Energy Technology, Politics, and Interpretative Frames: Insights from Shale Gas Fracking in Eastern Europe

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Abstract

This article explores competing interpretive frames regarding shale gas in Bulgaria, Poland, and Romania. These countries face the choice of embracing shale gas as a potential revolutionizing domestic source of energy, against the backdrop of Russia serving as the dominant gas supplier. This makes them interesting cases for studying how policy narratives and discourses coalesce around a novel technology. The findings, which are based on sixty-six semistructured research interviews, point to differing and indeed competing frames, ranging from national security, environmental boons, to economic sellout and authoritarianism, with different sets of institutions sharing those frames. This suggests that enhancing energy security by way of deploying novel energy technologies such as shale gas fracking is not simply a function of resource endowments and technological progress. Instead, it is the result of complex dynamics unfolding among social stakeholders and the related discursive processes, which eventually will determine whether—or not—shale gas will go global.

Shale gas has changed the energy industry. The primary technical driver behind the "shale gas revolution" is a leap in technical innovation: hydraulic fracturing, or "fracking" for short, coupled with horizontal drilling (Sovacool 2014a). These advances in technology allow exploiting reserves trapped in deep-rock formations. Today, shale gas—both the largest source of and a popular term for unconventional hydrocarbons—represents some 45 percent of total US gas output (EIA 2014).

Clearly, fracking technology is contested. It offers material benefits to the countries using the technology, in the shape of economic welfare, tax dollar income, or security gains in an energy world that has turned more volatile. However, environmental harm may be caused by the chemicals entailed in fracking fluids, methane migrating to the surface, and the processing, storage, or transport of contaminated flowback water (Gordalla et al. 2013; Howarth et al. 2011; Myers 2012; Vengosh et al. 2014). For societies deciding whether to invest in the technology, fracking in essence amounts to a cost-benefit calculation (Jackson et al. 2014).

Besides the purely empirical dimension, a number of contextual factors matter. Complex dynamics between societal groups, the characteristics of incumbent socio-technical systems, and the consequent societal response all exert profound and complex influences over technological

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innovation, diffusion, and acceptance (Bijker and Law 1992; Coutard 1999; Hughes 1983; Hughes 1986; Misa 2003; Summerton 1994). In short, context and framing give empirics their meaning.

Fracking has become subject to scholarly investigation from a range of disciplines. Most research from the energy studies field has continued to emphasize technical and economic concerns, ignoring more surreptitious yet salient social, political, and cultural elements (Sovacool 2014b; Sovacool 2014c). A rapidly growing literature beyond the energy studies community is particularly looking at the public attitudes, social contestation, and public discourse surrounding fracking (Boudet et al. 2014; Brasier et al. 2011; Brown et al. 2013; Cotton et al. 2014; Evensen et al. 2014; Hudgins and Poole 2014). However, these works so far remain centered on the US and Western Europe (particularly the UK).

Based on extensive field research and a total of sixty-six semistructured interviews, in this study we explore the "interpretive flexibility" of fracking in Bulgaria, Poland, and Romania. These countries, like Central Eastern Europe more generally, face the choice of embracing shale gas as a potential revolutionizing domestic source of energy (Goldthau 2013). This makes them interesting cases for studying how policy narratives and discourses coalesce around a novel technology, and the interpretative frames assigned to that technology in these countries.

In this way, the article contributes to three distinct strands of the literature. First, it speaks to an ongoing academic debate on the politics and social construction of technology (Bijker 1992; Hughes 1987; Pinch and Bijker 1984). Second, it adds to the work done on socially contested technologies, such as nanotechnology, biotech, or even geoengineering (Corner et al. 2013; Falkner and Jaspers 2012; Levidow 1998). Third, it feeds into analyses on the power of frames and narratives in the public discourse and in policy-making (Bomberg 2015; Feindt and Oels 2005; Lachapelle et al. 2014; Lorenzoni et al. 2007). Each of these three themes—construction, contestation, and framing—has relevance to political scientists and scholars.

The next section delves into case selection, the theoretical concept, and the empirical strategy. The following sections discuss individual case studies, offer some comparative analysis, and present findings and conclusions for analysts and practitioners.

Case Selection, Theoretical Concept, and Empirical Strategy

Central Eastern Europe is highly energy-import-dependent, with some countries sourcing up to 100 percent of their consumed natural gas from Russia's Gazprom. Poland imports around 60 percent of its consumed gas, and Bulgaria 96 percent. Romania constitutes an outlier, with a 15 percent dependence rate (Eurogas 2014). However, Romania's conventional production is set to decline significantly by 2020 (KPMG 2012), which will likely increase the country's currently low import ratio. Moreover, coal plays an important role in domestic electricity production in all of these countries. Therefore, EU decarbonization policies will force them to replace coal by less polluting sources, with gas resuming the role of a "bridge fuel."

Importantly, all of these countries share a common history as planned economies, which implies similar regulatory legacies and a strong state bias. In addition, they are subject to identical EU environmental regulations. At the same time, it is left to nation states to choose the energy mix and the sources of supply, and the EU has not enacted any regulation on fracking. Finally, the energy sector plays an important role in all three countries. This is due not only to the sector's size in total

GDP—some 20 percent in the case of Poland, for instance (EMIS 2014)—but also to its function as an engine of economic growth.

