTY, *supra* note 87, at 173.

111 *Id.* And, of course, a per-well allowable encouraged drilling more wells: twice the wells, twice the allowable production per day. DAVIDS HINTON & OLIEN, *supra* note 82, at 187.

Texas Rangers enforcing limits on East Texas oil production. *Credit*: CLARK & HALBOUTY, THE LAST BOOM (1972).

Of course, as the Railroad Commission optimized production limits, and oil prices rose, there was even more reward for producing more oil in violation of those limits. Despite the best efforts of the national guard and the Rangers, this "hot oil"—oil produced beyond the allowable limits—remained a huge problem.[112] Then, on February 18, 1932, a federal court struck down Governor Sterling's imposition of martial law and the limits he had imposed on oil production.[113] The Governor responded by appealing to the Supreme Court, claiming the limits were being imposed by the Commission, not the troops, and leaving most of the troops in place as roving "peace officers."[114] The Railroad Commission, for its part, responded by dropping allowables to seventy-five barrels per day.[115]

The year 1932 proved to be a time of regulatory defiance as the Commission issued nineteen new allowable orders, and the courts struck each one down.[116] Finally, in November, the legislature passed a

112 *Id.*; PRINDLE, *supra* note 86, at 31; D. Bruce Johnsen, *Property Rights to Cartel Rents: The* Socony-Vacuum *Story*, 34 J.L. & ECON. 177, 184 n.20 (1991) ("The highest estimate of hot oil production puts it at nearly 10 percent of domestic production in July 1934.").

113 Constantin v. Smith, 57 F.2d 227 (E.D. Tex. 1932).

114 CLARK & HALBOUTY, *supra* note 87, at 183–85.

115 PRINDLE, *supra* note 86, at 31.

116 CLARK & HALBOUTY, *supra* note 87, at 184.

law explicitly allowing the Commission to cut production to raise prices.[117] When the Supreme Court finally upheld the ruling against martial law in December,[118] more of the troops left, but a few stayed to support the new Railroad Commission mandates, which were getting even more organized support from local industry.[119] Finally, in February of 1934, the courts approved the Railroad Commission's new authority, and its ability to enforce limits was secure.[120]

As Texas began to control its oil production, which accounted for forty percent of U.S. production, the federal government began encouraging other states to cooperate. First, relying on his authority under the newly-passed National Industrial Recovery Act,[121] President Franklin D. Roosevelt issued an executive order banning interstate transportation of hot oil—that is, oil produced in violation of state allowable limits.[122] The National Industrial Recovery Act was struck down by the Supreme Court in 1935,[123] but just a month later the U.S. Congress passed a parallel law banning hot oil, the Connally Oil Act, almost universally known as the Connally Hot Oil Act.[124] By the same Act, Congress authorized the states to coordinate their restrictions through a new interstate compact: the Interstate Oil Compact Commission.[125]

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117 *Id.* at 187 ("After a bitter fight, and by a close vote, a market demand bill was passed on November 12, 1932."); DAVIDS HINTON & OLIEN, *supra* note 82, at 188; 1932 TEX. GEN. & SPEC. LAWS 3.

118 Sterling v. Constantin, 287 U.S. 378, 403–04 (1932) ("[T]here was no military necessity which, from any point of view, could be taken to justify the action of the Governor in attempting to limit complainants' oil production, otherwise lawful."). In the meantime, the Supreme Court upheld Oklahoma's restrictions on oil output. Champlin Refin. Co. v. Corp. Comm'n of Okla., 286 U.S. 210, 232 (1932).

119 CLARK & HALBOUTY, *supra* note 87, at 186–89.

120 Amazon Petroleum Corp. v. R.R. Comm'n of Tex., 5 F. Supp. 633, 639 (E.D. Tex. 1934) (noting that "all agree that a restriction to some extent is essential" and rejecting suggestion that the Commission was unlawfully doing bidding of the New Deal era federal government, under President Roosevelt, which supported state restrictions). On the series of lawsuits regarding New Deal legislation, *see* ROBERT H. JACKSON, THE STRUGGLE FOR JUDICIAL SUPREMACY: A STUDY OF A CRISIS IN AMERICAN POWER POLITICS 115 (1941).

121 National Industrial Recovery Act of 1933, Pub. L. No. 73-67, 48 Stat. 195, 15 U.S.C. § 703 (repealed 1935).

122 PRINDLE, *supra* note 86, at 36–37.

123 Pan. Refin. Co. v. Ryan, 293 U.S. 388 (1935).

124 Connally Hot Oil Act, 15 U.S.C. § 715 (2018); PRINDLE, *supra* note 86, at 38–39; ROBERT O. ANDERSON, FUNDAMENTALS OF THE PETROLEUM INDUSTRY 300 (1984); Spence & Prentice, *supra* note 43, at 184–85.

125 Spence & Prentice, *supra* note 43, at 138; YERGIN, *supra* note 3, at 239–40. The idea for the commission had been laid out in a book by Northcutt Ely of the United States Department of Interior, who later became a renowned scholar of international law, conservation, and oil and

The Compact Commission proved to be one of economic history's most important regulatory innovations. It allowed the independent states to coordinate production cuts to ensure they received maximum value for their oil and gas.[126] During its prime, from 1935 to 1953, the United States produced sixty percent of world oil, at times as much as seventy percent,[127] powering the recovery from the Great Depression, the Allies' victory in World War II, and the post-war economic boom.[128] Working with federal experts from the Bureau of Mines, the compact states agreed on production levels for each state.[129] The individual states then set production levels for each well in the state by taking that overall level of production and then allocating it among oil fields and then, in turn, individual wells.[130] Texas was the dominant player in the Compact

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gas. NORTHCUTT ELY, OIL CONSERVATION THROUGH INTERSTATE AGREEMENT (1933); *see also* Owen L. Anderson, *Foreword: The Evolution of Oil and Gas Conservation Law and the Rise of Unconventional Hydrocarbon Production*, 68 ARK. L. REV. 231 (2015) (describing earlier efforts at interstate coordination and the eventual development of the Interstate Oil Compact Commission).

126 WALLACE F. LOVEJOY & PAUL T. HOMAN, ECONOMIC ASPECTS OF OIL CONSERVATION REGULATION 33–36 (2013) (describing the development of the Interstate Oil and Gas Compact Commission from the Oil States Advisory Committee and noting that "[t]he heart of the immediate emergency program was the limiting of production by the states").

127 *See supra* note 91. Had the Compact Commission been in force earlier it could have won America further benefits, because the United States dominated production from 1901 on. By 1928, "the United States produced 68% of the world's total . . . ." Marshall & Meyers, *supra* note 4, at 33 n.2 (citing U.S. BUREAU OF MINES, WORLD'S PRODUCTION OF CRUDE PETROLEUM IN 1930, ANNUAL PETROLEUM STATES 75A (1930)). By 1932, the United States still "produce[d] 62% of the total supply of the world." Ford, *supra* note 4, at 1170 n.1.

128 Coleman, *supra* note 6, at 407–08 (summarizing sources describing why World War II "was the first war fought for oil and determined by oil"); Feis, *supra* note 94, at 1175–81 (describing the efforts of the United States and United Kingdom to develop oil reserves abroad to power the post-war expansion); John C. Jacobs, *Unit Operation of Oil and Gas Fields*, 57 YALE L.J. 1207, 1207 (1948) ("In less than a century, petroleum has changed from 'a peculiar liquid not necessary nor indeed suitable for the common use of man' to a substance indispensable to the military security and economic prosperity of a modern nation." (quoting Hail v. Reed, 54 Ky. 479, 490 (Ky. 1854))); Rex G. Baker & Erwin N. Griswold, *Percentage Depletion–A Correspondence*, 64 HARV. L. REV. 361, 362 (1951) ("Both in peace and in war the country must have and is very dependent upon oil and gas. Our civilian economy and the national safety would be jeopardized if we failed to maintain adequate reserves of petroleum . . . .").

129 Ely, *supra* note 92, at 1214–17 (describing the development and operation of the Compact Commission and noting that although there was no formal commitment to abide by production allocations, "the compacting states have done so, within reasonable limits"); YERGIN, *supra* note 3, at 239–40; Williams, *supra* note 97, at 1160–63 (describing how these limits were set in cooperation with the federal Bureau of Mines and supported by the oil industry).

130 Pickens v. Railroad Comm'n of Tex., 387 S.W.2d 35, 38 (1965) (state, field, well); JOHN S. LOWE, OWEN L. ANDERSON, ERNEST E. SMITH, DAVID E. PIERCE, CHRISTOPHER S. KULANDER, & MONIKA U. EHRMAN, CASES AND MATERIALS ON OIL AND GAS LAW 758–59 (7th ed. 2018); David Edward Pierce, *Coordinated Reservoir Development—An Alternative to the Rule of Capture for the Ownership and Development of Oil and Gas*, 4 J. ENERGY L. & POL'Y 1, 16–17 (1983).

