

Big Oil and Climate Regulation: Business as Usual or a Changing Business?

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Abstract

There is a long and continuing debate in the literature on corporate political power about whether businesses that advocate public-interest regulation do so for strategic political reasons or because they anticipate economic gains. Previous research on Big Oil's strategies in climate politics has largely converged on the first view, arguing that global majors feign support for moderate carbon pricing largely to prevent the adoption of more drastic and costly policies. In contrast, this article argues that Big Oil's growing stake in natural gas expansion is its economic motive for supporting favorably designed carbon pricing. The article finds that policy, technology, and energy market changes have paved the way for a shift toward natural gas and that a moderate carbon price, by triggering coal-to-gas switching, supports the realization of a gray transition in which "Big Gas" can expand its market share at the expense of coal and become a major bridge fuel next to renewables. Our findings underscore the importance of studying the competitive rivalry that underpins evolving industry demands for climate policy and regulation.

"It is prudent that the United States remain a party to the Paris Agreement," urged ExxonMobil in a personal letter to President Trump before his withdrawal from the global climate agreement in 2017. This seemed like a curious move for the American oil major, notorious for its long-standing greenhouse gas (GHG) emissions and opposition to regulation. "We support the Paris Agreement," Chevron echoed. That same year, Exxon and ConocoPhillips joined forces with Shell and BP to help found the Climate Leadership Council—a Republican-backed coalition promoting a US carbon tax starting at US\$ 40 per ton. In 2018, they also donated US\$ 1 million and US\$ 2 million to the Council's Political Action Committee. Why would these majors, at a time when the Trump administration had heralded a new era for climate denial and deregulation, advise the White House against withdrawing from Paris and encourage Congress to adopt a federal carbon price?

We examine why the American oil majors Exxon, ConocoPhillips, and Chevron have joined forces with European majors BP, Shell, Total, ENI, and

* We are grateful to the editors of *Global Environmental Politics* and the three anonymous reviewers for their very constructive comments and suggestions on an earlier version of this article. We also thank Mari Lie Larsen for excellent research assistance.

Equinor in the post-Paris period to advocate carbon pricing. Understanding the evolving interests and motives of these incumbents is imperative, as they all feature on the list of ninety “carbon majors” responsible for causing two-thirds of historical carbon emissions (Heede 2013).¹

Studies of corporate political power disagree on whether support for public-interest reform by previous business opponents mirrors some form of strategic accommodation or, alternatively, an economic self-interest in such regulation. The prevailing view assumes that business economic interests are at odds with public-interest policies and that corporate support for moderate regulation reflects a strategic camouflage of actual opposition, aimed at offsetting the threat of more radical alternatives (Broockman 2012; Hacker and Pierson 2002). Another view posits that corporations often pursue narrow, economic ends through social and environmental regulation, leading to capture or a strange-bedfellow alignment of private- and public-good objectives (Oye and Maxwell 1995; Yandle and Smith 2014). The first perspective sees an accommodative and risk-oriented political strategy (Grumbach 2015), whereas the second finds a more opportunistic search for regulatory benefits and competitive advantages that may strengthen and expand a firm’s or sector’s market share, often at the expense of rivals (Kennard 2020; Vormedal and Skjærseth 2019).

Previous research examining Big Oil’s engagement with climate politics has largely explained support or advocacy for carbon regulation as an opportunistic effort to offset the risk of more costly reforms. However, our investigation of current political and regulatory pressures provides no compelling evidence of majors feigning support for carbon pricing out of political expediency or to hedge against more radical policies. Instead, we find that a combination of policy, technology, and energy market change has paved the way for a shift toward natural gas, which burns cleaner than coal, and that a moderate carbon price serves the evolving economic interests of more gas-invested majors. To the extent that carbon pricing triggers widespread coal-to-gas switching in electric power, heavy industry, and the residential sector, it supports the realization of a “gray” transition toward a lower-carbon future, in which Big Gas can expand its market shares at the expense of coal and become a major bridge fuel next to renewables.

Business Support for Public-Interest Regulation: Strategic Accommodation or Economic Interests?

Here we trace the origins of two complementary theoretical perspectives on business support for regulation. They provide the basis for examining why the global majors have converged on support for carbon pricing in the post-Paris period.

1. Many of these oil and gas giants also rank at the very top of this list: Chevron (no. 1), Exxon-Mobil (no. 2), BP (no. 4), Shell (no. 6), ConocoPhillips (no. 9), and Total (no. 13).

The Strategic Accommodation Perspective

The idea that business support for public-interest policies reflects some form of “strategic accommodation” was proposed by Hacker and Pierson (2002) in their study of business power and the American welfare state. Faced with the risk of radical reforms being adopted, business groups, they argue, are likely to camouflage their actual opposition by feigning support for regulation, even though it contradicts their true economic interests. Thus, business support for welfare state reforms should be seen as a strategic calculation or effort to prevent the potential endorsement of more radical alternatives. Their focus on accommodation to strategic circumstances that constrain what can be achieved has influenced other scholars, such as Broockman (2012, 2019), who argues that businesses often face strong incentives to misrepresent their genuine preferences when seeking to position themselves strategically, in anticipation of policies that will hurt their bottom line. In this view, business support for public-interest regulation reflects an effort to promote the “lesser evil” and an induced, second-order preference that camouflages their true interest (see also Grumbach 2015).

The assumption of an adversarial relationship between public-interest regulations and business actors’ economic interests can be traced back to Mancur Olson’s (1965) classic view of regulation as imposing concentrated costs on a few, organizable groups in society, to obtain diffused benefits for the public. As in Wilson’s (1980, 1984) typology, social and environmental regulation has typically been understood as “Olsonian”—to imply concentrated costs for industry, with accrued benefits for society at large. To the extent that public-interest reform will “defy an industry, or even all of industry,” we can expect business to quintessentially oppose such regulation (Wilson 1984, 96).

This premise has also influenced scholars of business power in environmental politics. The rise of corporate environmentalism—with public claims of greening and support for climate policies—has been interpreted as a form of strategic accommodation for maintaining corporate legitimacy while reducing the risk of more drastic regulation (Levy and Newell 2005). However, Levy and Newell view such strategies as a distinct political response to public and regulatory pressures to solve environmental problems, not as a tokenistic camouflage of actual positions (59). Similarly, Meckling (2015) posits that businesses are likely to propose lower-cost, regulatory measures themselves when faced with a high degree of public pressure and a high risk of “Olsonian”-type policies—thereby “hedging” against even costlier policy options.