Against this backdrop, the prospect of domestic gas reserves has gained traction in Eastern European policy debates (Goldthau 2012). According to estimates, Poland's 148 trillion cubic feet (Tcf) or 4.191 billion cubic meters (bcm) of technically recoverable shale gas reserves could meet roughly 250 years of current consumption. Bulgaria and Romania together hold 37 Tcf (1.047 bcm), or around 70 years of cumulative consumption (EIA/ARI 2013). The exploitation of fracking would therefore benefit countries that all come with similar high import dependences on Russia and that face decarbonization imperatives stemming from EU climate policies. In fact, the governments of all three countries have publicly supported shale gas exploration, regardless of their party orientation. This makes shale gas in Central Eastern Europe an ideal case for studying the interpretative meaning assigned to a novel (energy) technology—fracking.

A key insight (Bijker 1997; Hughes 1987; Klein and Kleinman 2002; Pinch and Bijker 1984) is that the evolutionary pathway of a novel technology is not only a function of its technical qualities and characteristics, but equally of its perception within society. In this context, interpretative frames are of great importance, as they assign meanings to managers and corporate actors, as well as to regulators, investors, and even end-users (Sovacool and Brown 2015).

Frames are nothing new in the field of global environmental politics (Hayes and Knox-Hayes 2014; Wahlström et al. 2013). The specific concept of interpretive frames used in this article comes formally from a stream of thought known as the "social construction of technology," or SCOT. SCOT holds that technology emerges in society as a "seamless web" (Hughes 1986), or what Latour (1999) calls a "sociotechnical imbroglio." SCOT emphasizes the mutually constitutive natures of technology, which is usually described as a technical "artifact," and society (Bijker 1993; Misa 1988). Within this framework, four important elements have been developed: the relevant social group, interpretive flexibility, closure and stabilization, and the technological frame.

The *relevant social group* denotes the institutions and organizations that share the same set of meanings attached to a particular technology (Bijker 1992; Bijker 1995; Bijker 1997; Pinch and Bijker 1984). The social groups that constitute parts of the "environment" for technology play a critical role in shaping and defining the problems that arise during the development of an artifact; social groups thus give meaning to a technology and define the problems facing that technology (Pinch 1996).

Interpretive flexibility suggests that differing interpretations of technological artifacts are available. That is, different social groups see particular technologies in different ways. These technologies, then, become "heterogeneous," because their meaning, rather than being fixed, is interpreted and negotiated by those social groups connected to it (Pinch and Bijker 1984; Sovacool 2011).

Closure and *stabilization* occur for a technology when a consensus emerges that the problems arising in design and development have been alleviated. Closure has come to mean "the process by which facts or artifacts in a provisional state characterized by controversy are molded into a stable state characterized by consensus" (Misa 1992, 110). The concepts of closure and stabilization highlight that different interpretations of technology can lead to conflict and controversy, and that refinement of that technology will inevitably continue until such differences are resolved.

These three concepts culminate in the one we employ in this study, that of a technological or *interpretive frame*. An interpretive frame attempts to capture the interactions that occur between,

rather than in or above, the actors. It comprises "all elements that influence the interactions within relevant social groups and lead to the attribution of meanings to technical artifacts—and thus to constituting technology" (Bijker 1997, 123; Law 1991). In a nutshell, a shared frame "defines a relevant social group and constitutes [its] members' common interpretation of an artifact" (Klein and Kleinman 2002, 31).

Frames can exist in three configurations. In some instances, no frame may be present. Here, success in adopting a novel technology depends on the formation of a constituency. In others, one frame may be present because a dominant group is able to insist upon its adoption. A third configuration relates to when multiple frames are contested, and criteria external to such frames are needed to resolve the differences. Shale gas exhibits the third type, since it is a relatively mature technology (with more than 20 years of operating experience), and yet faces contestation from (mostly environmental) opponents.

To identify specific frames connected to shale gas in Eastern Europe, we relied primarily on original data drawn from sixty-six semistructured interviews in Bulgaria, Poland, and Romania, conducted between 2012 and 2014. Most of these interviews were conducted in Poland (twenty-seven) and Bulgaria (thirty), and the remaining nine occurred in Romania (see Table A2 in the Appendix). The cases of Poland and Bulgaria—countries representing opposite ends of the shale gas policy spectrum—serve to identify diverging national-level frames for shale gas. The case of Romania, by contrast, explores the extent to which the dominant frames in Poland and Bulgaria feature in a country representing the middle ground, points to similarities, and maps deviations. This justifies a lower number of data points for Romania, and at the same time allows for triangulating the narrative patterns.

The interviews covered all relevant policy levels (national, regional, and local) and actor groups (government, public and private companies, regulators, and civil society). Prior to conducting *sur place* interviews, the broader patterns characterizing each country's shale gas debate were identified through an assessment of media coverage and desktop research. Our interview questions were then specifically designed to explore in more detail the dominant perceptions about shale gas and fracking, to consolidate them in the shape of specific frames, and to unveil the importance assigned to each frame. The interview proceedings were kept open to ensure that additional comments were adequately captured through introspective dialogue.