Commission because it produced forty-one percent of U.S. oil during this period.[131]

When the center of oil production shifted to the Middle East in the 1960s, its new energy powers realized that they too must coordinate to maximize their oil riches.[132] Naturally they turned to the model of the Interstate Oil Compact Commission.[133] The organization they formed, OPEC, would dominate the global economy for the next half century.

B. *The Organization of Petroleum Exporting Countries*

The Organization of Petroleum Exporting Countries (OPEC) was formed in 1960, just as oil production from the Middle East was beginning to rapidly surpass the established sources in the United States.[134] The year 1953 was the first in the twentieth century in which the United States produced less than half of the world's oil.[135] By 1965, the Middle Eastern countries together produced more oil than the United States.[136] By 1973, the year of the great "Arab oil embargo,"[137] the United States produced less than a sixth of the world's oil, dwarfed by OPEC, which produced forty-six percent.[138] Since then, OPEC's

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131 PRINDLE, *supra* note 86, at 71 (Texas production reached forty-five percent of U.S. production by 1953.). For data sources, see *supra* note 91.

132 In recent years, commentators have sometimes expressed concern that a large endowment of natural resources might be an affirmative hindrance to development. *See generally* Robert Howse, *The End of the Globalization Debate: A Review Essay*, 121 HARV. L. REV. 1528 (2008) (reviewing RAWI ABDELAL, CAPITAL RULES: THE CONSTRUCTION OF GLOBAL FINANCE (2007); JAGDISH BHAGWATI, IN DEFENSE OF GLOBALIZATION (2007); SASKIA SESSEN, TERRITORY, AUTHORITY RIGHTS: FROM MEDIEVAL TO GLOBAL ASSEMBLAGES (2006); JOSEPH E. STIGLITZ, MAKING GLOBALIZATION WORK (2006)). But there is no consensus on whether oil or other resources have this effect, and the United States' rise to prominence, driven by oil, is a strong counterexample. Frankel, *supra* note 58, at 6–7.

133 Gilbert Burck, *A Strange New Plan for World Oil*, FORTUNE, Aug. 1959, 94, 94 (describing plan for OPEC as "a kind of international Texas Railroad Commission"); YERGIN, *supra* note 3, at 259; McNally, *supra* note 77, at 2 ("OPEC effectively took control of pricing and supply from the commission and the Seven Sisters [oil companies] during the 1970s.").

134 YERGIN, *supra* note 3, at 522; *Baghdad Parley Approves Permanent Organization; Caracas Talks Scheduled*, PLATT'S OILGRAM NEWS SERV., Sept. 16, 1960 ("Arab-Iranian-Venezuelan oil price conference here ended late yesterday with unanimous agreement on series of decisions—including formation of coordinating organization to include four Middle East states and Venezuela."); U.S. ENERGY INFO. ADMIN., ANNUAL ENERGY REVIEW 2006 309 tbl. 11.5 (2007).

135 ETEMAD & LUCIANI, *supra* note 91.

136 Coleman, *supra* note 6, at 408; Note, *From Concession to Participation: Restructuring the Middle East Oil Industry*, 48 N.Y.U. L. REV 774, 788–89 (1973).

137 There was an earlier failed embargo by the Middle Eastern oil exporters during the Six-Days War in 1967. YERGIN, *supra* note 3, at 555–58.

138 ETEMAD & LUCIANI, *supra* note 91; U.S. ENERGY INFO. ADMIN., 2006 ENERGY INFO. ADMIN. ANN. ENERGY REV. 309 tbl. 11.5.

decisions have been the single biggest factor in determining the world oil prices that shape the global economy.[139]

In the 1973 oil crisis the Middle Eastern OPEC countries cut overall production, embargoed exports to nations that they perceived as supporting Israel in the Yom Kippur War, and dramatically demonstrated the power of OPEC's oil dominance.[140] In the years leading up to 1973, Texas and the other American oil-producing states had given up on using allowables to ensure higher prices—they no longer had market power in a market dominated by OPEC.[141] States still set allowables, but they were simply set at a level to protect common oil and gas reservoirs and thus ensure maximum ultimate recovery.[142] They were not ratcheted down further to raise prices.[143] And of course, higher prices would no longer have served the national interest, because in the late 1940s the United States had become a net oil importer for the first time in modern history.[144] As a result, by 1973, when oil prices rose, the American states had no "spare capacity" to respond—that is, they could not ramp up production any further without damaging their oil reservoirs, which would lower their ultimate recovery of oil.[145] Without spare capacity, America was helpless to watch the oil crisis unfold.

When the Middle Eastern oil powers cut their production by less than a quarter, oil prices jumped sevenfold.[146] It was a complete triumph for OPEC, which found it had the same dizzying power the Railroad Commission had once exercised: it could cut its production, lowering its costs and extending the life of its oil reservoirs, while increasing its

139 M.A. ADELMAN, GENIE OUT OF THE BOTTLE: WORLD OIL SINCE 1970 (1995) 141–86.

140 ANDERSON, *supra* note 124, at 58. YERGIN, *supra* note 3, at 606–62.

141 PRINDLE, *supra* note 86, at 112. During this period, the Interstate Oil Compact Commission retreated to its modern form as a forum for regulatory exchange. *See* Hannah J. Wiseman, *Regulatory Islands*, 89 N.Y.U. L. REV. 1661, 1700–01 (2014) (describing the Compact Commission's work on fracking regulation and how it is used by states such as Texas).

142 Coleman, *supra* note 6, at 410–11; Colby, *supra* note 41, at 369'. Northcutt Ely presciently predicted this day would come in 1940. Ely, *supra* note 84, at 1073 ("To date, the optimum rate has nearly always been less than the market demand rate, so that a statute restricting production to the market demand has automatically produced some, if not all, of the benefits which would have been reached by laws restricting production to the rate calculated to produce maximum ultimate recovery.").

143 PRINDLE, *supra* note 82, at 112; YERGIN, *supra* note 3, at 567–68.

144 NEELESH NERURKAR, CONG. RSCH. SERV., R42465, U.S. OIL IMPORTS AND EXPORTS 1 (2012), https://fas.org/sgp/crs/misc/R42465.pdf [https://perma.cc/Q2AQ-46X5]; YERGIN, *supra* note 3, at 772 ("Oil imports have been a political and strategic concern since the United States moved from being an oil exporter to an oil importer in the late 1940s.").

145 YERGIN, *supra* note 3, at 664.

146 *Id.* at 614–15 (showing that production decreased from 20.8 million barrels per day to 15.8 million barrels per day, but oil prices rose 600 percent).

cash flow by making the world pay higher prices.[147] And it ushered in decades of OPEC-managed oil prices, in which higher energy prices stunted global growth, leaving the world to plead for more production.[148]

Since 1973, OPEC's decisions on production have shaped global oil markets. For example, when global oil discoveries swamped the markets in the 1980s, OPEC cut its production to ensure that oil prices did not crash.[149] Again, when oil prices plummeted following the 2008 global financial crisis, OPEC cut its production, doubling world oil prices.[150]

Of course, the rest of the world, dependent on oil imports, has tried to resist OPEC's market power, banding together and working to reduce their energy consumption.[151] Yet none of these efforts have changed the fundamental reality that oil prices continue to shape the economy, which uses more oil every year.[152] Finally, in the new century, the United States found the key to breaking OPEC's dominance: its own flood of crude oil.[153] The fracking boom is the biggest oil boom that the world has ever seen, and it may either break OPEC or forge a new alliance between the United States and the world's other energy powers.[154]

The American boom dramatically decreased OPEC's market share, limiting its market power.[155] OPEC's share of world oil production, which had at times been nearly half, fell to thirty-four percent by 2012 and thirty percent by 2019.[156] As OPEC's market share fell, its

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147 *Id.*; ROBERT MCNALLY, CRUDE VOLATILITY: THE HISTORY AND THE FUTURE OF BOOM-BUST OIL PRICES 131–32 (2d ed. 2019).

148 McNally, *supra* note 77, at 2–3; SMIL, *supra* note 1, at 346–47. *See generally* BRUNO & SACHS, *supra* note 1.

149 McNally, *supra* note 77, at 5; YERGIN, *supra* note 3, at 750–64.

150 McNally, *supra* note 77, at 5.

151 *See* SMIL, *supra* note 1, at 366 (describing formation of the International Energy Agency to increase energy efficiency and combat OPEC); YERGIN, *supra* note 3, at 612; PHILLIP BROWN, CONG. RSCH. SERV., IN FOCUS, IF11186, NO OIL PRODUCING AND EXPORTING CARTELS (NOPEC) ACT OF 2019 (2019) (describing proposed bill to ban OPEC).

152 Despite efforts to reduce oil use, global demand for oil has doubled since 1971. INT'L ENERGY AGENCY, WORLD OIL SUPPLY AND DEMAND, 1971–2019 (2020), https://www.iea.org/data-and-statistics/charts/world-oil-supply-and-demand-1971-2018 [https://perma.cc/G8PL-VNZM]. Even the International Energy Agency, formed to reduce oil use and combat OPEC, admits that oil demand will continue climbing for the foreseeable future. INT'L ENERGY AGENCY, OIL 2020: FUEL REPORT—MARCH 2020 (2020), https://www.iea.org/reports/oil-2020#key-findings [https://perma.cc/TZA3-Y3FB].