The idea of strategic accommodation also features prominently in the literature examining why Big Oil’s united opposition to climate regulation in the 1990s eventually came to an end (Kolk and Levy 2001; Levy and Egan 1998; Newell and Paterson 1998). After the adoption of the Kyoto Protocol in 1997, European oil majors faced a new political reality where they were no longer able to prevent climate regulation in the European Union (EU)—which led oil majors like BP and Shell to shift their focus from opposing regulation toward shaping it

(Skjærseth and Skodvin 2003). They joined new, pro-reform coalitions lobbying for market-based emissions trading systems (Victor and House 2006), seen as the least costly, less radical alternative to taxes or command-and-control regulation (Meckling 2011). However, US majors, such as ExxonMobil and Chevron, faced with less home-country political risk and realistic opportunities to prevent congressional ratification of Kyoto, continued their opposition (Skjærseth 2013). But around 2008—with heightened domestic pressures due to President Obama’s new climate targets, the 2007 Supreme Court ruling granting the Environmental Protection Agency (EPA) authority to regulate greenhouse gas emissions under the Clean Air Act (CAA), and the rise of state-level climate policy—*some* US majors began to support regulation. Chevron and ConocoPhillips joined BP and Shell in the US Climate Action Partnership (USCAP), a new coalition lobbying for a federal cap-and-trade program, deemed a less radical, less costly option to EPA regulation (Vormedal 2011). In short, the shift from opposition to support for climate policy, first among European and later among some US oil and gas majors, has been widely interpreted as an accommodative move in response to home-country political and regulatory risks and pressures (see Levy and Kolk 2002; Meckling 2011; Pinkse and Kolk 2012; Pulver 2007; Skjærseth 2013; Skjærseth and Skodvin 2003).

The Economic Interest Perspective

The origins of an economic interest-based perspective can be found in standard economic theories of regulation. The proposition of George Stigler (1971, 393), that regulation was typically acquired by politically connected industries seeking various forms of benefits and protection from governments, quickly became a widely accepted basis for subsequent theorizing on interest-group competition (Becker 1983; Posner 1974). These economists saw rent-seeking firms or industries with rival market interests as battling among themselves, and with other organized interests (such as consumers) to achieve advantageous wealth redistribution through regulation (Peltzman 1989). Regulatory benefits and advantages could include subsidies, rents, tax breaks, price controls (floors or ceilings), or barriers to entry, such as import or production quotas, or strict product standards, which help restrict competition and support cartelization (Peltzman 1976, 1989; Stigler 1971). And because firms may profit as much from hindering market rivals as from direct government payouts or protection (Yandle and Smith 2014), they are also expected to support regulation that can impede their competitors’ ability to survive in the market—for example, by raising their rivals’ costs or establishing an advanced technology or product standard that would burden or exclude weaker competitors (Bartel and Thomas 1987; Salop and Scheffman 1983). In this view, business support for regulation reflects an opportunistic pursuit of benefits and market advantages and a first-order policy preference anchored in economic interests.

However, the wave of new social and environmental policy in the 1970s also led skeptics to question the relevance of economic theories for understanding

the sources of public-interest regulation (Pashigian 1985). Many political scientists were inclined to view such regulations as “Olsonian” and thus essentially “bad for business” (e.g., Wilson 1984). However, social and environmental regulation can also be “Stiglerian”—providing direct or hidden benefits to some business groups and asymmetrically burdening others, while accruing dispersed costs to the public. As Swenson (2018, 3) argues, “there is no a-priori reason to think that rent-seeking is not involved in welfare and other progressive causes” (see also Swenson 2019). Buchanan and Tullock (1975) have shown that direct pollution control may raise industry rents, while Maloney and McCormick (1982) have demonstrated that technology or production standards can provide cartel-like gains. Ackerman and Hassler (1981) revealed how the CAA offered competitive advantages to high-sulfur Rust Belt coal producers, while burdening low-sulfur miners in the Sun Belt with disproportionate costs. Pashigian (1984) showed that the CCA regime benefited large producers at the expense of small firms, which resonates with Bartel and Thomas’ (1987) study of how US environmental, health, and occupational safety standards distributed economic rents to large firms and those in the Frost Belt, whereas small firms or those in the Sun Belt faced substantial costs. Finally, Oye and Maxwell (1995) argue that the Montreal Protocol gained support from leading chlorofluorocarbon (CFC) producers due to the profitable opportunities it created through entry barriers, new markets for substitutes, and competitive advantages vis-à-vis small and developing-country producers.

Despite the emerging focus on business conflict (Falkner 2008), new market opportunities (Vogel 2018; Vormedal 2012), and heterogeneous adjustment costs (Kennard 2020) as sources of polluters’ support for climate regulation, few studies of business preferences have drawn on insights from economic interest-based perspectives. Climate policies are both Olsonian and Stiglerian, yet the dominant interpretation of this “dualism” is that carbon pricing places costs on incumbent polluters, whereas green industrial policies provide benefits to clean challengers (Meckling et al. 2015). More research examining how the relative costs of carbon pricing fall unevenly on different types of polluters, hurting some while bestowing competitive advantages on others, such as the opportunity to raise rivals’ costs and expand their own market shares, is needed.

To sum up, the strategic accommodation perspective posits that polluters’ endorsement of moderate climate policy should be recognized as a camouflage of their true economic interest and as an effort to prevent, or hedge against, the adoption of more radical and costly regulations looming on the political horizon. The economic interest perspective posits that business support for climate policy reflects a strategic effort to gain competitive advantages, burden rivals, and enable market expansion through new regulation. To test the relative explanatory power of these perspectives in the case of oil majors and carbon pricing, we first examine whether moderate carbon pricing helps the majors prevent or hedge against the adoption of more costly and threatening regulatory alternatives and, second, whether and how carbon pricing can help advance the profit opportunities and

competitive positions of the majors vis-à-vis rivals, and thus their economic interests.

Data and Methodology

ExxonMobil, Chevron, ConocoPhillips, BP, Shell, Equinor, Total, and ENI were selected for closer study. Our quantitative analysis of changes in oil and gas production is based on statistics of daily production from company annual reports.² The standard volume unit used for oil is barrels; various measurement units are used for natural gas, depending on a company's standards. Our calculations use "oil equivalent"³ barrels as gas unit: we have converted standard cubic feet to oil equivalent when necessary.⁴ For the qualitative analysis, we reviewed and analyzed forward-looking statements and strategies found in speeches, presentations, and information provided to investors to establish current and future business motives related to carbon pricing. To triangulate our findings, we interviewed three corporate managers in one international oil major: the vice president for sustainability, the "lead consultant on climate policy," and their head lobbyist in Washington, DC. In addition, we reviewed large amounts of gray literature and secondary sources, including industry consultancy reports and media inquiries.