Our dataset comes with three caveats. First, due to the sensitivity of the subject, a number of actor groups could not be included in the sample—for instance, state-owned companies in Bulgaria. In addition, several interviews had to be held anonymously. Throughout the article, names are therefore omitted, and interviewees are identified by their function and institutional background. Second, the sample is not fully representative regarding the spectrum of relevant societal groups and institutions. This caveat pertains primarily to civil society, which remains slightly underrepresented. To the extent possible, this problem was addressed through triangulation with other data sources. Third, since debates on fracking are still ongoing, the interpretative frames remain in flux. The data, therefore, capture the meaning given to fracking as a novel technology for the period between 2012 and 2014. The outlier here is Bulgaria, a country where "closure" could be observed via a 2012 ban of shale gas, backed by a broad set of societal groups.

We proceed to identify the dominant frames within each country. This was done in an inductive way, by coding and then grouping key terms used by the interviewees to describe their attitudes or expectations toward framing. Then we compare variations in frames across countries, and assess

their relative dominances. The aim is to uncover whether the dominant frames are similar or divergent across countries, and which sets of actors and institutions endorse these frames.

Poland: "Economic Opportunity," "National Security," and "Environmental Boon"

Poland for a long time has been viewed as the shale gas frontrunner in Central Eastern Europe. The country has been the target of major international energy companies, including ExxonMobil, Shell, ENI, and Chevron, as well as companies specializing in shale gas, such as Talisman, Marathon, Cuadrilla, and Lane Energy. The prospects of unconventional gas have become bleaker, though, after most of the larger companies turned their backs on Poland due to disappointing test drillings.[2]

The data on Poland reveal three dominant interpretative frames for shale gas. The first, the *economic opportunity* frame, embraces shale gas as a source of welfare. The positive effects on job creation, state revenues on national and subnational levels, and the competitiveness of the manufacturing industry constitute the core of this frame. This narrative essentially mirrors statements made by Radoslav Sikorski, Poland's former foreign minister, to the effect that shale gas could make the country "a second Norway."[3] The frame was found to be most dominant among business, the oil-and-gas sector, and the state administration, but it was also supported by a broader cross-section of societal actors.

In the words of a director-level representative of the Polish Confederation of Private Employers (PKPP Lewiatan), shale gas "can be an important driver for the Polish economy [because it] can produce cheaper gas for other economic sectors [such as] the chemical industry." In the same vein, a former advisor to the Polish foreign minister stressed lower energy costs and a "knock-on effect on energy consuming industry." Adding to this statement, a member of the Economic Policy Department of the Polish Foreign Ministry pointed specifically to the economic benefits for local communities, for whom "shale gas [is] a tremendous opportunity to speed up their development." Furthermore, an interviewee representing the Office of the Minister of the Treasury—the body overseeing state-owned companies—stressed that "[w]e will do our best to help investors, because our companies will benefit as well." An advisor to the minister of the environment, in charge of environmental oversight, seconded this statement by revealing that "we will try to regulate [shale] in a way that will boost the level of investments and security of investments."

For representatives of the extractive industry, "[s]hale gas can be an impulse and driver for the economy," according to a manager at United Oilfield Services, a private Polish energy service company, particularly against the backdrop of Polish gas prices, generally perceived as being among the highest in Europe. Because of the potential of the Polish shale reserves, a former advisor to the Polish foreign minister alleged, "[s]ome of the [major international oil and gas companies] are viewing Poland as a base for their European oil and gas business." Representatives of state-owned companies also point to the opportunities coming with shale gas—possibly a function of the Polish government insisting on making them part of private-industry-led gas exploration. As the chief economist of the Polish national energy company Orlen insisted, "[i]t is not the case that the government pushes us into this. . . . We go in because we believe in it and put money on our bet that

[2] Eni Joins Shale Gas Exodus from Poland, *Financial Times*, January 15, 2014; Exit by Two Foreign Firms Leaves Polish Shale Gas under Cloud, Reuters, May 8, 2013.
[3] Dimiter Kenarov, Poland's Shale Gas Dream, *Foreign Policy*, December 26, 2012.

we will find gas." The benefits perceived by state-owned companies include foreign direct investment, gains in skills and expertise, and technology transfer.

The second dominant interpretative frame surrounding Polish shale centers on *national security*. This frame connects to Poland's historical trauma of being geographically located between major European powers. As coined by the manager at United Oilfield Services, "energy is a foreign policy tool for Russia [and] shale gas opens up the possibility of being more secure from Russia's monopolistic position." Other representatives of the Polish business community seconded this statement. Public officials remarked that "shale gas [is] part of [Poland's] diversification policy" (representative of the Office of the Minister of the Treasury). Interviews with members of the scientific community also revealed the perception that shale gas "would be a milestone to be independent from Russia" (professor at the Polish Institute of Soil Science).

Though not supporting shale gas as a key means to end Gazprom's dominance of the Polish market, the chairman of Poland's Green Party admits that "[c]itizens see the opportunity to be independent . . . from Russia." Even for Polish environmental NGOs, "sovereignty is important," as alleged by a representative of Cleantech Poland, a consultancy firm. That said, environmental NGOs remained among the more cautious observers, hinting that the business community may only utilize the security narrative for fostering the shale gas cause. As a representative of the Climate Coalition argued, "[w]e should not expect too much in the way of shale gas development in Poland. As a threat or a success story." Still, the national security frame is embraced by the bulk of actor sets represented in the interview sample.