153 Coleman & Klass, *supra* note 7, at 674–78.

154 Coleman, *supra* note 6, at 418–19, 419 n.165 (the U.S. oil boom alone is seven times the biggest previous oil boom, which was in Saudi Arabia in the 1970s).

155 McNally, *supra* note 77, at 6–12.

156 Alex Lawler, *OPEC's Market Share Sinks—And No Sign of Wavering on Supply Cuts*, REUTERS (Aug. 22, 2019, 5:22 AM), https://www.reuters.com/article/us-oil-opec-graphic/opecs-

production cuts had less and less influence on global prices, and it captured a smaller share of any price increase, decreasing its incentives to restrict production.[157] OPEC found a temporary solution to this problem by working with Russia to form an alliance known as OPEC+, which cooperated from January 1, 2017 until Russia abruptly withdrew on March 6, 2020.[158] With the breakup of OPEC+, we are entering a new period of uncertainty for global oil supply, but one that presents a unique opportunity for the United States and the global environment to benefit from new three-way negotiations with Russia, Saudi Arabia, and OPEC.[159]

C. *Nascent North American Cartels*

North America is emerging from the biggest oil and gas boom the world has ever seen. In fact, it is emerging from three simultaneous booms that have raised North America to a completely unprecedented level of oil and gas production.[160] Most important has been the boom in oil production enabled by directional drilling and hydraulic fracturing—generally known as "fracking."[161] Second, fracking has also unlocked vast reserves of natural gas production that are set to soon make the United States the world's number one exporter of liquefied natural gas—gas that is cooled until it is liquid and shipped to gas-hungry nations in Europe and Asia.[162] Third, Canadian oil production is still rising as it produces more and more from its oil sands, extracting heavy oil from sandy soils using steam or hot water.[163]

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market-share-sinks-and-no-sign-of-wavering-on-supply-cuts-idUSKCN1VC0U4 [https://perma.cc/7JA5-N5F4].

157 *See supra* Section II.B.

158 Lawler, *supra* note 156; Gamal et al., *supra* note 63.

159 Gardner & Hiller, *supra* note 64.

160 James W. Coleman, *Importing Energy, Exporting Regulation*, 83 FORDHAM L. REV. 1357, 1366 (2014); Coleman, *supra* note 12, at 277–78.

161 *See* Coleman, *supra* note 6, at 418–21, 418 n.160 (explaining how fracking works and why oil companies sometimes object to using the term "fracking"); Fenner L Stewart & Allan Ingelson, *Regulating Energy Innovation: US Responses to Hydraulic Fracturing, Wastewater Injection and Induced Seismicity*, 35 J. ENERGY NAT. RES. L. 109, 110 (2016) (explaining how modern fracking process differs from previous similar processes).

162 Coleman, *supra* note 12, at 272–76.

163 CANADIAN ASS'N OF PETROLEUM PRODUCERS, 2019 CRUDE OIL FORECAST, MARKETS AND TRANSPORTATION 4–5 (2019), https://www.capp.ca/wp-content/uploads/2019/11/338843.pdf [https://perma.cc/PCG3-EMZK]; *CERI: Canadian Crude Oil Production to Rise Until 2025*, OIL & GAS J. (July 23, 2019), https://www.ogj.com/drilling-production/production-operations/article/14036679/ceri-canadian-crude-oil-production-to-rise-until-2025 [https://perma.cc/JDT9-4S5N] ("Canadian crude oil production is expected to continue to rise until 2025.").

These booms have, at times, overwhelmed the ability of the transportation system, as companies cannot build pipelines or ramp up crude-by-rail fast enough to bring this flood of oil and gas to market.[164] There is so little room in gas pipelines that producers in Texas, North Dakota, and Canada often must simply flare their natural gas or pay others to take it away.[165] And even oil can trade at a substantial discount in regions where there are not yet enough pipelines to bring all the new oil to market.[166] Low prices in these transport-constrained local markets have created growing economic pressure to adopt regulations to slow oil and gas production until the pipeline system can catch up. And these transport constraints have created temporary situations of market power that nimble regulators can use to protect cash flow for producers unable to get their products to market.

The clearest example is the province of Alberta. In recent years, it has faced catastrophically low local oil prices because there are too few pipelines connecting it with global oil markets.[167] Even a small surplus of oil over transport capacity means that oil producers must bid lower and lower prices to secure a spot on the province's export pipelines.[168] Making matters worse, Canadian oil is so heavy and viscous that it needs to be diluted with lighter hydrocarbons to make it fluid enough to be transported by pipeline.[169] In late 2018, the cost of this diluent plus pipeline transport was more than the value of a barrel of exported Canadian oil—that is, rather than receiving money, Canadian producers were having to pay people to take their oil away.[170] In

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164 Coleman, *supra* note 12, at 272–79.

165 *Id.* at 275–76; *supra* notes 16–17 and accompanying text.

166 *See infra* notes 168–70.

167 For some of the regulatory hurdles that have held up the Keystone XL pipeline and the Trans Mountain pipeline, both designed to carry oil away from Alberta, see Coleman, *supra* note 68, at 135–45.

168 Ian Bickis, *Pipeline Constraints to Cost Canadian Economy $10.7-billion in 2018: Scotiabank*, GLOBE & MAIL (Feb. 20, 2018), https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/pipeline-constraints-to-cost-economy-107-billion-in-2018-scotiabank/article38030883 [https://perma.cc/Z4GG-R68R]; Kelsey Hallahan, *Pipeline Constraints, Refinery Maintenance Push Western Canadian Crude Oil Prices Lower*, TODAY IN ENERGY (Dec. 3, 2018), https://www.eia.gov/todayinenergy/detail.php?id=37672 [https://perma.cc/MHZ8-W2K8].

169 JONATHAN L. RAMSEUR, CONG. RES. SERV., R43128, OIL SANDS AND THE OIL SPILL LIABILITY TRUST FUND: THE DEFINITION OF "OIL" AND RELATED ISSUES FOR CONGRESS 3 (2017) ("Diluted bitumen (Dilbit) is bitumen that is blended with lighter hydrocarbons—typically natural gas condensates—to create a lighter, less viscous, and more easily transportable material.").

170 Dan Healing, *Oilsands Bitumen Prices Are Actually in Negative Territory for the First Time Ever, Analyst Says*, FIN. POST (Oct. 12, 2018), https://business.financialpost.com/commodities/energy/oilands-bitumen-prices-are-actually-in-negative-territory-analyst-calculates

response, Alberta ordered all oil companies to cut their production back 8.7%.[171] This curtailment was supported by many oil companies, and it immediately raised oil prices, increasing their cash flow and profits.[172]

Alberta's example illustrates the surprisingly wide range of situations where regulators can exercise market power. Alberta does not have a monopoly in global oil markets; it produces under four percent of the world's oil.[173] But transport constraints mean that there is not a single global oil market: Alberta does not have enough pipelines connecting it to global markets so it is, to an extent, an isolated market.[174] Alberta's government controls production from a group of oil companies that can exercise market power within their isolated market if they work together. That is, Alberta can increase its producers' profits by cutting their production, as its 2019 curtailment proved. When Alberta cut production by just 8.7%, heavy oil prices in Alberta

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[https://perma.cc/ZN66-X4JP] ("[P]rices being paid for Western Canadian oilsands bitumen have fallen so far that many producers are losing money on every barrel sold into the spot market."). Although less common than negative gas prices, oil prices do, at times turn negative, as they have in some places following the March 2020 oil price collapse. Javier Blas & Sheela Tobben, *One Corner of U.S. Oil Market Has Already Seen Negative Oil Prices*, BLOOMBERG (Mar. 27, 2020, 12:25 PM), https://www.bloomberg.com/news/articles/2020-03-27/one-corner-of-u-s-oil-market-has-already-seen-negative-prices [https://perma.cc/Q9Z5-58ZN] (finding negative oil prices in Wyoming).

171 Province of Alberta Curtailment Rules, O.C. 375/2018 (Dec. 3, 2018), http://www.qp.alberta.ca/documents/orders/Orders_in_Council/2018/1218/2018_375.pdf [https://perma.cc/LE6F-FFKZ]; *Oil Production Limit*, ALBERTA, https://www.alberta.ca/oil-production-limit.aspx [https://perma.cc/8HGX-UH8L]; Robert Tuttle & Kevin Orland, *Alberta Ready to Cut Oil Output to Ensure 'Survival Price' to Help Producers Through Oil Crash*, FIN. POST (Mar. 11, 2020), https://business.financialpost.com/commodities/energy/alberta-ready-to-cut-oil-output-to-ensure-survival-price-to-help-producers-through-oil-crash [https://perma.cc/6WYV-NPYG].

