



Energy (in)security in Poland the case of shale gas

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HIGHLIGHTS

- We examine geologic, economic, environmental and political issues of shale gas.
- Poland is used to assess prospects for shale gas development in Europe.
- Debate in Poland has largely been framed as an energy security issue.
- A number of significant hurdles may prevent large scale development there.

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ABSTRACT

The large scale extraction of natural gas from shale rock layers in North America using hydraulic fracturing, or “fracking”, has prompted geologists, economists and politicians in various parts of the world to ask whether there are new reserves of this precious resource to be found under their soils. It has also raised a host of questions about the potential environmental impacts of extracting it. Drawing on research on both sides of the Atlantic, this paper assesses the most pressing issues for research and policy makers related to shale gas extraction. The paper first provides a survey of environmental and economic issues related to shale gas. It then turns to a case study of Poland, whose policy makers have been among the most fervent proponents of shale gas development in the European Union. We examine the status of shale gas extraction in that country and what the barriers are to overcome before commercial extraction can in fact take place, if at all.

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1. Introduction

This paper examines the shifting center of gravity of the debate over fracking and shale gas development from North America to Europe and assesses the complex mix of market, environmental, and geopolitical considerations that set the tone, and likely the outcome, of this debate in Europe. No European country has a history of commercial development of shale gas, and it is still far from certain that a single cubic meter of gas will be commercially produced. The reasons for this uncertainty lie partly in geologic and geographic realities about the distribution of shale resources, but there are also significant economic, political, and environmental obstacles that would need to be overcome for the emergence of a commercially viable shale gas industry in Europe akin to what has developed in North America over the past decade. Bans on hydraulic fracturing are already in place in France, Bulgaria, Czech Republic, and the Netherlands and

the German federal state of Nordrhein–Westfalen have imposed moratoria pending further research. In Poland, where government enthusiasm for shale extraction is greatest and public opposition least vocal, as of writing only about twenty wells have been drilled, with a handful of private companies researching cores to establish what amount of natural gas can eventually be commercially extracted. The US Energy Information Administration estimates that technically recoverable shale gas reserves in Poland are roughly 187 trillion cubic feet (tcf), or roughly 5300 billion cubic meters (bcm), though the Polish Geological Institute's estimate is far smaller as noted later in the paper. Other substantial basins in Europe are in France and Scandinavia (US Energy Information Administration, 2011).

Because it is at the center of the emerging European discussions over shale gas, the paper uses the case of Poland to assess the emerging issues surrounding shale gas in Europe. The article is based on interviews in Warsaw with senior Polish government officials and natural gas industry representatives, in Brussels with European Union officials, as well as field site visits in northern Poland (see Table 1 for a list of interviews). The paper also draws extensively on published reports, scientific literature, and government documents related to shale gas and hydraulic fracturing,

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Table 1
Overview of interviews conducted.

Interview with	When?	Where?
Private US gas company	November, 2011	Pennsylvania, US
Environmental protection agency	November, 2011	Washington, DC, US
European commission, DG energy, DG environment and DG climate	January, 2012 and May, 2012	Brussels, Belgium
European Parliament, representatives of ITRE committee and ENVI committee	January, 2012	Brussels, Belgium
Private gas company	January, 2012	Gdansk, Poland
Ministry of Environment, Ministry of Economic Affairs, Ministry of Foreign Affairs	January, 2012	Warsaw, Poland

which is currently the favored technology for extracting shale gas. The structure of the paper is as follows. First, an overview of key policy considerations is provided. This includes an analysis of how the “shale gas revolution” in North America and its ripple effects on natural gas markets beyond North America, and an examination of the environmental science of shale gas and hydraulic fracturing in light of existing policies in Poland and the EU. Second, the regulatory, infrastructural, and geopolitical context of energy in and its implications for shale gas development in Poland is described. Third, and by way of conclusion, the prospects for shale gas development in Poland are assessed in light of the available evidence.