Support for Carbon Pricing

Before examining the rationale behind Big Oil's support for carbon pricing, we give a short account of the companies' positions, activities, and coalitions. Prior to the 2015 Paris meeting, a group of European majors—BP, Equinor (then Statoil), ENI, Shell, and Total—sent a letter to the United Nations Framework Convention on Climate Change executive secretary and the French presidency, expressing their support for carbon-pricing frameworks: "Our companies are already taking a number of actions to help limit emissions, such as growing the share of gas in our production," they explained. "We need governments across the world to provide us with clear, stable, long-term, ambitious policy frameworks. ... We believe that a price on carbon should be a key element of these frameworks."⁵ In a related "letter to the media," these majors also stressed that governments should "recognize the vital roles of natural gas and carbon

2. Comparable data on production for the past decade are available only when the companies have used consistent reporting schemes. Data from older reports (e.g., twenty years back) do not necessarily distinguish between oil and natural gas production.
3. "Barrel of oil equivalent" is based in the approximate energy released by combusting one barrel of crude oil; this is an energy unit used for combining or comparing oil and gas reserves or production.
4. The conversion factor for natural gas depends on the properties of the gas in question. We have used an approximate, commonly used conversion factor where one thousand cubic feet of natural gas contain one-sixth of the energy of a barrel of oil (1,000 scf = 1/6 boe).
5. Letter to Christiana Figueres, available at: https://www.total.com/sites/g/files/nytnzq111/files/atoms/files/letter_to_christiana_figueres.pdf, last accessed June 18, 2020.

pricing” to solve the climate change problem.⁶ At this point, the US companies had only tacitly welcomed the Paris deal. But in 2017, when President Trump announced his plans to withdraw from the Paris Agreement, Chevron and Exxon urged him to reconsider. After an initial letter to the White House from Exxon’s environmental policy manager, Peter Trelenberg, the CEO, Darren Woods, followed up with a personal memo to the president, arguing that the United States was “well positioned to compete” within the Paris Agreement, due largely to its “abundant low-carbon resources such as natural gas,” and that Paris could provide a boost for gas, while securing the United States a seat at the negotiating table.⁷ Exxon’s position also received vocal backing from Chevron, ConocoPhillips, BP, and Shell, which “supported,” “welcomed,” or were “strongly in favor” of the Paris Agreement.⁸

The US majors soon reinforced their newfound position on US climate policy by teaming up with their European competitors BP, Shell, and Total to help found the Climate Leadership Council (CLC)—a new, Republican-backed coalition promoting a US carbon tax starting at US\$ 40 per ton. Under their Baker–Schultz Plan, revenues would be returned to US citizens in the form of quarterly dividend checks; furthermore, the tax would increase annually by 5 percent, cutting US emissions in half by 2035. Furthermore, the carbon tax would displace all federal regulations of stationary carbon sources. The initial plan included a climate liability waiver that would have shielded companies from lawsuits of alleged liability for damages caused by historical emissions; however, that waiver was removed in 2019.⁹ To support the CLC’s congressional lobbying campaign, Exxon, Shell, and BP also donated US\$ 1 million, and ConocoPhillips US\$ 2 million, to the political action committee Americans for Carbon Dividends.¹⁰ In May 2019, Exxon, BP, and Shell took their efforts to Capitol Hill, together with a broad business coalition of seventy-five Fortune 500 companies, to encourage lawmakers to pass a federal carbon tax.¹¹

6. BP, “Oil and Gas Majors Call for Carbon Pricing,” June 1, 2015, available at: <https://www.bp.com/en/global/corporate/news-and-insights/press-releases/oil-and-gas-majors-call-for-carbon-pricing.html>.
7. Ed Crooks, “Exxon Chief Urges Trump to Back Climate Agreement,” *Financial Times*, May 26, 2017, available at: <https://www.ft.com/content/fcf73abc-4202-11e7-9d56-25f963e998b2>, last accessed June 29, 2020.
8. Matt Egan, “Why Big Oil Wants Trump to Stay in Paris Climate Deal,” *CNN Business*, April 18, 2017, available at: <https://money.cnn.com/2017/04/18/investing/big-oil-paris-deal-trump/index.html>, last accessed June 18, 2020.
9. “Climate Liability Waiver Dropped from Major Carbon Tax Proposal,” *Climate Liability News*, September 12, 2019, available at: <https://www.climatedocket.com/2019/09/12/climate-liability-waiver-carbon-tax-baker-schultz/>, last accessed June 18, 2020.
10. Josh Siegel, “Yes or No? Is the Media Fair?,” *Washington Examiner*, May 20, 2019, available at: <https://www.washingtonexaminer.com/policy/energy/oil-giants-bp-and-shell-pledge-1-million-each-to-republican-backed-carbon-tax>, last accessed June 18, 2020.
11. Miranda Green and Alex Gangitano, “Oil Companies Join Blitz for Carbon Tax,” *The Hill*, 2019, available at: <https://thehill.com/policy/energy-environment/445100-oil-companies-join-blitz-for-carbon-tax>, last accessed June 18, 2020.

Strategic Accommodation in the Post-Paris Era?

We now proceed to investigate whether the majors' support for carbon pricing represents an effort to prevent or hedge against more costly and threatening alternatives, by examining recent political and regulatory developments in the EU and the United States.

In Europe, regulatory pressures have continued to build as a result of the EU's progressively bolder climate and energy goals. Already in 2007, the EU adopted 20 percent emissions reductions, renewable energy, and energy efficiency targets (compared to 1990 levels), which have been implemented through binding legislation. A longer-term 2050 target of cutting emissions by 80–95 percent compared to 1990 levels was agreed two years later. In 2014, ambitions were scaled up to *at least* 40 percent reductions in GHG emissions, 32 percent renewable energy deployment, and 32.5 percent improvement in energy efficiency by 2030. To achieve these ends, the EU aimed for a 43 percent cut in EU emissions trading scheme (ETS) emissions compared to 2005 and a 30 percent cut in emissions compared to 2005 in non-ETS sectors, such as transport. These goals have been translated into differentiated binding targets for individual member states (Eikeland and Skjørseth 2019). The new commission president has also proposed raising the overall EU target to at least 50 percent reductions by 2030, and most European countries now support a net zero emissions target by 2050.

In the United States, however, federal political and regulatory pressures have subsided. After a failed attempt to negotiate a national cap-and-trade scheme in 2010, the Obama administration launched the Clean Power Plan (CPP), the centerpiece of the US pledge to cut its GHG emissions, as per the Paris Agreement. The CPP target was to reduce emissions from utilities by 32 percent by 2030 and to phase out coal by introducing emissions standards favoring natural gas. However, the plan was later blocked by the US Supreme Court and never entered into effect.