172 Rod Nickel, *Canada's Oil Cuts Offer Lifeline to Producers but Create New Problems*, REUTERS (Jan. 16, 2019, 12:40 PM), https://www.reuters.com/article/us-canada-crude-curtailment/canadas-oil-cuts-offer-lifeline-to-producers-but-create-new-problems-idUSKCN1PA2FK [https://perma.cc/9W8M-2GCJ]. Natural gas producers have asked for a similar system for gas. *Action Needed To Avert Alberta Natural Gas Crisis, CEOs Say in Open Letter to Kenney*, DAILY OIL BULL. (July 17, 2019, 12:00 AM), https://www.dailyoilbulletin.com/article/2019/7/17/action-needed-to-avert-alberta-natural-gas-crisis- [https://perma.cc/NX5M-PDUV].

173 Alberta produces 3.81 million barrels of oil per day. *Oil Production Limit*, *supra* note 171; INT'L ENERGY AGENCY', *supra* note 152. The world now produces just over 100 million barrels of oil per day. Dan Murtaugh, *100 Million Barrels: The World Hit a Daily Oil and Liquids Record*, BLOOMBERG (Oct. 12, 2018, 4:00 AM), https://www.bloomberg.com/news/articles/2018-10-12/100-million-barrels-the-world-hit-a-daily-oil-liquids-record [https://perma.cc/Y4Y7-PJ3C].

174 For a description of the unique challenges facing all forms of oil transportation out of Alberta, see James W. Coleman, *Policymaking by Proposal: How Agencies Are Transforming Industry Investment Long Before Rules Can Be Tested in Court*, 24 GEO. MASON L. REV. 497, 512–14 (2017). Fuel markets are also divided in many other ways that prevent oil from being an undifferentiated commodity. James W. Coleman, *Energy Competition: From Commodity to Boutique and Back*, 7 NEW DEVS. COMPETITION L. & ECON. 321, 321-23 (2019).

tripled; enforcing a cartel to cut all companies' production drastically increased those companies' cash flow.[175]

Alberta's isolation is somewhat unusual in oil markets because oil can easily be transported by rail, truck, or ship. But it is commonplace in natural gas markets because natural gas can only be moved by pipeline or as liquefied natural gas.[176] As a result there are many, many jurisdictions that can exercise market power in isolated natural gas markets around the world.[177] Like Alberta, these jurisdictions could reap an economic benefit from slowing their production of natural gas.

The two jurisdictions that currently have the most to gain from slower natural gas production are Texas and North Dakota. Both states are flaring vast amounts of natural gas, which means natural gas is worth zero or less at the site of the well[178]—that is, it would cost more to transport the gas to market than it would be worth once it got there.[179]

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175 Dan Healing, *Canadian Crude Prices Retain Strength as Alberta Production Cuts Kick In*, FIN. POST (Jan. 2, 2019), https://business.financialpost.com/commodities/energy/western-canada-oil-prices-remain-strong-as-alberta-production-cutbacks-kick-in [https://perma.cc/C7GJ-JR86] (describing how announcing the cuts sent the price of oil from "the low teens" to $40); Chris Varcoe, *Oil Curtailment a 'Bitter Pill' That Should End in 2020, Says Kenney*, CALGARY HERALD (Jan. 2, 2020), https://calgaryherald.com/opinion/columnists/varcoe-oil-curtailment-a-bitter-pill-that-should-end-in-2020-says-kenney [https://perma.cc/FB9P-CX54] (describing how curtailment brought barrels of Canadian oil $34 closer to world prices).

176 *See* Coleman, *supra* note 12, at 272–74.

177 Many of these jurisdictions, however, would not want to raise prices if all the locally produced gas went to local consumers. The cartel would only be in the state interest if a significant percentage went for export.

178 *Permian Gas Flaring Reaches Yet Another High*, RYSTAD ENERGY (Nov. 5, 2019), https://www.rystadenergy.com/newsevents/news/press-releases/permian-gas-flaring-reaches-yet-another-high [https://perma.cc/28W7-VE9D]; Emily Geary & Steve Hanson, *Natural Gas Venting and Flaring Increased in North Dakota and Texas in 2018*, U.S ENERGY INFO. ADMIN. (Dec. 6, 2019), https://www.eia.gov/todayinenergy/detail.php?id=42195 [https://perma.cc/D9CA-M949] ("The volume of U.S. natural gas that was reported as vented and flared reached its highest average annual level . . . ."); Brian Scheid, *With Permian Flaring on the Rise, Regulation Remains Uncertain*, S&P GLOB. PLATTS (Mar. 6, 2020, 5:56 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/030620-with-permian-flaring-on-the-rise-regulation-remains-uncertain [https://perma.cc/5KXD-STT5] (flaring in the Permian has "skyrocketed"; it has "roughly tripled in two years").

179 For this reason, a common trope of multiplying the quantity of flared gas by the gas price in distant markets to report the monetary value of gas wasted is, at best, very misleading. *See, e.g.*, Jon Goldstein, *$1.5 Billion and Counting: "Real Time "Waste Ticker" Reveals Value of Publicly Owned Gas That Private Companies Waste*, ENV'T DEF. FUND (Jan. 30, 2017), http://blogs.edf.org/energyexchange/2017/01/30/1-5-billion-and-counting-real-time-waste-ticker-reveals-value-of-publicly-owned-gas-that-private-companies-waste [https://perma.cc/5YTH-9HNB] (multiplying flaring on public lands by gas price at Henry Hub); Rebecca Elliott, *In America's Hottest Drilling Spot, Vast Volumes of Gas Is Going Up in Smoke*, WALL ST. J. (Aug. 29, 2018, 5:30 AM), https://www.wsj.com/articles/in-americas-hottest-drilling-spot-vast-volumes-of-gas-go-up-in-smoke-1535535001 [https://perma.cc/F4KL-KUSG] ("[R]oughly $1

In fact, at Texas's natural gas hub, the Waha hub, natural gas prices are often negative—that is, even if producers invest in gathering lines to take the gas from their wells to this local market, they will still have to pay to have their gas taken away.[180] As a result, Texas is considering exercising its authority to cut production.[181] And North Dakota's oil and gas regulator, the North Dakota Industrial Commission, is considering limiting production as well.[182] These two states have an opportunity to lead the way toward a renaissance of American state energy cartels.

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million worth of natural gas is burned away every day, going to waste."). If you have a ton of gravel blocking your driveway, the fact that it would be worth $10 to a construction company across town does not mean that your pile is "worth" $10; instead, you will have to pay someone to take it away because the cost of transporting it is greater than the value it will have at the place it is needed. Flared gas is worth less than nothing—if it had value at the well, someone would pay for it, and it would not be flared. New pipelines or stricter allowables can raise the value of gas at the well, but in their absence large quantities of gas will be a waste product with negative value to society that producers must flare or pay others to take away.

180 J. Robinson & Jack Winters, *Permian Spot Gas Prices Test Record Low as Maintenance Limits Midstream Capacity*, S&P GLOBAL PLATTS (Apr. 20, 2020, 10:20 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/042020-waha-spot-gas-price-eyes-record-low-in-intraday-trading [https://perma.cc/Z53Q-783V] ("[N]atural gas prices in West Texas tumbled to levels below minus $7/MMBtu . . . ."); Spencer Jakab, *Oil Producers Are Setting Billions of Dollars on Fire*, WALL ST. J. (Jan. 10, 2020, 5:30 AM), https://www.wsj.com/articles/oil-producers-are-setting-billions-of-dollars-on-fire-11578652210 [https://perma.cc/Z82E-4MP4] ("Last year the price of gas at the Waha Hub in Texas reached negative four dollars per million British thermal units while gas in the other parts of the country was around $2.50/MMBtu."); Scott DiSavino, *Explainer: Why Are U.S. Natural Gas Prices in Texas Below Zero?*, REUTERS (Apr. 9, 2019, 4:07 PM), https://www.reuters.com/article/us-natgas-pipelines-flaring-explainer/explainer-why-are-u-s-natural-gas-prices-in-texas-below-zero-idUSKCN1RL2NL [https://perma.cc/PJ3N-3RHS] ("U.S. natural gas prices in West Texas have been trading in negative territory for more than two weeks, largely due to a lack of pipeline space, forcing some drillers to pay those with spare pipeline capacity to take unwanted gas."). Natural gas prices have also been negative in Alberta. Geoffrey Morgan, *Natural Gas Prices Are So Bad in Alberta Producers Are Having to Pay Customers to Take It*, FIN. POST (Oct. 12, 2017), https://business.financialpost.com/commodities/canadian-natural-gas-prices-enter-negative-territory-amid-pipeline-outages [https://perma.cc/A5P2-XKH4] (describing why natural gas prices, for the first time, have started turning negative).