The third dominant frame pertaining to Polish shale gas relates to the environment. This frame is more contested. To some, fracking technology represents an *environmental bane* in Poland, as in other European countries. The prospects of drillings using horizontal hydraulic fracturing have indeed raised protests among the local population. A prominent case in point is the village of Zurawlow, whose inhabitants have successfully mobilized against drilling activities planned by Chevron.[4] Skepticism has grown mainly regarding groundwater safety issues and the risks posed to local habitat. Environmental NGOs have vocally made the negative side effects of shale gas exploration and production a topic in public debates, which led to attempts by the Polish government to legally curb the ability of NGOs to get involved in shale gas matters.[5]

However, despite the presence of this negative frame, the dominant narrative is one of *environmental boon.* This frame is supported by members of the business community, parts of the state administration, and, surprisingly, even the environmental community. As representatives of the employers' association, oil and gas companies and the business community stressed during the interviews that Poland may face economic pressure related to the European carbon-trading scheme and rising carbon prices—a function of the country's power supply relying primarily on coal. Shale was therefore generally supported as a means to decarbonize Poland's energy system. More interestingly, however, the environmental community also cautiously embraced unconventional gas as an opportunity to reduce the country's emissions. As a representative of the Climate Coalition, a Polish environmental NGO, summarized: "[w]e believe local use of shale gas [using the] best available technologies could be a transition fuel that could complement the use of renewables." Even the Green

[4] Poland's Shale Gas Revolution Evaporates in Face of Environmental Protests, *The Guardian*, January 12, 2015.
[5] Poland Proposes Restrictions to Shale Gas Opposition, Natural Gas Europe, April 1, 2013. Available at http://bit.ly/2ccODPH, accessed September 8, 2016.

Party does not wholly stand against shale gas. As its chairman indicated, his party was divided in two groups, with one opposing shale but the other trying to demonstrate that alternatives may neutralize the need to explore it in the first place. In sum, "[w]ithin environmental organizations, there is a pragmatic understanding" (consultancy firm Cleantech Poland).

Bulgaria: "Economic Sellout," "Authoritarianism," and "Environmental Bane"

Much as did Poland's political elite, Bulgaria's leadership sought to frame shale gas as a matter of *national security* and *economic opportunity*. The national security argument came following a January 2009 dispute between Ukraine and Russia, during which a week-long gas cutoff left the country out in the cold. This experience was what motivated statements by a former member of parliament and chairman of the Energy Independence Movement to the effect that "[s]hale gas is not only an industry, it's geopolitics." Moreover, rising energy prices have repeatedly led to protest in Bulgaria, reputedly the EU's poorest country, and even forced governments to leave office.[6] It has been alleged by Bulgarian authorities that domestic sources of gas would ameliorate the situation and reduce exposure to price hikes induced by the prevalent oil indexation.[7] Furthermore, as the former deputy minister of economy, energy and tourism highlighted in an interview, the country's envisaged "reindustrialization process [requires] cheap gas," which would also "enter state budgets in the form of concession fees and royalties [and] fix our trade balance."

This national security and economic opportunity narrative resonated among some of the interviewees. However, it did not prove strong enough to be supported by key actors: Bulgaria, in contrast to Poland, enacted a ban on fracking in January 2012, which effectively stalled further exploration activities for unconventional gas in the country (LaBelle and Goldthau 2014). Chevron, the only foreign company active in shale gas in Bulgaria, has left.

Three negative interpretative frames were identified as dominant in Bulgaria.

The first, the *economic sellout* frame, labels shale gas as an attempt to exploit domestic resources for private gains. This frame was most dominant among left and "green" parties and the local-level public administration, but it was also supported by a broader cross-section of societal actors, ranging from business associations to academia.

In this frame, foreign companies are portrayed as the cause of unsustainable economic activity rather than as engines of growth and sources of investment. As the co-chairman of the Bulgarian Green Party stated, "foreign companies . . . do not create jobs for the local population [except for] guards, cleaning ladies and drivers." A leading activist of the Fracking Free Bulgaria Initiative further stressed that *"investor* is a dirty word in Bulgaria because for them it's easy to bribe officials and sign contracts with virtually no obligations."

The negative attitude toward foreign investors, particularly in the extractive sector, coincides with the widespread perception that "when things start to collapse, companies just give up, but environmental problems remain" (Member of За Земята—Friends of the Earth Bulgaria). As the chairman of the Parliamentary Committee on Economic Policy, Energy and Tourism explained, "people . . . have seen in the past how [investors] caused damages and disappeared after that." What

[6] Bulgaria's Electricity Prices: Protesting about Power Prices, *The Economist*, 15 February, 2013.
[7] Chevron Seeks to Explore for Shale Gas in Bulgaria, Reuters, July 15, 2010.

is more, municipalities do not perceive economic benefits as arising from drilling activities. On the contrary, the mayor of the town of Toshevo stated, "[w]e don't have any gains for these 10 years [the lifetime of the lease], only a symbolic rent for the municipal lands." Concession fees for natural resources are considered low by international standards, which has caused particular controversy in the case of the Bulgarian gold mining sector.[8] While observers, notably from academia, stressed the opportunities that would be missed, the general perception, which also resonated among the scientific community, was that "[t]here are no gains for the local population, only damages and problems" (retired hydrology professor and anti-shale-gas scientist).

Importantly, the risk that fracking-related pollution may deprive parts of Bulgarian society of their economic base also forms part of the "sellout" frame. For instance, the region of Dobrudzha, typically referred to as the "bread basket of Bulgaria," had been earmarked for exploratory fracking drilling. Overall, Bulgaria's agricultural sector adds some 10 percent to GDP and accounts for 19 percent of the total employment (European Commission 2015), as compared to roughly 3 percent for the EU as a whole.