Since the election of President Trump, the administration and Congress have taken several steps to roll back or wholly eliminate existing climate regulations. To replace the CPP, the EPA proposed the Affordable Clean Energy (ACE) Rule in 2018, which aims to upgrade technology and improve energy efficiency, but allows for the continued use of coal. The ACE also lets states set their own rules, in place of federal rules. Furthermore, the Trump administration has removed, repealed, or weakened a range of air-pollution and emissions regulations. According to the *New York Times*,¹² ninety-five climate and environmental regulations are being rolled back, including the prohibition against flaring from gas wells and measures

12. See Nadja Popovich, Livia Albeck-Ripka, and Kendra Pierre-Louis, "The Trump Administration Is Reversing 100 Environmental Rules. Here's the Full List," *New York Times*, updated May 20, 2020, available at: <https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks.html>, last accessed June 18, 2020.

to reduce methane emissions, rules that govern how refineries monitor pollutions in surrounding communities, and many more. Other regulations have been removed and reinstated as a result of legal challenges, while some remain bogged down in court. The largest number of rollbacks concern air pollution and emissions (twenty-four), followed by drilling and extraction (eighteen)—all of which ease the regulatory burden on the oil and gas industry.

On the other hand, new pressures have emerged from US courts. Since 2015, a wave of legal challenges has washed over ExxonMobil in particular. First, the attorneys general of New York, Massachusetts, and the US Virgin Islands launched investigations into whether Exxon had misled the public and shareholders about the science of global warming and how climate-related risk might hurt their investors. By 2019, this legal battle had reached the US Supreme Court,¹³ which declined Exxon's request that records be kept secret and forced it to turn over forty years' worth of documents to the office of Massachusetts attorney general Maura Healy.¹⁴ Also other majors have been targeted: since 2017, fourteen cities and municipalities and the state of Rhode Island have filed lawsuits against Chevron, BP, Shell, Exxon, and ConocoPhillips, claiming that these majors have attempted to undermine science and mislead the public about the consequences of climate change. In 2018, some courts dismissed such cases, arguing the issues should be resolved by Congress or the president, to which many cities have filed appeals. Regardless, this upsurge in lawsuits has indeed raised concerns. As Chevron stated in a filing with the Securities and Exchange Commission, climate litigation could have a "material adverse effect on the company," "curtail profitability," and make its business model "economically infeasible."¹⁵

Overall, regulatory pressures have grown steadily in Europe as the result of the EU's early institutionalization of climate policies and the mandate to adopt gradually bolder goals. However, it is not apparent how the majors' support for carbon pricing could have helped them offset or hedge against these developments. In the United States, the heightened regulatory risks under Obama have now subsided, and the political climate has turned in favor of business as usual for fossil fuel producers. Thus, there is a lack of federal-level regulatory threats that majors would seek to offset by proposing a moderate carbon tax as an alternative.

13. David Hasemyer, "Fossil Fuels on Trial: Where the Major Climate Change Lawsuits Stand Today," *InsideClimateNews*, January 17, 2019, available at: <https://insideclimatenews.org/news/04042018/climate-change-fossil-fuel-company-lawsuits-timeline-exxon-children-california-cities-attorney-general>, last accessed June 18, 2020.
14. Clark Mindock, "US Supreme Court Rejects Exxon Challenge to Climate Change Lawsuit That Could Reveal 40 Years of Documents," *The Independent*, January 8, 2019, available at: <https://www.independent.co.uk/news/world/americas/exxon-supreme-court-climate-change-lawsuit-documents-global-warming-a8716451.html>, last accessed June 18, 2020.
15. Lee Wasserman and David Kaiser, "Beware of Oil Companies Bearing Gifts," *New York Times*, July 25, 2018, available at: <https://www.nytimes.com/2018/07/25/opinion/carbon-tax-lott-breaux.html>, last accessed June 18, 2020.

Economic Interests, Competition, and a Gray Transition Toward a Lower-Carbon Future

We will return to the question of strategic accommodation after considering whether a moderate carbon price might advance the economic interests, profit opportunities, and market positions of the majors. We begin by examining how a carbon price affects oil and gas differently as regards competition.

Simply put, having a price on carbon increases the cost of producing energy relative to its carbon intensity. Therefore, carbon pricing affects the relative competitiveness of rival energy sources (with differing carbon intensities) that compete against each other in the market. Importantly, oil and gas generally serve different markets. Natural gas is used to generate electricity in the power sector, for combined heat and power in heavy industry, and for heating and cooling in residential buildings. Little natural gas is used for transport. Oil, by contrast, predominates in the transport sector, but is also used for noncombustion purposes. Relatively little oil has been used for electric power.

Natural gas and oil also face distinct competitive dynamics in power and transport. In power markets, gas competes with coal, renewables, and nuclear for market shares. Since the carbon intensity of natural gas is less than half of coal, the *direct effect* of carbon pricing is to raise the costs of coal much more than the cost of gas. Thus, the *indirect effect* on competition is to shift demand away from coal and toward lower-emitting and cheaper options like natural gas and renewables. To the extent that natural gas can replace coal, gas producers may benefit from a carbon fee that would raise the costs of its rivals and impede the ability of coal to compete, or even survive, in a carbon-priced market.

In transport, however, oil is not currently facing heavy competition from rival fuels. The widespread use of petroleum products—like gasoline and diesel for automobiles, jet fuels for aviation, and heavy- or low-sulfur oil fuels for shipping—is not yet faced with the threat of an immediate switch to less-polluting alternatives.¹⁶ Carbon pricing raises the direct costs of oil production and refining, but, because of the lack of significant competition, it does not have a substantial indirect effect on the dominant market position of oil.¹⁷ Kaufman and Gordon (2018) also conclude that a US carbon tax would have a considerable effect on the power market, triggering a dramatic decline for coal (28–84 percent by 2030) and a parallel growth for natural gas and renewables. However, they estimate that the effect on oil markets will be small, due largely to the lack of competition and the continued dominance of petroleum fuels.

16. In the longer term, however, a shift toward electric vehicles, or competition from biofuels or hydrogen, could fundamentally threaten the position of oil as the dominant source of energy for transport.