2. Key policy considerations concerning shale gas

In North America, the shale gas genie is out of the bottle. Barring some sensational finding on the environmental impacts of hydraulic fracturing (“fracking”), such as extensive groundwater contamination, shale gas will likely remain a growing part of the energy landscape in North America (Boersma and Johnson, 2012). The debate will continue in scientific and policy communities, localities, and the media, about the potential impacts of shale gas extraction on climate, a fledgling renewables industry, groundwater and surface water quality, structural geology, etc., and there are legitimate concerns in each of these realms that shale gas could have detrimental effects. In certain jurisdictions overlying recoverable deposits, these concerns may inhibit the development of shale gas resources. However, the overall political and business cultures in both the United States and Canada have historically valued hydrocarbon development in spite of environmental costs, domestic energy supplies instead of imports, and property owners’ rights to exploit subsurface mineral rights versus the collective’s wishes to prevent such exploitation. Some have argued that the regulatory framework governing natural gas infrastructure development, transportation services, marketing and minerals rights have been crucial elements in the development of shale gas (Medlock, 2012). Whatever the exact causes may be, they are unlikely to change anytime soon.

2.1. Market and economic impacts

Over the past decade shale gas exploitation has boomed in the United States. In 2010, production amounted to 5 tcf (141.5 bcm) and projections are this number will almost triple by 2035 (US Energy Information Administration, 2012). However, the limitations of these projections must be considered.

First, new technical and/or geological insights have to be taken into consideration. The 2012 Annual Energy Outlook downgrades estimates of technically recoverable resources, largely due to a decrease in the estimate for the Marcellus shale from 410 tcf to 141 tcf (1160 bcm to 400 bcm). When accounting for land use patterns, regulations and policies, much of the shale gas that is likely underground is not in fact recoverable (Blohm et al., 2012). Given this context, it is worth noting here that roughly a decade

ago many in industry, government, and academia, had not foreseen the development the US gas industry has experienced. In other words, predicting future developments in shale gas is exceedingly difficult.

Second, economic conditions of the gas market can change. Abundant production within the United States has caused natural gas wellhead prices to plummet after July 2008 (US Energy Information Administration, 2011). Increasingly there are reports of delayed investments in drilling of new wells for exactly this reason. This development has prompted some to support the reintroduction of a wellhead price-floor, which was abolished in 1989 with the Wellhead Decontrol Act (Weijermars, 2011). However, it appears that the market shall correct the existing mismatch between supply and demand, with for instance BP reporting a write-off of \$2.1 billion on shale gas acreage because of lower natural gas prices.¹

Despite existing uncertainties, the impacts of the US shale gas boom are substantial. Domestically, wellhead prices for natural gas are expected to remain below \$5 per thousand cubic feet at least to 2023. Relatively cheap gas in turn is expected to trigger investments in gas-fired power plants, resulting in an assumed rise of the share of natural gas in the electricity generation portfolio to 27% in 2035 and in some scenario studies an even more substantial rise up to 2050 (Paltsev et al., 2011). More broadly speaking, the future of natural gas depends on a complex set of factors, such as adoption of natural gas for transportation, future climate policies, renewable energy policies or the lack thereof, and geopolitical considerations (Myers Jaffe and O’Sullivan, 2012).

It appears that the effects of US shale gas production on European markets have been indirect to date and there are currently no signs that this will change in the near future. Liquefied natural gas (LNG) from Qatar, other parts of the Middle East and Eastern Siberia intended for terminals in North America is now finding its way to both European and Asian markets. Furthermore increased usage of gas-fired power plants in the US has made coal cheap and available, resulting in an incline of coal-fired electricity generation in Europe (Rühl, 2012). LNG is changing the dynamics of global gas markets and European gas prices on spot markets have been significantly lower than oil-indexed gas during recent years. It is therefore expected that the EU will continue to move slowly away from oil-indexation as long-term contracts are re-negotiated and new contracts negotiated that take into account market developments (Pearson et al., 2012).

Significant shale gas resources have been reported in the European Union (Leteurtrois et al., 2011; Polish Geological Institute, 2012; US Energy Information Administration, 2011). Yet given the absence of experience with shale gas extraction in most parts of the world and given the number of related uncertainties, reserve estimates should be treated with ‘considerable caution’ (Pearson et al., 2012). In stark contrast to the US, actual shale gas extraction is still in the embryonic phase.

¹ http://www.nytimes.com/2012/08/01/business/energy-environment/01iht-bp01.html?_r=0 – Article accessed on 10 October 2012.

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