A final element of the "economic sellout" frame consists in the prevailing distrust in the government. The chairman of the Parliamentary Committee on Economic Policy, Energy and Tourism hinted that "it looked like the government had an agreement with Chevron without [a proper] assessment of risks." According to the chairman of the Bulgarian Federation of Industrial Energy Consumers (BFIEC), the prevalent idea was that "the money will not go to people, but to the state." This brings the shale gas industry close to allegations of state capture, which needs to be seen in the context of high-level corruption plaguing the country's energy sector (CSD 2014).

The second frame made shale gas a case for promoting *energy authoritarianism.* Overall, the actors sharing this frame were similar to those supporting the "economic sellout" frame, but this frame also found supporters among the proponents of shale gas. The frame highlights the problematic way that public interests were handled by the government and the energy industry—notably by Chevron, as the primary company active in unconventional gas. As numerous observers noted, information levels on shale gas among the public were generally low, and the former deputy minister of economy, energy and tourism confirmed that "[t]he public lacked sufficient information and the government . . . and business did not fill this gap in time."

Interviews also revealed the perception that information on the fracking technology was strategically withheld, with an element of "secrecy" (member of Bulgarian Greens) characterizing governmental activities related to planned drilling activities. Information campaigns were pursued "in a purely lobbyist fashion" (ibid.), and "[t]hings were presented as if everything is going to be alright" (member of За Земята—Friends of the Earth Bulgaria). As a result, people started to source information from the Internet, with *Gasland*, the American documentary on shale gas, being cited as a key source. Moreover, dialogue between the government and citizens and other key constituencies was described as poor or lacking. As observers noted, the communication between the private sector and civil society was top-down and channeled through the state administration. Even the proponents of shale gas admitted that "Chevron . . . did not provide at that time any publicly available technological or other arguments regarding shale gas exploration" (former advisor to the Bulgarian minister of economy and energy and former Bulgarian ambassador-at-large for energy and climate change).

[8] Dimiter Kenarov, Where Your Gold Comes From: The Story of an Exploited Town in Bulgaria, *The Atlantic*, November 7, 2011.

In fact, municipalities and the local population typically learned about planned drilling activities only via official announcements. As one local mayor revealed, "[w]e don't have any communication with competent authorities, we only got a letter from the ministry when [Chevron] was granted a permit for exploration." This top-down and nonparticipatory approach on the part of the government was perceived as "endangering democracy and the environment" (leader of the anti-shale-gas movement and co-chairman of the Bulgarian Greens).

The third frame pertains, as in Poland, to shale gas being an *environmental bane.* As was pointedly noted by two senior scientists of the Bulgarian Academy of Sciences' Geological Institute, "the population was frightened and waited for some kind of apocalypses provoked by shale gas and fracking," which was induced by "information that came from environmentalists' organizations—contamination of waters and soil with chemicals, radiation, earthquakes, and destruction." Overall, well-educated (co-chairman of the Bulgarian Greens) and "predominantly young people who take the Bulgarian environment and nature to heart" (former advisor to the Bulgarian minister of economy and energy) drove the process. Interviews also revealed clear rifts within the scientific community, with some researchers siding with environmentalists and some not. Scientists critical of fracking were even alleged to form part of "epistemic communities . . . naturally leaning in favor of conventional technologies," rather than novel and unconventional ones (member of the board of directors and head of the exploration unit of Oil and Gas Exploration and Production Plc).

The environmental bane frame gained particular traction in the context of potential damage done to groundwater safety, and specifically to an aquifer in the Dobrudzha region. While officially dismissed as "senseless theories" (former deputy minister of economy, energy and tourism), protesters managed to establish a link to agriculture and food safety. The environmental groups constituting the core proponents of this frame were also joined by the National Association of Grain Producers and by farmers (Dobrich protest leader). The media, finally, tended to highlight environmental risks, too, which prompted comments from the energy business community to the effect that "[t]he media was not objective in covering the debate" (representative of Oil and Gas Exploration and Production Plc).

In this context, it is important to mention the alleged Russia-led anti-fracking campaign, aimed at preventing competition in the form of domestic energy sources.[9] As our data suggest, environmental protests were locally rooted, not part of a concerted effort. Moreover, interviewees at the municipal level revealed a strong suspicion against any outside intervention, be it on the part of the national government, foreign companies, or arguably also Moscow-sponsored agents.

Overall, a broad coalition of left-leaning political parties (notably the Greens and the Socialist Party), local municipalities, and scientists, but also industry associations and conservative parts of the society such as farmers, supported this third frame pertaining to the Bulgarian shale gas debate.

Romania: "Economic Opportunity," "Environmental Bane," and Frame Segregation

Because Romania covers most of its gas consumption through domestic production, shale gas does not play as vital a role in energy security. Romania thus offers an excellent opportunity to test the perceptions and frames of shale gas in a country that has more latitude in choosing to adopt it.

[9] Bulgarians See Russian Hand in Anti-Shale Protests, *Financial Times*, November 30, 2014; Nato Claims Moscow Funding Anti-Fracking Groups, *Financial Times*, June 19, 2014.