181 Rebecca Elliott, *Texas Weighs Curtailing Oil Production for First Time in Decades*, WALL ST. J. (Mar. 19, 2020, 3:38 PM), https://www.wsj.com/articles/texas-weighs-curtailing-oil-production-for-first-time-in-decades-11584646724 [https://perma.cc/N6UH-JCCM]; Gardner & Hiller, *supra* note 159 (statement of Railroad Commissioner Ryan Sitton) ("[P]roduction limits could be implemented quickly, though no one who works at the agency was around the last time the state limited production, in the early 1970s."); Mike Lee, *Texas Grapples with How to Fight Oil Crash*, E&E NEWS (Mar. 27, 2020), https://www.eenews.net/energywire/2020/03/27/stories/1062710491 [https://perma.cc/76ZA-EBNK] (describing divisions between commissioners and candidates for commissioner in approaches to production cuts).

182 Brian Scheid, *North Dakota Weighs Plan to Keep Some Bakken Crude Off Market*, S&P GLOBAL PLATTS (Mar. 18, 2020), https:// www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/031820-north-dakota-weighs-plan-to-keep-some-bakken-crude-off-market [https://perma.cc/2NFH-QLLQ] ("[T]he North Dakota Industrial Commission next week will

III. U.S. ENERGY CARTELS FOR THE 21ST CENTURY

The Railroad Commission of Texas and North Dakota's Industrial Commission should both ratchet down allowable limits of gas production to raise natural gas prices above zero in oil fields like the Permian Basin and Bakken Formation that do not have enough pipelines to carry natural gas to market. Because wells produce a mix of oil and gas, this will also mean slowing oil production down, which will also raise oil prices a bit. If properly calibrated, as in Alberta, these limits should increase immediate cash flow for operators, while extending the life of wells. The alternative methods of controlling flaring, such as flaring prohibition or fees, could devastate the industry and be environmentally counterproductive.

As long as wellhead natural gas prices are not lifted substantially above zero, stricter limits should only slightly raise delivered prices of natural gas to consumers. And it should benefit consumers by ensuring a more durable and less volatile supply of natural gas. The Interstate Oil and Gas Compact Commission can also work with Texas, North Dakota, and other oil-producing states to limit this downside by ensuring that production limits are coordinated and just enough to limit flaring, which is a waste of gas with no benefit to consumers. The overall goal should be to maximize the economic and environmental benefits from the current boom.

The reinvigorated Compact Commission can also work with the federal government to secure cooperation from other major energy exporters, such as Russia, Saudi Arabia, and the rest of OPEC. These oil and gas exporters have a shared interest in restraining production to achieve higher energy prices. Slowing global production of oil and gas will also slow emissions of greenhouse gases and other pollutants emitted by combustion of fossil fuels. This is a rare opportunity where the economic interests of key fossil fuel producers coincide with global efforts to slow carbon emissions.[183] It should be seized.

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consider new rules aimed at preventing operators from either bringing more unwanted crude onto the market or abandoning wells completely.").

183 In general, the economic interest of oil-producing countries, may be opposed to climate regulation. Monika U. Ehrman, *A Call for Energy Realism: When Immanuel Kant Met the Keep It in the Ground Movement*, 2019 UTAH L. REV. 435, 463–67 (describing benefits to United States of continued robust oil and gas production); James W. Coleman, *Unilateral Climate Regulation*, 38 HARV. ENV'T L. REV. 87, 107–08 (2014).

A. *Reforming the Railroad Commission and the Compact Commission*

The Railroad Commission of Texas and North Dakota's Industrial Commission should ratchet down gas production allowables for wells in fields with abnormal flaring until flaring returns to normal levels.[184] All these wells already have allowable limits, but they are generally set above the level that any producer would reach.[185] After 1973, the United States was desperate to lower oil prices, and allowables were loosened to the maximum that shared reservoirs could handle.[186] And fracking obviated the need to protect shared reservoirs because each fracked well produced only the portion of the subsurface that had been fractured, rather than drawing from a larger permeable, shared reservoir.[187] Freed of concern about price and shared reservoirs, for the past decade, regulators have been setting allowables so high that they do not

184 The Railroad Commission has recently shown signs of being more open to limits on flaring. Ryan Collins, *Texas Oil Regulator Shifts Stance as Gas Flaring Hits Record*, BLOOMBERG (Aug. 7, 2019, 6:39 PM), https://www.bloomberg.com/news/articles/2019-08-07/texas-oil-regulator-shifts-stance-as-gas-flaring-hits-record [https://perma.cc/JV65-JUTN] (The Commission has never denied a permit to flare; those decisions are usually unanimous; the Commission's chairman dissented from granting one to a company that, uniquely, was already connected to a pipeline but claimed it would lose $146 if the permit was not granted; such permits last up to 180 days.).

185 John McFarland, *What Landowners Need to Know About Field Rules*, OIL & GAS LAW. BLOG (Feb. 27, 2017), https://www.oilandgaslawyerblog.com/landowners-need-know-field-rules [https://perma.cc/C6AU-632V] ("Although the Commission continues to adopt field rules that provide for assignment of allowables to wells in the field—usually based on acreage assigned to each well under the field rules—as a practical matter the allowable system no longer limits or regulates the amount a well can produce.").

186 YERGIN, *supra* note 3, at 664.

187 Although simply pumping oil will not extract the oil in a neighbor's impermeable formation, there is a limited danger of pulling from a shared reservoir if there is "interference" between the two neighboring wells. Bradley Olson, *A Fracking Experiment Fails to Pump as Predicted*, WALL ST. J. (July 4, 2019, 5:01 PM), https://www.wsj.com/articles/a-fracking-experiment-fails-to-pump-as-predicted-11562232601 [https://perma.cc/EDP9-2F2P] (describing problem of wells drilled "too close together"); Wei Yu, Yifei Xu, Ruud Weijermars, Kan Wu, & Kamy Sepehrnoori, *Impact of Well Interference on Shale Oil Production Performance: A Numerical Model for Analyzing Pressure Response of Fracture Hits with Complex Geometries*, SOC. OF PETROLEUM ENG'RS (2017).

constrain production.[188] With the rise of flaring, and the collapse of oil and gas prices, it is time to ratchet down allowables again.[189]

There will always be some flaring in exceptional circumstances where safety or unforeseeable circumstances require it.[190] But if regulators reduce production enough that natural gas prices are no longer negative at the well, industry will have an incentive to capture natural gas and bring it to market to capture that value. Industry is currently looking at many innovative ways of using natural gas, including compressing or liquefying it on the spot as well as using it to generate electricity for innovative purposes including bitcoin mining.[191]

Of course, fracked wells produce oil and gas together, so limits on gas production will also ratchet down oil production.[192] The Commissions can limit this impact by allowing trading of gas allowables between producers so that the producers who would most benefit from maintaining current production could do so. Trading would let producers who cannot cut their gas production without cutting oil to purchase gas allowables from companies that can cut their gas production more easily.[193] Alberta successfully used this kind of trading to increase the benefits of its oil production limits.[194]

The collateral impact of gas limits on oil production may slightly reduce revenue from oil. On one hand, reduced oil production will raise field oil prices when they are priced below world market levels because

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188 McFarland, *supra* note 185 ("The allowable system for gas has been 'suspended' by the Commission for many years, so gas wells can always produce at their maximum rate. And the field rules adopted for the fields in the new shale reservoirs usually set the allowable so high that no well in the field can produce in excess of its allowable, except perhaps in the early months of the well's production.").

189 Flared gas must, of course, count toward allowable production so that producers cannot avoid the limits by flaring.

190 Eman A. Emam, *Gas Flaring in Industry: An Overview*, 57 PETROLEUM & COAL 532 (2015) (describing three types of flaring, including "emergency flaring").

191 Anna Shiryaevskaya & Naureen S. Malik, *A Way to Halt Natural Gas Flaring Arrives on the Back of a Truck*, BLOOMBERG (Jan. 31, 2020, 12:00 AM), https://www.bloomberg.com/news/articles/2020-01-31/portable-lng-plants-arrive-at-natural-gas-wells-to-curb-flaring [https://perma.cc/R576-NHRQ]; Naureen S. Malik, *Why Bitcoin Mining Is Being Touted as a Solution to Gas Flaring*, BLOOMBERG (Dec. 6, 2019, 5:46 PM), https://www.bloomberg.com/news/articles/2019-12-06/why-bitcoin-mining-is-being-touted-as-a-solution-to-gas-flaring [https://perma.cc/6LZL-L7NL].

192 Coleman, *supra* note 12, at 275–76.

193 Companies that already have received long-term commitments from consumers to purchase gas at positive prices would also likely purchase allowables from companies without such hedges.