17. Interview with oil and gas major, 2018.

The Rise of Natural Gas and Competitive Renewables

Only a decade ago, coal was an important source of energy for electric power generation in the United States and Europe, accounting for nearly 46 percent of US power and 25.5 percent of European power in 2009. Natural gas, a more expensive and less abundant option at that time, provided only 22 percent of US electric power and 23 percent of European electric power.¹⁸ Nonhydroelectric renewable sources like wind and solar represented a small to miniscule share of electric power generation on both continents.

Since then, however, technological and operational advances have triggered a natural gas revolution. Due to the integration of two key technologies, horizontal directional drilling and hydraulic fracturing (fracking), shale gas locked in tight hard-rock and coal seams can now be tapped in previously unrecognized quantities and used as a cheaper and cleaner alternative to coal in electric power generation (Bang and Skodvin 2014; Rabe 2014; Smith 2020). In the United States, which sits on some of the largest shale fields in the world, the gas output grew by about 40 percent between 2007 and 2017,¹⁹ transforming the country from a net importer to a world-leading exporter of natural gas. This shift was also bolstered by the development of liquified natural gas (LNG) technologies, which enable shipping of cooled-down gas in liquid form to new markets.²⁰

New, renewable energy sources like wind and solar have also become significant competitors to coal and natural gas (Aklin and Urpelainen 2018). Between 2008 and 2018, the generation of nonhydroelectric renewable electricity nearly doubled, to account for about 9 percent of US power.²¹ In Europe, too, the growth in renewable power from 2008 to 2018 largely reflects the expansion of nonhydroelectric, wind, and solar generation.²² Behind these statistics lies a long-haul process of policy layering (Laird and Stefes 2009), with governments introducing support programs for renewable energy, such as production and investment tax credit, feed-in tariffs, and renewable portfolio standards, without dismantling the existing fossil fuel regime (Laird 2016; Stokes and Breetz 2018).

18. See EIA, available at: <https://www.eia.gov/coal/index.php>, last accessed June 18, 2020; EEA, available at: <https://www.eea.europa.eu/data-and-maps/indicators/electricity-production-by-fuel-1/electricity-production-by-fuel-assessment-3>, last accessed June 18, 2020.

19. D. Yergin and S. Andrus, "The Shale Gale Turns 10: A Powerful Wind at America's Back," Strategic Report, HIS Markit, 2018, available at: <https://cdn.ihs.com/www/pdf/Shale-Gale-turns-10-powerful-wind-Americas-back.pdf>, last accessed June 18, 2020.

20. ExxonMobil vice president Andrew P. Swiger, "The Unconventional Potential: Opportunities for Shale Gas Development in Europe and Beyond," October 12, 2011, available at: https://corporate.exxonmobil.com/en/News/Newsroom/Speeches/2011/1012_The-Unconventional-Potential-Opportunities-for-Shale-Gas-Development-in-Europe-and-Beyond, last accessed June 18, 2020.

21. EIA, available at: <https://www.eia.gov/todayinenergy/detail.php?id=38752>, last accessed June 18, 2020.

22. Eurostat, "Renewable Energy Statistics," available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics, last accessed June 18, 2020.

By 2018, much of the new onshore wind capacity had become cost-competitive to fossil fuel–based generation.

However, widespread uptake of renewables to substitute fossil fuels will require significant changes to electricity systems to find solutions to the intermittency problem. Whether a 100 percent renewable power system is feasible remains disputed (Clack et al. 2017; Jacobson et al. 2015): many argue that there will be a widespread need for baseload power from gas or coal, to compensate for the intermittency of wind and solar power. Storage options like batteries remain costly, and solutions for balancing excess power with shortages elsewhere require larger and modernized electricity systems. For some time into the future, then, electric utilities are likely to remain dependent on a significant share of baseload power that can allow the power grid to adjust to wide swings in demand.

In the context of climate policy, this leaves space for natural gas, which burns more cleanly than coal, to become the favored baseload partner of intermittent renewables in the ongoing energy transition. As opposed to a truly “green” transition, characterized by the rapid uptake and integration of renewable energy in power, natural gas would be well served by a “gray” transition, in which it could absorb the market share of coal and become a major bridge fuel to renewables. Moderate carbon-pricing regulation, which penalizes coal versus gas and may trigger extensive coal-to-gas switching, can support the realization of a gray transition. Beyond 2030, however, to the extent that stored, renewable power becomes more competitive and the electricity grid is modernized, a higher carbon price may begin to penalize gas versus renewables. Therefore, the positive effect on the competitive position of gas is likely to be limited to the short and medium terms.²³

From Big Oil to Big Gas? Change in the Majors’ Gas Production and New Market Opportunities

We now proceed to examine the majors’ evolving stake in natural gas expansion. Figure 1 shows the percentage growth and/or decline in natural gas and oil production for the eight majors from 2007 to 2017. Table 1 translates these percentage changes into absolute figures. We see that most majors boosted their production of natural gas and reduced their production of oil over that decade. Total and Equinor rank at the top, with almost 40 percent growth. Shell and ENI come close, with an upsurge of about 30 percent, followed by Chevron, with an increase of 20 percent, and Exxon, with nearly 10 percent. Altogether, this represents a 25 percent increase in gas production.

By contrast, oil production has dropped: ENI scaled back its oil production by 15 percent, Total by 10, Exxon by 12 percent, and Shell by 5 percent. Perhaps

23. McKinsey, available at: <https://www.mckinsey.com/industries/oil-and-gas/our-insights/carbon-prices-fire-up-gas-demand-in-electricity-generation>, last accessed June 18, 2020.

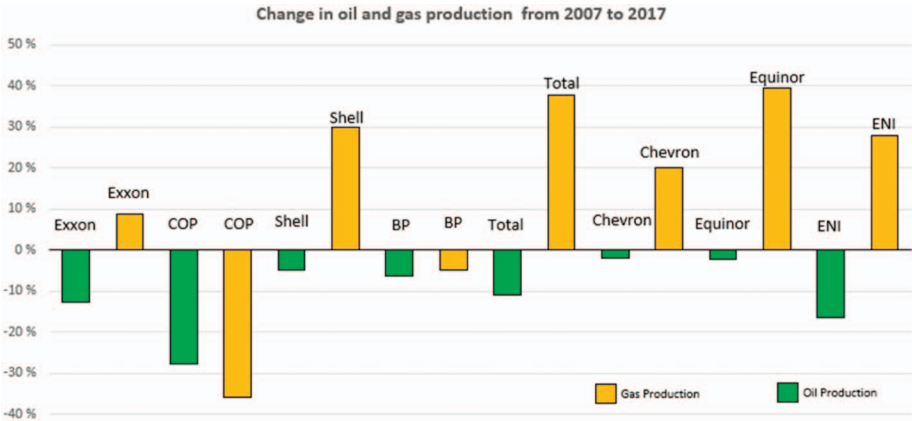


Figure 1
Percentage change in oil and gas production, 2007–2017

puzzlingly, ConocoPhillips and BP show a different tendency, with reduced oil and gas production. This is linked to explicit strategies for selling off assets: BP completed more than US\$ 32 billion of upstream divestments following the 2010 Deepwater Horizon accident.²⁴ ConocoPhillips has followed a US\$ 10 billion divestiture program since 2009, selling off noncore assets, limiting annual capital spending, and reducing debt.²⁵