In many respects, the Romanian frames feature elements of those in both Poland and Bulgaria. On the one hand, the country's shale gas prospects have attracted the interest of international energy corporations such as Chevron (US), Sterling Resources (Canada), TransAtlantic Petroleum (Canada), or Hungary's MOL, which all acquired exploration-and-production licenses. Domestic state-owned gas producer Romgaz has also expressed interest in joining shale gas exploration. A temporary moratorium on shale gas exploration in 2012 never went into effect, leaving the country open to the fracking technology. On the other hand, growing social opposition against fracking may have been a decisive factor in making foreign companies let go of Romanian shale gas assets.[10] Officially citing disappointing test drillings and a bearish international business environment, Chevron has announced it will leave Romania, whereas Sterling Resources sold their assets to Carlyle, the investor group.

As our interviews show, all of the frames identified for Poland and Bulgaria also exist in Romania, albeit with three important qualifiers: the environmental boon frame does not feature prominently; none of the frames is dominant among all actor groups; and the frames seem much more attached to specific actor sets, with little overlap between them.

The *economic opportunity* frame, which was strongly pushed by the Socialist Ponta government despite its rallying against shale gas while in opposition, mainly resonated among representatives of the state administration and independent observers. Cases in point are statements to the effect that there is "a favorable case [to make] for shale gas exploration, due to the benefits it can bring to the national economy and energy security" (Romanian ambassador-at-large for energy security and counselor to the prime minister). Shale gas would also improve the oligopolistic Romanian gas market structure, as "[n]ew competitors . . . would bring shale gas to the market [which] would make competition look totally different" (energy analysts at Expert Forum, a Bucharest-based think tank). Moreover, the counties with potential for shale gas extraction typically are in the poorer parts of the country, and "badly . . . need better infrastructure—water, roads, scholarships for kids, etc. (director of the National Agency for Environmental Protection (ANPM), Ministry of Environment, Waters and Forests). Shale gas development therefore promises to enhance "the quality of life in the involved local communities, by creating jobs and raising local budget revenues" (ambassador-at-large for energy security).

The actors embracing the economic opportunity narrative partially overlap with those framing shale in terms of *national security*. Particularly, representatives of state institutions and the ruling party backed this frame. The general argument was that in light of falling domestic production, "shale gas . . . is a potential substitute and alternative to conventional hydrocarbons (member of parliament, Industry and Services Commission). Shale gas "would be a contribution to our energy balance" (director of ANPM) and may "strengthen Romania's energy security . . . , which is particularly important in the current regional geopolitical context" (ambassador-at-large for energy security). In short, given "Romania's energy security, we simply cannot ignore the potential contribution of natural gas from shale deposits" (president of the Romanian Agency for Mineral Resources, ANRM).

The two first frames starkly contrast with the narratives of *economic sellout* and *environmental bane,* which are shared by two other actor sets—environmental organizations and think tanks. According to the president of the Terra Mileniul III Foundation, an environmental NGO, shale gas exploration

[10] Anca Elena Mihalache, No Shale Gas, After All—Implications of Chevron's Exit from Romania, Natural Gas Europe, March 30, 2015. Available at http://bit.ly/1G1uEA1, accessed September 8, 2016.

and production "will [only] relocate oil workers from other parts of the country to the production site, while the more specialized employees will likely come from abroad [and] there are not many permanent positions in this industry." Seconding this, and echoing arguments also made in the Bulgarian context, analysts at Expert Forum stressed that "since the kind of job openings for the industry are mainly for the high-skilled workers [there are no] opportunities for the locals—other than a few low-skills jobs." In addition, the royalty system was criticized as generating insignificant financial revenue.

The perception of losing out economically coincides with fears of potential harm done to agricultural land and habitat. Though some observers argued that "[b]ringing more gas to the energy mix[, thus] replacing coal . . . would bring down emissions in Romania" (analyst at Expert Forum) and stressed Romania's longstanding history and sophisticated expertise in the oil and gas industry and its ability to implement proper environmental oversight (member of parliament, Industry and Services Commission), environmental risks dominate. What is more, while the environmental risk narrative was most dominant in the national-level discourse, the economic sellout frame resonated strongest at the local level. As a consequence, "these two kinds of protest are augmenting each other" (analyst at Expert Forum).

The latter two frames extend into the *authoritarianism* frame. It is mainly embraced by protest groups, NGOs, and think tanks. This narrative on the one hand centers on institutional capacity and quality. In the words of an analyst at Expert Forum, "the fickle institutions probably [are] one of the most important obstacles against public acceptance of fracking. The public does not trust institutions that today want to put a moratorium on fracking and tomorrow turn into enthusiastic supporters of it." Moreover, as various experts repeated, accessible scientific information in the Romanian language was scarce, and the quality of information remained low. As a counselor to the minister for energy and member of the management council of Transgaz mourned, "[d]iscussions in the media are mainly emotional, with little reference to science-based assessments of the costs and risks that shale gas operation can bring to Romania." *Gasland*, the US documentary, was again cited as a key source of information, which some observers deemed "scientifically unfounded" (president of ANRM) or even "hostile [and] fuelled by often radical and anarchistic movements" (ambassador-at-large for energy security).