194 Robert Tuttle & Kevin Orland, *Oil Companies Cash In by Not Pumping in Canada*, BLOOMBERG (Feb. 27, 2019, 7:00 AM), https://www.bloomberg.com/news/articles/2019-02-26/alberta-oil-cuts-spawn-new-market-in-trading-production-rights [https://perma.cc/EZ2K-8KJL].

of transport constraints.[195] But oil markets are better connected, so a cartel of just Texas producers usually does not exercise oil market power—that is, reducing all of Texas oil production usually will not increase the cash flow of its companies enough to offset selling less because the reduction will not have a big enough effect on world prices.[196]

The Texas Railroad Commission and the North Dakota Industrial Commission should start by mandating the modest level of reduction that maximizes increased cash flow from natural gas subtracting the reduced cash flow from oil.[197] The Commissions could consider cutting even a bit further to maximize ultimate value of oil recovered because cutting further would reduce cash flow now but make the well produce longer.[198] Of course, a dollar now is worth more than a dollar later, but Hotelling made clear that it is worth deferring sales if prices decrease faster than the appropriate discount rate.[199] There is no question that natural gas, which is often worth less than zero at the well, will be worth much more in the future.[200] The current rock-bottom prices for oil caused by the coronavirus mean that oil prices will also be much higher in the future—suggesting that current oil cuts could maximize the long-term value of oil and gas wells.[201] Finally, the Commissions should also consider the costs to consumers and the benefits to the environment as they determine how far to cut production beyond the level that would maximize cash flow to producers.[202]

In the current coronavirus crisis, some oil companies have made thus far unsuccessful attempts to convince state conservation commissions to impose exactly these kind of production cuts. In Texas,

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195 Jeff Barron, *Permian Region Crude Oil Prices Have Increased with Additional Pipeline Takeaway Capacity*, ENERGY INFO. ADMIN. (Mar. 26, 2019), https://www.eia.gov/todayinenergy/detail.php?id=38832 [https://perma.cc/9F6S-Q867] (West Texas prices can be as much as $20/barrel lower than Houston prices).

196 *See supra* Section II.C.

197 This balance will differ between different fields. For example, fields where both oil and gas trade at a larger discount from coastal prices will maximize revenue through more aggressive cuts than fields where only gas is constrained.

198 Like all companies and regulators, it would discount future cash flow to reflect the time value of money.

199 Hotelling, *supra* note 55, at 139.

200 *See infra* Section III.E; INT'L ENERGY AGENCY, WORLD ENERGY OUTLOOK 2011: ARE WE ENTERING A GOLDEN AGE FOR GAS? (2011).

201 Naureen S. Malik, *Natural Gas Is Already in Contango—Brace for Super-Contango*, BLOOMBERG (Apr. 6, 2020, 1:01 PM), https://www.bloomberg.com/news/articles/2020-04-06/natural-gas-is-already-in-contango-brace-for-super-contango [https://perma.cc/7KSC-3V8V] (describing "steep discount" of current oil prices compared to future oil prices, a situation known to the finance industry as "contango").

202 *See infra* Sections III.C–D.

two oil companies, Parsley Energy and Pioneer Natural Resources, unsuccessfully petitioned the Railroad Commission to cut oil production twenty percent to mirror the fall in "reasonable market demand" for oil.[203] Similar petitions were considered in Oklahoma and North Dakota.[204] The Railroad Commission rejected the petition to reduce production without a vote on May 5, 2020, suggesting it is not yet ready to impose these controls.[205] One issue is that, as in the 1930s, the regulator may not yet have sufficiently complete and timely data to enforce production limits.[206] On the other hand, production data is now much easier to access than it was in the past, so, given time and effort, this is a surmountable problem.[207]

The Interstate Oil and Gas Compact Commission should go back to its roots and assist Texas and North Dakota by working with neighboring states to moderate the pace of oil and gas development. The re-invigorated Compact Commission would be particularly helpful because the key flaring formations are both shared between two states: Texas's Permian Basin extends into New Mexico, and North Dakota's Bakken Formation extends into Montana.[208]

The Interstate Oil and Gas Compact Commission could also coordinate nationwide production of oil and gas. In 2017, the United

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203 Proposed Order, Order Establishing the Reasonable Market Demand for Oil Production in Texas, https://www.rrc.state.tx.us/media/57506/final-conference-agenda-for-may-5-2020.pdf TEX. NAT. RES. CODE ANN. § 85.046(a)(10) (defining production in excess of "reasonable market demand" as "waste").

204 Jerry Bohnen, *Decision Time Approaches for Oklahoma Regulators on Question of Mandated Reduction of Produced Oil*, OK ENERGY TODAY (May 10, 2020), http://www.okenergytoday.com/2020/05/decision-time-approaches-for-oklahoma-regulators-on-question-of-mandated-reduction-of-produced-oil [https://perma.cc/6C8V-CARN]; Tim Olson, *N.D. Industrial Commission Holds Off on Oil Market Intervention, Considers Future Relief for Energy Sector*, KXNET (Apr. 21, 2020, 2:28 PM), https://www.kxnet.com/news/local-news/n-d-industrial-commission-holds-off-on-oil-market-intervention-considers-future-relief-for-energy-sector [https://perma.cc/FP3P-PY93].

205 Sergio Chapa, *Texas Railroad Commission Rejects Statewide Oil Production Cuts*, HOUS. CHRON. (May 6, 2020, 10:30 AM), https://www.houstonchronicle.com/business/energy/article/Railroad-Commission-15247644.php [https://perma.cc/55T5-K5G5].

206 Anas Alhajji, *History Tells Proration Would Cause Chaos in The Texas Oil Patch*, FORBES (Apr. 13, 2020, 10:23 PM), https://www.forbes.com/sites/anasalhajji/2020/04/13/history-tells-proration-would-cause-chaos-in-the-texas-oil-patch/#e76b9b82e5f2 [https://perma.cc/M6D3-XK8J].

207 In fact, oil companies now have remote data on wells' production that allows them to throttle back production to respond to temporary price swings. Ryan Collins, *Drillers in Biggest U.S. Gas Play Get More Bang for Their Buck*, BLOOMBERG (Apr. 10, 2017, 1:29 PM), https://www.bloomberg.com/news/articles/2017-04-10/drillers-in-biggest-u-s-gas-play-get-more-bang-for-their-buck [https://perma.cc/J4F3-G3DM].

208 *See* Klass & Meinhardt, *supra* note 13, at 966.

States became a net exporter of natural gas.[209] The United States is projected to be the world's biggest exporter of liquefied natural gas in the next five years because it has a vast supply of low-priced natural gas coveted by Asian and European nations that often pay high prices for clean-burning gas.[210] In theory, the United States would win more value for its gas exports if it could husband its resources for higher price periods.[211] Implementing this theory, however, would require modest and time-limited production controls; producing states would only be likely to accept them if the Interstate Oil and Gas Compact Commission proved itself to be just such an adept, humble, and nimble force for coordinating state regulation.

Similarly, if it proved capable, the Compact Commission could prepare the United States for its future as an oil exporter. In December 2018, the United States became a net oil exporter.[212] If it joined OPEC and Russia, together they would control sixty percent of global oil production.[213] If these countries worked together, they would have more market power than any producing block since the heydays of the Compact Commission when the United States alone produced sixty percent of the world's oil.[214]

B. *Other Approaches to Reducing Flaring Will Not Work*

State cartels are the best solution to flaring because the most commonly proposed alternative solutions have serious economic and environmental downsides. The most simple-minded solution—simply forbidding flaring—would prevent many new oil wells and create persistently negative natural gas prices that would devastate an already stressed oil industry and cause cascading releases of greenhouse gas.[215]

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209 Terry Yen, *The United States Is Expected to Export More Energy Than It Imports by 2020*, EIA: TODAY IN ENERGY (Jan. 29, 2019), https://www.eia.gov/todayinenergy/detail.php?id=38152 [https://perma.cc/KRD9-RW8C].

210 Kasumu et al., *supra* note 72, at 1739.

211 *See supra* Section I.B.

212 Blas, *supra* note 7.

213 Lawler, *supra* note 156.

214 *See supra* Section II.A.

215 If the Railroad Commission does place new limits on new flaring permits, it should make clear that its actions are extraordinary to activate force majeure clauses in leases and loan agreements, ensuring that oil and gas companies are not unduly harmed by loss of their permit. *See* Bret Wells, *Please Give Us One More Oil Boom—I Promise Not to Screw It Up This Time: The Broken Promise of Casinghead Gas Flaring in the Eagle Ford Shale*, 9 TEX. J. OIL, GAS & ENERGY L. 319, 349–50 (2014) (describing why flaring limits may constitute force majeure); J. Denson Smith, *Impossibility of Performance as an Excuse in French Law: The Doctrine of Force Majeure*,

Persistently negative natural gas prices would create an affirmative incentive to flare, vent, and leak throughout the natural gas supply chain, a cascade of greenhouse gas emissions that would be even harder for regulators to control.

If oil companies cannot flare gas, they cannot drill for oil until they have built "gathering" lines that connect their proposed well to a larger pipeline that can carry it to market.[216] Not only will oil companies have to invest in gathering lines; when they get to market, they will have to actually pay other companies to take their gas away.[217] It makes no sense to force companies to invest in delivering a product with a negative price—the negative sign of the price indicates that it is a waste substance, the production of which harms society.[218] Worse yet, as companies with oil wells are forced to deliver more and more gas to market hubs, the price of gas will become more and more negative as companies struggle to find someone willing to take the gas away.