The majors have also invested substantially in new natural gas ventures. For example, BP launched four large gas projects in 2019 and plans to start another eleven projects by 2022.²⁶ Exxon is pursuing two major LNG projects in Papua New Guinea and Mozambique,²⁷ while Chevron has added two giant LNG projects in Australia to its portfolio.²⁸ Total acquired Engie’s LNG business in 2018 and is now aiming to double its sales of LNG by 2020.²⁹

24. BP, “Upstream Investor Day,” December 2014, available at: <https://www.mckinsey.com/industries/oil-and-gas/our-insights/can-carbon-prices-fire-up-gas-demand-in-electricity-generation>, last accessed June 18, 2020.
25. ConocoPhillips, “Building on Strengths,” 2009 Summary Annual Report, available at: http://www.annualreports.com/HostedData/AnnualReportArchive/c/NYSE_COP_2009.pdf, last accessed June 18, 2020.
26. BP, “Major Projects 2019,” available at: <https://www.bp.com/en/global/corporate/investors/upstream-major-projects/major-projects-2019.html>, last accessed June 18, 2020; Gaurav Sharma, “Oil Majors Are Stepping Up Their Natural Gas Game,” *Forbes*, July 24, 2018, available at: <https://www.forbes.com/sites/gauravsharma/2018/07/24/oil-majors-are-stepping-up-their-natural-gas-game/#1e553fca7ddc>, last accessed June 18, 2020.
27. ExxonMobil, investor information, March 6, 2019.
28. Chevron, available at: <https://www.chevron.com/projects>, last accessed June 18, 2020.
29. Total, “Total Closes the Acquisition of Engie’s Upstream LNG Business and Becomes World #2 LNG Player,” July 13, 2018, available at: <https://www.total.com/media/news/press-releases/total-closes-acquisition-engies-upstream-lng-business-and-becomes-world-2-lng-player>, last accessed June 18, 2020; Total, “Results and Outlook,” February 2019, available at: <https://www.total.com/sites/g/files/nytnzq111/files/atoms/files/results-2018-and-outlook-presentation.pdf>, last accessed June 18, 2020.

Table 1

Absolute and percentage change in oil and gas production, 2007–2017

| | <i>Daily Production</i> | | <i>Change in Production</i> | |
|----------------|-------------------------|-----------------------|-----------------------------|----------------------|
| | <i>2007 (k bbl/d)</i> | <i>2017 (k bbl/d)</i> | <i>2007–2017 (k bbl/d)</i> | <i>2007–2017 (%)</i> |
| Exxon | | | | |
| Oil | 2,616 | 2,283 | -333 | -13 |
| Gas | 1,564 | 1,702 | 138 | 9 |
| ConocoPhillips | | | | |
| Oil | 982 | 710 | -272 | -28 |
| Gas | 848 | 545 | -303 | -36 |
| Shell | | | | |
| Oil | 1,818 | 1,730 | -88 | -5 |
| Gas | 1,416 | 1,839 | 423 | 30 |
| BP | | | | |
| Oil | 2,414 | 2,260 | -154 | -6 |
| Gas | 1,357 | 1,291 | -67 | -5 |
| Total | | | | |
| Oil | 1,509 | 1,346 | -163 | -11 |
| Gas | 807 | 1,111 | 304 | 38 |
| Chevron | | | | |
| Oil | 1,756 | 1,723 | -33 | -2 |
| Gas | 837 | 1,005 | 169 | 20 |
| Equinor | | | | |
| Oil | 1,165 | 1,139 | -26 | -2 |
| Gas | 674 | 941 | 267 | 40 |
| ENI | | | | |
| Oil | 1,020 | 852 | -168 | -16 |
| Gas | 686 | 877 | 191 | 28 |

From the companies' forward-looking statements and strategies, we also note that the majors place significant emphasis on opportunities to grow markets for natural gas in the medium term, seeing such opportunities as linked to climate or clean-air policies, increased gas supply, and advances in LNG transport. All the companies anticipate strong growth for natural gas in power generation but also in heavy industry. For example, BP expects its delivery of gas to power to increase substantially in the next decade, eyeing "a potential for doubling the operational

cash flow from gas." They link this potential for growth in the position of gas to its being the cleanest fossil fuel and to the fact that "demand growth predicted for gas is twice that of oil."³⁰ Total speaks of a large potential for coal-to-gas switching³¹ as well as greater LNG sales to emerging economies.³² Also, Exxon foresees an emerging "golden age"³³ for natural gas, linked both to "policy-aided" coal-to-gas switching in power and heavy industry and to a potentially steep rise in global LNG demand.³⁴ Equinor, arguing that the displacement of coal by gas in Europe will depend on a carbon price above € 30 per ton, views China and the emerging Asian economies as drivers of growing demand for LNG.³⁵

Overall, this reflects an increased focus on expanding sales and the market shares for natural gas among the majors, particularly by replacing coal in power and industry.³⁶ This trend has led business analysts to refer jokingly to Big Oil as an emerging "Big Gas" industry.³⁷

Coal-to-Gas Switching in Regional and Global Markets

By 2016, the rise of cheap, natural gas had led to a turnaround in US power: for the first time in history, natural gas surpassed coal, providing 34 percent of electricity generation, whereas coal had dropped to about 31 percent. By 2018, coal represented only 27 percent, while gas had expanded to a 35.5 percent share of US power generation.³⁸ Although the main factors that have enabled gas to displace coal have been lower prices and the upsurge in supply, state-level carbon