This antagonism connects in part to Romania's experience with an open-pit gold-mining project at Roşia Montană in Alba county (Transylvania), a contested project for its use of the poisonous cyanidation mining technique and allegations of corruption surrounding the permitting process.[11] In this context, scientific studies have allegedly been commissioned by vested interests. As a result, a deep divide can be identified between two "epistemic communities" (director of the Energy Policy Group, a Bucharest-based think tank): scientists and the business community, on the one hand, and the shale gas critics, on the other. As the president of Terra Mileniul III alleged, "scientists and academics that often promote shale gas . . . are happy to get a small research contract financed by the oil companies." Coupled with "weak and indecisive . . . authorities . . . there are only the NGOs and civil society left to counterbalance this."

In this respect, shale gas was also perceived as an issue of citizen participation. As the director of ANPM admits, "[u]nfortunately, we started off on the wrong foot, due to inadequate communication." A member of the management council of Transgaz, Romania's state-owned operator of the national gas transmission system, went further by stressing that "[t]he fact that currently there is no

[11] Romania Expected to Reject Gold Mine Following Week of Protest, *The Guardian*, September 10, 2013.

participation of local communities in the prospective revenues makes them justifiably frustrated." Analysts at Expert Forum pointed to the heavy security apparatus deployed to protect shale gas exploration that raised "serious concerns about human rights infringement." In all, while the key actors embracing the authoritarian narrative are found among NGOs, civil society, and think tanks, this frame also resonates among certain representatives of state institutions.

Conclusion

The research conducted here regarding three Eastern European countries—Poland, Bulgaria, and Romania—suggests that the same technology can be given diverging meanings. This has at least four implications for political scientists, security analysts, and international relations scholars.

First, as Table A1 summarizes, shale gas fracking can be perceived, positively, as a way of accelerating economic development, serving national interests, and increasing regional security, and encouraging less carbon-intensive forms of energy supply. However, other relevant social groups envisioned shale gas as an environmental bane due to its impacts on water and ecosystems, as a mechanism of transferring national wealth and assets out of the country, and as reinforcing patterns of authoritative decision-making or further marginalizing the poor and vulnerable. Thus, it is a mistake to view energy systems as apolitical or uniformly interpreted.

Second, the fact that five of our frames—all but "environmental boon"—occur within relevant social groups across two or more countries implies a commonality of interpretation. That is, despite differing cultures, time periods, energy markets, modes of industrial cooperation, and national identities, there seem to be more universal frames that resonate with social groups at a deeper level. Energy systems such as shale gas can therefore intersect positively with notions of economic growth and national security, or negatively with issues of social injustice and concerns over environmental degradation. Interpretive frames can become aligned across cultures and contexts.

Third, cross-country exchange clearly exists among the groups subscribing to a given frame. Moreover, media or films such as *Gasland* foster the transnational dissemination or solidification of certain frames. At the same time, different sets of institutions tend to gather behind or share frames. For this reason, it is not necessarily one frame per institution, but different frames are shared by various sets of institutions. Sometimes one institution also buys into several frames at the same time (e.g., jobs and national security). The fact that many types of actors (such as business associations or public administrators) can populate multiple frames at once may imply that they have learned about this universal appeal of some frames, and may switch between them depending on their audience. Moreover, this suggests that, although frames can "travel" across borders, such "cross-border frame export" from one country to another is not necessarily a linear process.

Finally, our study reveals that energy systems such as shale gas possess an interpretive flexibility, but so far lack closure and stabilization, given that various social stakeholders continue to attach different, and at times conflicting, meanings to them. Shale gas, in other words, is polysemiotic—it will provoke a heterogeneous mix of varying reactions, based on both the type of relevant social group and the nature of the particular frame. The interpretive flexibility of shale gas therefore reminds us that energy projects not only mark the physical landscape and contribute to the production and distribution of natural gas or other energy sources. They can also transfer what were once customary public resources into private hands, concentrate political power, become intertwined in national discourses of revitalization and strength, and validate distinct approaches to economic and social development.

These findings bear important implications for other fields of social inquiry, including security studies—a field mostly concerned with the geopolitical implications of shale gas. As this study reveals, new energy technologies such as shale gas interact in mutually reinforcing ways with social, cultural, political, and economic forces. Therefore, the interpretative meaning attached to a novel technology determines whether or not it will blend into a given energy system in a seamless way, and whether it will "succeed" or "fail."

In other words, the deployment of new, yet risky energy technologies such as shale gas fracking is not simply a function of resource endowments and technological progress. Instead, it the result of dynamic stakeholder interactions and of the related discursive processes that result. These dynamics, not hardnosed security imperatives by themselves, will eventually determine whether or not shale gas will go global. Also, and more troublingly, assessments of shale gas that ignore these (sometimes hidden) social dimensions threaten to naturalize them as part of the normal environment and depoliticize them as acceptable risks.