Simple limits on flaring could also be environmentally counterproductive because persistently negative natural gas prices would encourage flaring, or worse, methane leaking, throughout the natural gas supply chain.[219] And leaking is even worse for the global climate than flaring because methane is twenty-five times worse for the climate than carbon dioxide.[220] Low gas prices give companies insufficient incentive to control flaring, leaking, and venting; negative prices make matters much, much worse. Every link in the chain, from well operators to gathering lines to processing plants to pipelines, would have an incentive to intentionally or accidentally leak or flare the gas rather than pay someone to take it off their hands.[221]

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45 YALE L.J. 452, 453 (1936) ("Governmental acts and regulations by both the national and local authorities have been held to constitute force majeure . . . .").

216 Klass & Meinhardt, *supra* note 13, at 1003; *see also id.* at 955 (defining "gathering" lines).

217 *See supra* note 180.

218 HEINZ KURZ & NERI SALVADORI, INTERPRETING CLASSICAL ECONOMICS: STUDIES IN LONG-PERIOD ANALYSIS 230 (1st ed. 2007); MELISSA L. RORIE, THE HANDBOOK OF WHITE-COLLAR CRIME 478 (1st ed. 2019) ("Waste is a product that has a negative value attached to it."); Richard J. Pierce, Jr., *State Regulation of Natural Gas in a Federally Deregulated Market: The Tragedy of the Commons Revisited*, 73 CORNELL L. REV. 15, 27 (1987) ("[F]laring sometimes is the use of natural gas tht [sic] most benefits society, and a no-flare order in such circumstances is itself wasteful").

219 *See* Kevin Crowley, *Permian's Gas-Flaring Is Much Worse Than Previously Thought*, BLOOMBERG (Feb. 11, 2020, 3:15 PM), https://www.bloomberg.com/news/articles/2020-02-11/permian-s-gas-burning-black-eye-is-30-worse-than-thought [https://perma.cc/RS85-KR6A] (reporting that, with too much gas production, flaring was happening not just at the wellhead but also at processing plants, which added thirty percent to wellhead flaring numbers).

220 JASON BORDOFF & JOHN LARSEN, COLUM. CTR. ON GLOB. ENERGY POL'Y, US CARBON TAX DESIGN: OPTIONS AND IMPLICATIONS 22 tbl. 1 (2018).

221 Crowley, *supra* note 219.

Of course, most of the parties in the gas supply chain are already subject to regulations that limit leaks and flaring, and enforcement could be stepped up, but gas leakage is already a knotty challenge for companies and regulators because a colorless, odorless gas is so hard to monitor.[222] Negative natural gas prices would destroy any incentive for companies to monitor and would turn a regulator's job into an endless and unnecessary game of whack-a-mole with recalcitrant companies.

More moderate solutions, like banning only new flaring, or merely penalizing or taxing flaring, present the same environmental and economic problems in somewhat mitigated form. Production limits, by contrast, can attack both problems—flaring and leaking. Natural gas prices above zero will give the industry an incentive to capture, control, and sell all the gas that comes out of the ground. As venting and flaring tapers off, regulators can focus enforcement efforts on a smaller number of bad actors that are negligently wasting gas.

C. *Limiting Harm to Oil and Gas Consumers*

The Railroad Commission of Texas and the North Dakota Industrial Commission should start with modest limits and implement them gradually to ensure that higher natural gas prices do not harm consumers or pipeline companies. Consumers do not receive any benefit from natural gas that is flared and society as a whole loses out when a company is forced to produce a negative-value product. But raising natural gas prices too far above zero could harm end-use consumers by raising the cost of the gas they ultimately receive. It could also harm pipeline companies by eroding the geographic price differentials that allow them to profit from transporting gas. Raising prices too much could also disrupt anticipated investments in local processing and use of gas.[223] At the same time, both consumers and transport companies will benefit if production limits can ensure them a longer-term supply of gas at more stable, but still low, prices.

To that end, the Railroad Commission and the Industrial Commission should not raise Permian and Bakken gas prices to

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222 Mike Lee & Carlos Anchondo, *EPA May Roll Back Methane Rules. Will States Fill the Gap?*, E&E NEWS (Aug. 15, 2019), https://perma.cc/TN4D-AJJE (describing federal rollback of methane standards and noting that the two biggest oil producing states, Texas and North Dakota, do not have methane regulations).

223 Brandon Evans & Richard Frey, *Analysis: Bakken Looks to Add 350 MMcf/d of Natural Gas Processing by Year-End*, S&P GLOBAL PLATTS (Oct. 24, 2019, 9:07 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/102119-analysis-bakken-looks-to-add-445-mmcf-d-of-natural-gas-processing-before-years-end [https://perma.cc/Y7H7-Z9LQ].

anything approaching the value of natural gas at the United States' main natural gas market—the Henry Hub in Louisiana.[224] And the commissions must ensure that they do not artificially erase the differential between Henry Hub and West Texas and North Dakota prices so that there is still enough of a difference to encourage pipeline investment to bring this flood of gas to market. One lesson of the Alberta oil curtailment is that too rapid cuts can harm transport investment—Alberta later had to reduce its curtailment to correct this initial mistake.[225] Texas and North Dakota should heed this lesson.

Consumers and transport companies may actually benefit if supply restrictions ensure a longer-term supply at more predictable, if initially somewhat higher, prices.[226] Every time that a company builds a new factory or refinery that requires natural gas, it is making a bet on a long-term supply of affordable natural gas. The same goes for any developer that builds a new home with natural gas heating and any company that builds a new natural gas pipeline. Production limits that reduce flaring of natural gas help ensure that these customers have a long-term supply of affordable gas by conserving natural gas for the future.

D. *Slowing Carbon Emissions From Oil and Gas*

State cartels and a Hotelling approach to oil and gas production will slow the release of carbon dioxide that comes from burning fossil fuels.[227] To maximize the long-term value of oil and gas, a coordinated

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224 *Q&A: What Is a Gas Trading Hub, and How Are They Established?*, REUTERS (Dec. 29, 2017, 2:27 AM), https://www.reuters.com/article/us-china-gas-exchange-q-a/qa-what-is-a-gas-trading-hub-and-how-are-they-established-idUSKBN1EN0I1 [https://perma.cc/2VJU-25ZZ] ("The world's biggest natural gas hub is the Henry Hub in the U.S. state of Louisiana.").

225 Memorandum from Grant Bishop, Assoc. Dir. of Rsch., C.D. Howe Inst., to Sonya Savage, Alberta Minister of Energy, C.D. Howe Inst., Finding the Exit Door for Alberta's Crude Oil Curtailment (Sept. 19, 2019); *Global Economics: Scotiabank Commodity Price Index*, SCOTIABANK 3, https://www.scotiabank.com/content/dam/scotiabank/sub-brands/scotiabank-economics/english/documents/commodity-price-index/SCPI_2019-04-30.pdf [https://perma.cc/9MTY-389C] (explaining why "[f]ine-tuning production balances in an attempt to achieve not-too-hot-not-too-cold differentials is slow, finicky work").

226 Kiah Collier, *Pipeline Giant Sues Railroad Commission, Alleging Lax Oversight of Natural Gas Flaring*, TEX. TRIB. (Dec. 3, 2019, 12:00 AM), https://www.texastribune.org/2019/12/03/railroad-commission-sued-lax-oversight-natural-gas-flaring [https://perma.cc/3LZ6-9KS4] ("A major pipeline operator is suing the Texas Railroad Commission—the state agency that regulates oil and gas drilling—alleging that it has blatantly disregarded longstanding state law that restricts the controversial and growing practice of burning off natural gas.").

227 Indeed, the release of carbon dioxide and its accompanying energy is the entire point of burning fossil fuels. JAMES G. SPEIGHT, HANDBOOK OF INDUSTRIAL HYDROCARBON PROCESSES 421 (2d ed. 2019) (combustion of hydrocarbons "produces carbon dioxide (CO_2), steam (H_2O), light, and heat").

global oil cartel would try to restrict supply enough to ensure that prices smoothly increase over time.[228] This supply restriction would mean that, for any period, less oil and gas will be sold than would be sold in a market without collusion, limiting the greenhouse gases and other pollutants that come from burning fossil fuels. For most of the world's major oil exporters, these externalities are unpriced, so if they coordinated to reduce production, their cooperation would produce a substantial global benefit.[229]

Of course, if global oil producers believed that oil consumption was going to rapidly fall to zero, there would be a much smaller benefit from coordination. Producers still might want to maximize their profit by artificially lowering prices to raise prices in the few years left to them. So, a global oil cartel would still slow oil production a bit. But there would be less value to its producers in saving oil for the future.[230] But, happily, oil producers do not believe that oil consumption will rapidly decline. They see that oil consumption is higher than it has ever been, and they continue to make investments based on their belief that oil use will continue to rise.[231]

As a result, if other policymakers believe that oil consumption will or should fall quickly, they should urgently favor cartel formation now, while oil producers still believe that oil consumption will rise. State energy cartels are a fascinating example of a situation where differing underlying beliefs can create a strong convergence on a policy solution.[232] The *more* oil that a producer cartel believes will be consumed in the future, the more the cartel will cut production now. And the *less* oil that climate regulators believe will be consumed in the

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228 Hotelling, *supra* note 55, at 139.