30. BP, "Upstream Investor Day," December 2014, available at: <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/investors/bp-lamar-mckay-presentation.pdf>, last accessed June 18, 2020; BP, "Advantaged Gas Portfolio and Growth," 2018, available at: <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/investors/oman-2018-investor-day-breakout4.pdf>, last accessed June 18, 2020.
31. Total, "Energy Outlook 2040," February 2019, available at: <https://www.total.com/sites/g/files/nytnzq111/files/atoms/files/total-energy-outlook-and-integrating-climate-into-strategy.pdf>, last accessed June 18, 2020.
32. Total, "Investor Day—Focus Presentations," February 2019, available at: <https://www.total.com/sites/g/files/nytnzq111/files/atoms/files/total-energy-outlook-and-integrating-climate-into-strategy.pdf>, last accessed June 18, 2020.
33. David James, "Papua New Guinea's LNG Capacity Could Double, Says ExxonMobil SVP," *Business Advantage PNG*, November 27, 2018, available at: <https://www.businessadvantagepng.com/papua-new-guineas-lng-capacity-could-double-says-exxonmobil-svp/>, last accessed June 18, 2020.
34. ExxonMobil, "2018 Sellside Meeting," September 17, 2018, available at: <https://corporate.exxonmobil.com/-/media/Global/Files/investor-relations/other-investor-presentations/2018-Sell-Side-meeting.pdf>, last accessed June 18, 2020.
35. Equinor, "Gas Market Update," 2019, available at: <https://www.equinor.com/en/investors/events-and-presentations.html>, last accessed June 18, 2020.
36. Ernest Scheyder, "Energy Giants Opening Natural Gas Spigots, Fueling Profit Rise," Reuters, July 23, 2018, available at: <https://www.reuters.com/article/us-oil-majors-preview/energy-giants-opening-natural-gas-spigots-fueling-profit-rise-idUSKBN1KD0F2>, last accessed June 18, 2020.
37. Rakteem Katakey and Tara Patel, "Big Oil's Plan to Become Big Gas," Bloomberg, June 1, 2015, available at: <https://www.bloomberg.com/news/articles/2015-06-01/big-oil-becomes-big-gas-as-climate-threat-spurs-tussle-with-coal>, last accessed June 18, 2020.
38. EIA, "Today in Energy," available at: <https://www.eia.gov/todayinenergy/detail.php?id=31672>, last accessed June 18, 2020.

pricing schemes, combined with regulations governing industrial pollutant emissions (like the mercury and toxic standards), have also created financial incentives for coal-to-gas switching in the absence of a federal carbon price.³⁹

In Europe, however, due to historically high gas prices, the share of gas in power had dropped to about 17 percent in 2013, while the share of coal remained stable at 26 percent. However, by 2016, coal had dropped to 21 percent, while gas covered around 20.5 percent of European power generation.⁴⁰ Problems with the EU ETS, which resulted in a low and ineffective carbon price, have been linked to this lower level of coal-to-gas switching (Stern 2017). Indeed, in the United Kingdom, a higher carbon price after the adoption of a price floor, combined with emissions performance standards, led to a dramatic drop in coal, from 42 to 10 percent between 2012 and 2016, and a parallel growth for gas, from 24 to 42 percent.⁴¹ But according to the International Energy Agency,⁴² a recovery of the ETS carbon price around € 30 per ton (as in 2019), combined with a high influx of US LNG (which pushes European gas prices further down), puts gas-fired capacity within the competitive range for coal-to-gas switching.

Europe and the United States have the greatest opportunities for coal-to-gas switching, thanks to existing infrastructure that allows for immediate displacement of around half of the coal-fired power output.⁴³ Globally, the potential is more uncertain. In emerging economies like China and India, which have abundant, low-cost coal and represent 60 percent of global coal demand, there is not as much spare, gas-fired capacity to enable immediate coal-to-gas switching. Coal plants are also younger and more efficient, and gas prices are higher. However, clean-air policies have boosted Chinese demand for gas by 30 percent since 2017, indicating substantial potential for replacing coal-fired boilers with gas use in industry and residential buildings, and India has stated its ambitions to expand the use of gas in industry, residential cooking, and water heating. But as the IEA points out,⁴⁴ the potential for coal-to-gas switching depends on a combination of regional gas and LNG prices; transport-enabling infrastructure,

39. International Energy Agency, "The Role of Gas in Today's Energy Transition," 2019, available at: <https://webstore.iea.org/the-role-of-gas-in-todays-energy-transitions>, last accessed June 18, 2020.

40. EEA, "Overview of Electricity Production and Use in Europe," December 18, 2018, available at: <https://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-2/assessment-4>, last accessed June 18, 2020.

41. G. Wilson, I. Staffell, and N. Godfrey, "Britain's Electricity Since 2010: Wind Surges to Second Place, Coal Collapses and Fossil Fuel Use Nearly Halves," *The Conversation*, January 6, 2020, available at: <http://theconversation.com/britains-electricity-since-2010-wind-surges-to-second-place-coal-collapses-and-fossil-fuel-use-nearly-halves-129346>, last accessed June 18, 2020.

42. EEA, "Overview of Electricity Production and Use in Europe," December 18, 2018, available at: <https://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-2/assessment-4>, last accessed June 18, 2020.

43. International Energy Agency, "The Role of Gas in Today's Energy Transition," 2019, available at: <https://webstore.iea.org/the-role-of-gas-in-todays-energy-transitions>, last accessed June 18, 2020.

44. EEA, "Overview of Electricity Production and Use in Europe," December 18, 2018, available at: <https://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-2/assessment-4>, last accessed June 18, 2020.

such as terminal capacity; and regulatory policy, such as carbon pricing—all of which make gas more competitive.

Overall, our analysis shows that carbon pricing can enable a gray transition toward a lower-carbon future, offering substantial economic opportunities for an emerging Big Gas industry to increase its market share in electric power and heavy industry.

From Threat to Opportunity: Strategic Accommodation or Economic Interests?

Our analysis has shown that the majors' advocacy for the Paris Agreement and a US carbon tax is unlikely to represent a case of feigned support or hedging. In 2009, when (some) US majors began to support federal emissions trading, they faced the tangible threat of costlier EPA regulation being adopted in the absence of a cap-and-trade scheme. By contrast, the majors' support for a federal carbon tax does not aim to offset the adoption of more drastic alternatives. In the Trump era of US politics, the White House has disputed the need for climate action and has focused on eliminating existing federal regulations, not least rules that affect and restrict oil and gas production. The most serious threat facing the majors today appears to be costly legal settlements, which may explain the climate liability waiver included in the original Baker–Schultz Plan. On the other hand, it may be that the majors see the Trump administration as a mere blip on the screen and that more radical regulation, such as a Green New Deal (see Rifkin 2019), can be politically feasible, beyond that administration's term in office. In this view, the majors' advocacy for a moderate US tax could reflect a precautionary, longer-term strategy. Still, the direction of US climate politics remains a matter of speculation.