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Appendix

Table A1
Summary of Shale Gas Interpretive Frames, Locations, and Relevant Social Groups in Eastern Europe

	Interpretive Frame	**Present in**	**Relevant Social Group(s)**	**Description**
Positive	Economic opportunity	Poland, Bulgaria	Government ministries, private energy companies	Shale gas will endow countries and communities with jobs, economic development, tax revenue and in some situations a reindustrialization of the economy
	National security	Poland, Bulgaria	Energy consumers, some government ministries, private energy companies, members of civil society	Shale gas will enable countries to liberate themselves from dependence on energy imports (particularly from Russia) and enhance regional stability
	Environmental boon	Poland	Trade groups, unions, private companies, some environmentalists, some politicians	Shale gas will assist Poland in its process of national decarbonization
Negative	Environmental bane	Poland, Bulgaria	Local communities, environmental nongovernmental organizations	Shale gas threats water quality and availability, risks chemical pollution, and can accelerate species loss and the destruction of habitats
	Economic sellout	Bulgaria	Political parties, some civil society groups, some trade	Shale gas production merely transfers wealth

			unions and business associations, local public administrators, some academics	and revenue out of domestic economies to foreign actors
	Energy authoritarianism	Bulgaria	Trade and business associations, local public administrators, some civil society groups	Shale gas decision-making is opaque, can concentrate political power, and marginalize local communities

Table A2
Summary of Interviewees

Position	**Organization**
Poland	
President	Polish Ecological Club (Central-Eastern Region)
Economist, strategy and PPM department	PKN Orlen
Expert, Department of Energy and Climate Change	Polish Confederation of Private Employers Lewiatan (PKPP Lewiatan)
President of the board	Environmental Protection League, Lublin
Advisor to minister and to chief national geologist	Ministry of the Environment
Country manager, business development	United Oilfield Services
Director-level expert, Department of Energy and Climate Change	Polish Confederation of Private Employers Lewiatan (PKPP Lewiatan)
Chairman	Poland's Green 2004 Party
Chief expert, Department of Economic Policy	Ministry of Foreign Affairs
Deputy director	Regional Directorate for Environmental Protection (RDOS)
Former advisor to foreign minister	Ministry of Foreign Affairs
Executive director	Cleantech Poland
Advisor & geologist	Instytut Studiow Energetycznych / Institute of Energy Studies
Professor	Polish Institute of Soil Science
Professor	Polish Institute of Soil Science
Professor	John Paul II Catholic University of Lublin (KUL)
Expert, economic policy department	Ministry of Foreign Affairs
Energy and natural resources lawyer	White & Case Warsaw
Corporate affairs manager	Talisman Energy

General manager	Talisman Energy Polska Sp.
Researcher, economics department	Warsaw University
Project coordinator	Climate Coalition
Researcher and policy analyst	Instytut na rzecz Ekorozwoju / Polish Institute for Sustainable Development, Projekt LIFE+ „Dobry Klimat dla Powiatów"
Expert, Department of Strategic Projects, Office of the Minister	Ministry of the Treasury
Poland representative	NaftaGaz Poland
Professor in power engineering	Technical University of Lodz, Poland Institute of Electric Power Engineering
Professor	John Paul II Catholic University of Lublin (KUL)
Bulgaria	
Regional leader in antifracking organization	Dobrich—anti-shale movement
Antifracking leader / co-chair	Anti-shale-gas coalition / Green party
Professor	Sofia University, Faculty of Economics and Business Administration
Member of parliament	Bulgarian Parliament; chairman of the parliamentary Committee on Economic Policy, Energy and Tourism, member of Union of Democratic Forces party
Member of parliament / former deputy minister	National assembly / former minister of economy, energy and tourism, Citizens for European Development of Bulgaria (GERB) party
Mayor	General Toshevo municipality, member of Bulgarian Socialist Party (BSP)
Mayor	Dobrich urban municipality, GERB
Former member of parliament, Leader	Energy Independence Movement
Director-level expert	Regional Inspectorate for Environment and Water Varna
Director-level expert, Department of Energy Resources and Concessions	Ministry of Economy and Energy / Bulgarian Energy and Mining Forum
Managing partner at private energy consultancy / former ambassador of Bulgaria in Russia	Innovative Energy Solutions / Ministry of Foreign Affairs
Campaigner	Fracking Free Bulgaria Initiative
Analysts, Economic Program	Center for the Study of Democracy
Analysts, Economic Program	Center for the Study of Democracy
Municipal deputy mayor	Dobrich rural municipality
Chief environmental expert	Dobrich rural municipality
Head of environmental unit	Dobrich urban municipality

Member of the board of directors and head of the exploration unit	Oil and Exploration and Production Plc.
Former advisor to minister of economy and energy & former ambassador-at-large for energy and climate change	Ministry of Economy and Energy
Deputy director	Geological Institute, Bulgarian Academy of Sciences
Professor	Sofia University, Department of Geology and Geography
Professor (retired), hydrologist, anti-shale-gas activist	Bulgarian Academy of Sciences
Professor	Institute of Geology, Bulgarian Academy of Sciences
Drilling supervisor	Genting Oil & Gas
Director of strategic planning and investments	Bulgarian Federation of the Industrial Energy Consumers (BFIEC)/ Stomana Industry
Head of unit in the Water Management Directorate	State Ministry of Energy and Water
Member	За Земята—Friends of the Earth Bulgaria & CEE Bankwatch Network
Member	За Земята—Friends of the Earth Bulgaria
Member	Green Policy Institute, Green party
Former member of parliament / Chair	Bulgarian National Assembly / Temporary Committee on the Study of Shale Gas, GERB
Romania	
Analyst, energy & public policy	Expert Forum
Analyst, energy & public policy	Expert Forum
President	Romanian Agency for Mineral Resources
Director	Romanian Agency for Mineral Resources
Counselor to energy minister	Ministry of Energy
Member of parliament / commission member	Romanian Parliament / Commission on Industry and Services
Ambassador-at-large for energy security	Ministry of Foreign Affairs
President	Terra Mileniul III
Director	Energy Policy Group, a Bucharest-based think tank