229 Jayni Foley Hein, *Federal Lands and Fossil Fuels: Maximizing Social Welfare in Federal Energy Leasing*, 42 HARV. ENV'T. L. REV. 1, 18–23 (2018) (describing externalities from unpriced emissions from burning oil produced on federal land).

230 Another way of putting the same insight is that the Hotelling rule suggests selling enough so that prices rise with the growth rate of the economy. If developments suggest that the future price will be lower, the rational response is to sell more quickly so that prices fall enough to leave room to grow to that revised future price.

231 *See supra* note 152; Holly Ellyatt, *Clean Energy and Climate Change Are Helping Big Oil, Goldman Sachs Says*, CNBC (Apr. 3, 2019, 7:56 AM), https://www.cnbc.com/2019/04/03/clean-energy-and-climate-change-are-helping-big-oil-goldman-sachs-says.html [https://perma.cc/S7TQ-QRTZ] (describing oil companies' optimism for long-term continuation of "robust" and "resilient" demand growth).

232 *Cf.* Cass R. Sunstein, *Incompletely Theorized Agreements*, 108 HARV. L. REV. 1733, 1739–40 (1995); Meir Dan-Cohen, *Decision Rules and Conduct Rules: On Acoustic Separation in Criminal Law*, 97 HARV. L. REV. 625 (1984); JOHN RAWLS, POLITICAL LIBERALISM 385–95 (2d ed. 2005). *But see* T.S. ELIOT, MURDER IN THE CATHEDRAL 44 (1935) ("The last temptation is the greatest treason: To do the right deed for the wrong reason.").

future, the more important it is that oil producers cut now while they still believe otherwise.

Even if a global oil cartel would only delay production to the future, it would still have substantial benefits for climate protection. First, economic harm from climate change is often tied to the *pace* rather than the *magnitude* of warming, as communities around the world must adjust to rapidly rising temperatures.[233] Second, reducing current emissions will buy us time to prepare for the worst consequences of climate change.[234] Third, in the meantime, higher oil prices will benefit alternative energy sources and transportation technologies that could permanently change the trajectory of global greenhouse gas emissions.[235]

E. *Increasing the Environmental Benefits of Natural Gas*

State energy cartels can also turn U.S. natural gas production from an environmental liability to an environmental asset. Natural gas has no environmental benefit if it is vented or flared: its energy is just wasted, and it contributes to climate change by raising global concentrations of methane and carbon dioxide.[236] On the other hand, if slower drilling means that gas can be shipped to markets that are currently dependent on coal for power and oil for heat, it could have significant environmental benefits.[237]

Burning natural gas releases less greenhouse gas and drastically less air pollution than burning oil or coal.[238] And much of the world is

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233 Richard S.J. Tol, *The Damage Costs of Climate Change Toward More Comprehensive Calculations*, 5 ENV'T & RES. ECON. 353, 359 (1995) (explaining why "a large part of the damage is attributed to the rate of climate change" rather than "absolute changes").

234 Daniel A. Farber, *Modeling Climate Change and Its Impacts: Law, Policy, and Science*, 86 TEX. L. REV. 1655, 1697 (2008) (explaining the need to "buy time" to find solutions to climate change)

235 Williams, *supra* note 97, at 1163 (explaining that "prorationing serves the ends of conservation" because "[a] steady, reasonably high price . . . tends to encourage the use of competing energy sources").

236 A. R. Brandt, G. A. Heath, E. A. Kort, F. O'Sullivan, G. Pétron, S. M. Jordaan, P. Tans, J. Wilcox, A. M. Gopstein, D. Arent, S. Wofsy, N. J. Brown, R. Bradley, G. D. Stucky, D. Eardley, & R. Harriss, *Methane Leaks from North American Natural Gas Systems*, 343 SCIENCE 733, 734 (2014) ("LCA studies generally agree that replacing coal with [natural gas] has climate benefits.") (also noting reasons that methane emissions are sometimes undercounted).

237 Sabouni et al., *supra* note 23, at 5428 (burning natural gas emits far less criteria pollutants than burning coal—less than 0.04% the sulfur dioxide and 0.3% the particulate matter).

238 Paul Gilbert, Conor Walsh, Michael Traut, Uchenna Kesieme, Kayvan Pazouki, & Alan Murphy, *Assessment of Full Life-Cycle Air Emissions of Alternative Shipping Fuels*, 172 J. CLEANER

still dependent on oil and coal for heat and power. Coal is far and away the world's leading source of electricity, responsible for thirty-eight percent of global power.[239] And three percent of the world's power still comes from oil, more than it gets from solar.[240] Coal is particularly dominant in Asian markets that are also most affected by debilitating air pollution, and it is projected to continue rising in coming years.[241] Natural gas is a particularly good replacement for coal power because, like coal and unlike solar and wind, it can produce power at any time.[242] But, unlike coal, it can easily be ramped up and down, so that it allows countries to incorporate more intermittent solar and wind power into their electricity mix.[243] As a result, U.S. natural gas could clean up the air in developing countries around the globe.[244]

If natural gas from Texas and North Dakota can reach markets around the world, it can also clean up home heating, which still often depends on coal and heating oil. China is struggling to convert millions of homes each year from coal heating to gas heating.[245] Even in the United States, many households in polluted cities on the Eastern seaboard are dependent on dirtier sources such as heating oil.[246] And Europe too depends on heating oil, with some countries using it to heat

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PROD. 855 (2018); James W. Coleman & Sarah Marie Jordaan, *Clearing the Air: How Canadian LNG Exports Could Help Meet World Greenhouse Gas Reduction Goals*, C.D. HOWE INST., E-BRIEF 2 (2016), https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/e-brief_244.pdf [https://perma.cc/84WC-8MA8].

239 Int'l Energy Agency, *World Gross Electricity Production By Source, 2017* (2019), https://www.iea.org/data-and-statistics/charts/world-gross-electricity-production-by-source-2017 [https://perma.cc/3A7G-U4KK].

240 *Id.*

241 'Carlos Fernández Alvarez, *Fading Fast in the US and Europe, Coal Still Reigns in Asia*, https://www.iea.org/commentaries/fading-fast-in-the-us-and-europe-coal-still-reigns-in-asia [https://perma.cc/8JS9-6RSZ].

242 Coleman, *supra* note 12, at 270.

243 Coleman, *supra* note 68, at 148.

244 Environmental groups and fossil fuel executives have, at times, formed alliances on these kinds of policies in the past, promoting natural gas power over coal. Felicity Barringer, *Answering for Taking a Driller's Cash*, N.Y. TIMES (Feb. 13, 2012), https://www.nytimes.com/2012/02/14/science/earth/after-disclosure-of-sierra-clubs-gifts-from-gas-driller-a-roiling-debate.html [https://perma.cc/4UT8-3QVE] (describing how Sierra Club took money from Chesapeake Energy's top executive "from 2007 to 2010, for its Beyond Coal campaign to block new coal-fired power plants and shutter old ones" and then "promoted natural gas as a cleaner 'bridge fuel' to a low-carbon future").

245 *China Expands Switch from Polluting Coal Heating in 2018: Environment Minister*, REUTERS (Mar. 11, 2019, 3:56 AM), https://www.reuters.com/article/us-china-parliament-environment-gas/china-expands-switch-from-polluting-coal-heating-in-2018-environment-minister-idUSKBN1QS0QB [https://perma.cc/GUT2-FGMA].

246 Marcela Rourk, *Winter Begins with Higher U.S. Heating Oil and Propane Prices*, EIA: TODAY IN ENERGY (Nov. 6, 2018), https://www.eia.gov/todayinenergy/detail.php?id=37432 [https://perma.cc/EZ6J-3KAF] ("[M]ost heating oil is consumed" in the U.S. "Northeast.").

almost half of their homes.[247] U.S. natural gas could replace these dirtier systems around the world, but only if state energy cartels can coordinate so that it is no longer flared at oil wells across the country.

CONCLUSION

The United States of America is emerging from history's biggest oil boom, but it is wasting staggering amounts of natural gas and facing an uncertain future of rock-bottom oil prices. Timely action by state conservation commissions and a re-invigorated Interstate Oil and Gas Compact Commission can protect the oil industry's health and, more importantly, conserve our resources for tomorrow's challenges. And the federal government can leverage these actions to negotiate global cooperation on oil production that will throw its producers a lifeline and, at the same time, achieve unprecedentedly effective cooperation on slowing climate change. Texas, North Dakota, the other oil states, and the nation should move urgently and cooperatively to take this unique opportunity to protect the nation's economy and the global environment.

247 UPEI, OIL HEATING: AN EFFICIENT OPTION FOR CONSUMERS 1 (2016), https://www.upei.org/images/documents/Oil_Heating.pdf [https://perma.cc/E9DX-PXH9].