A looser interpretation of strategic accommodation, as in Levy and Newell's (2005) idea of corporate support to environmental policy being a means for maintaining corporate legitimacy, highlights the added value of appearing "responsible" through advocacy for carbon pricing. Indeed, the global majors are highly visible companies open to public criticism: if they appear to ignore calls for climate action, they may incur significant reputational costs.⁴⁵ The added benefit of accommodating public pressures to appear responsible need not conflict with our main finding: that a combination of policy, technology, and market change has shifted the economic interests of majors toward new business opportunities related to natural gas expansion—in particular, coal-to-gas switching in electric power and heavy industry. Carbon pricing, with its indirect effect on competition, can unlock a considerable potential for immediate coal-to-gas switching in European and US power and for replacing the use of coal with gas in heavy industry and residential buildings in emerging economies like China and India. As expected by the economic interest-based perspective, moderate carbon pricing

45. Another interpretation is that oil majors support a US carbon tax in order to appear green but in fact consider such a tax to be politically infeasible.

gives natural gas a competitive advantage while impeding coal's ability to survive the transition toward a lower-carbon future. This indicates that majors' support for the Paris Agreement and a US tax also reflects a strategy for strengthening their market position and profit opportunities through the ongoing energy transition, and thus their emerging economic interest in such regulation.

Why, then, do cases of "lobbying duplicity" still occur? For example, in 2018, BP put more than US\$ 13 million into the opposition campaign against Initiative-1631 for a Washington State carbon tax, arguing that their fuel-producing oil refineries had received unfair treatment.⁴⁶ A report published in March 2019, widely covered by the world press, also claimed that Exxon, Shell, Chevron, BP, and Total spend US\$ 195 million a year to block, delay, or control climate regulations.⁴⁷ These cases provide examples of how large majors have mixed interests, such as those linked to gas versus oil refineries. For oil refineries, a carbon price raises the cost of production without adding benefits, such as the opportunity to expand markets. Importantly, they show that the majors' support for climate regulation should *not* be seen as unconditional: it has been restricted to proposals and frameworks advantageously designed to enable them to pursue narrow economic ends. To be sure, we expect majors to oppose other types of climate regulations that do not provide benefits or that serve to strengthen their rivals, such as rules that limit upstream oil and gas exploration and drilling activities or renewable portfolio standards and feed-in tariffs. According to the logic of competition by means of regulation, Big Gas is likely to resist or seek to delay and water down policies that would enable more rapid upscaling and integration of renewables, and thus a greener transition in electric power markets, which would eliminate the window of opportunity for gas to become a major bridge fuel. As the *Guardian* revealed in 2015, Shell has lobbied to undermine EU renewable energy targets: in a letter to EU Commission president Barroso in 2011, Shell maintained that a market-led strategy of gas expansion would save Europe € 500 billion in its transition to a low-carbon energy system, compared with an approach centered on renewables.⁴⁸

Conclusions

This article has discussed whether Big Oil's united support for carbon pricing in the post-Paris Agreement period is motivated by strategic accommodation or a shift in its economic interests toward natural gas expansion, facilitated by

46. While substantial carve-outs were made for coal and heavy industries exposed to international trade, refineries were not granted any exemptions. "Because of that, I can't support it. But we are not going to fight it, either," Shell CEO van Beurden argued. BP's Cherry Point refinery manager also said their opposition was due to the exemption made for other polluters.
47. InfluenceMap, 2019, available at: <https://influencemap.org/report/How-Big-Oil-Continues-to-Oppose-the-Paris-Agreement-38212275958aa21196dae3b76220bddc>, last accessed June 18, 2020.
48. Arthur Neslan, "Shell Lobbied to Undermine EU Renewables Targets, Documents Reveal," *The Guardian*, April 27, 2015, available at: <https://www.theguardian.com/environment/2015/apr/27/shell-lobbied-to-undermine-eu-renewables-targets-documents-reveal>, last accessed June 18, 2020.

advantageously designed frameworks. We have found limited grounds for interpreting Big Oil's advocacy as a case of feigned support or hedging, although its support for the Paris Agreement and a US tax has the added value of accommodating public demands for greater corporate responsibility. Instead, we have argued that an evolving Big Gas industry may benefit from the regulatory frameworks it now supports. This is mainly due to the indirect effects of a moderate carbon price on the competitive ability of natural gas to become the preferred baseload partner of intermittent renewables and a major bridge fuel in a gray transition toward a lower-carbon future. To be sure, it is also in the economic interest of majors to delay a green(er) transition that would bring faster upscaling and integration of renewables. Their support for moderate carbon pricing should therefore not be confused with unconditional support for climate policy. On the contrary, the majors can be expected to oppose, delay, or water down any type of regulation or policy support that would strengthen rival renewable energy. But by supporting favorably designed and moderate carbon pricing, the majors may profit from expanding gas markets, while simultaneously "greening" their image by acting like climate protagonists on the regulatory scene.

Our findings underscore the importance of studying the competitive dynamics behind the evolving industry demand for climate policy and the perverse motives that underpin pro-regulation business groups' participation in carbon coalitions (see also Betsill and Stevis 2016). We have shown that incumbent business interests are not static but subject to change as a result of shifting technological, market, and policy conditions. The possible reinvention of Big Oil as a Big Gas industry also speaks to the question of whether polluters are not simply losers but "convertibles" (Kelsey 2018) that can be recruited to coalitions in support of low-carbon transitions (Roberts et al. 2018). However, there may be negative consequences and costs associated with such recruitment. While a prominent role for natural gas in the energy transition can reduce GHG emissions immediately and substantially, thanks to the sizable potential for coal-to-gas displacement,⁴⁹ the entrenchment of natural gas may also cause negative feedback and lock-in. It may become a barrier to deeper decarbonization in the long run, as expanding gas power involves highly capital-intensive investments in plants and pipelines with a lifetime of multiple decades (Jordan and Matt 2014; Meckling 2019). As we have seen, moderate carbon pricing will not reduce global oil and gas output, which, as the Intergovernmental Panel on Climate Change has argued, is essential to avoiding dangerous climate change in the long term.

Our findings also shed light on a proposition advanced by economic theories of regulation: that public-interest climate policies are not necessarily "Olsonian" but can also be "Stiglerian," providing profitable benefits and

49. EEA, "Overview of Electricity Production and Use in Europe," December 18, 2018, available at: <https://www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-2/assessment-4>, last accessed June 18, 2020.

competitive advantages to *some* industry groups, while harming others. As rival energy providers compete for market shares through a lower-carbon or gray transition, incumbent polluters may support certain types of climate policy if they eye opportunities for advantageous redistribution of wealth through regulation. Finally, as industry groups can burden competitors and reap new market benefits through climate regulation, their economic interests may also explain their emerging policy support.

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