Path to Prosperity or Road to Ruin? Shale Gas Under Political Scrutiny

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Cover photo: A wellhead "christmas tree" at a shale gas completions site,
British Columbia, Canada, May 2011
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Executive summary

– Uncertainty reigned in last year's debates about the future of gas markets. There was uncertainty about prices, a sufficient level of investments, the implementation of climate policies and the post-crisis economic recovery, thus, about demand, but not about the availability of new sources of supply. This year, the uncertainty seemed to be narrowed down to the European market, while elsewhere a new "dash-for-gas" is predicted, with new centres of consumption and new sources of supply on the horizon.

– Unconventional gas is at the heart of the current debates. The European shale-gas debate is peculiar for its polarization between euphoria ("game-changer") and total rejection ("environmental disaster"). The fiercest critics are prone to more ideological and, thus, categorical judgments despite a general lack of sufficient scientific studies, credible geological data and environmental impact assessments. However, even if many of the potential risks associated with shale-gas production are just a part of "scare game", all public concerns should be addressed and the myths exposed and explained.

– Available estimates of unconventional-gas reserves outside North America are rarely accompanied by reliable data about the economic feasibility of production. Opponents of shale gas refer to this lack of knowledge about reserves or the environmental footprint of its extraction as a sufficient cause to prematurely halt all such activities in Europe. Supporters tend to overestimate the U.S. breakthrough and underestimate local nuances, and thus run the risk of overlooking the need to put proper preventive measures in place. The debate about shale gas in Europe is therefore focused on the extremes rather than on acceptable trade-offs.

– A simple replication of the U.S. scenario in Europe is unfeasible. Sceptics take this claim as proof that the development of shale gas in Europe is highly unlikely. But such a thesis is based on the wrong assumption that success requires reaching the same scale of production as in the U.S. In the EU, which is still divided into separate national markets with growing regional cooperation but a common market still beyond the horizon, what indeed matters most are the implications for individual member states. So, shale gas should be seen as a potential "local or regional game-changer", in particular with respect to Central Europe.

– Shale gas might become a sort of mental game-changer as well. For supporters of renewables, natural gas becomes a direct competitor, not just a supplementary source. For shale-gas promoters, mainly from heavily import-dependent countries, natural gas may go from a necessary evil to a long-awaited solution to their current security of supply concerns.

– The mounting controversies about shale-gas exploration and production in Europe reveal political and ideological differences. Meeting geological, technical and economic challenges might not be enough to develop this new industry in Europe. Debates about energy in the EU are pursued in a very complex legal and political environment. The future energy landscape will be decided by both national governments responsible under EU primary law for their own energy mix and EU institutions that will pave the way for a low-emission economy and, thus, are certain to have an impact on the national energy mixes.

– Shale gas caught the attention of the EU institutions only last year. At first, the debate was focused on energy security, but now environmental dimensions have started to prevail. Two different approaches can be distinguished: A) the Commission opts for legal and regulatory adjustments to address the potential risks of shale-gas exploration and production, which would be introduced by the member states themselves; and, B) some MEPs insist on EU-wide legislation to impose strict environmental rules and limit these activities.

– In 2010, European discussions about unconventional gas were limited to energy experts and the industry, but this year they were translated into political decisions, public campaigns and legal measures, such as a ban on hydraulic fracturing in France. This clearly shows that political and public concerns will play almost as equally as important a role as will confirming reserves and finding economically efficient ways of production.
– However, emphasizing the potential risks and threats as well as repeating calls for a radical implementation of the precautionary principle (a total ban until the full record of threats is known) might turn into a self-fulfilling prophecy. With the existing uncertainty, a more pragmatic approach is recommended, one based on in-depth analysis of the trade-offs and their public acceptance, which might replace the current oscillation between rejection and enthusiasm.
– The debate over shale gas reveals the shakiness of the EU's energy goals, in particular constant efforts to balance competitiveness, security of supply and sustainability, and underscores the need for flexibility rather than one-size-fits-all policies. What seems obvious from the EU level, becomes less so from the perspective of an individual member state. Shale gas as a new fossil fuel does not fit into the grand strategy of the almost totally decarbonised EU energy system proclaimed by the 2050 Road Map. Yet, it fits perfectly into the energy strategy of Poland given its security of supply concerns and its need for the diversification of its coal-dominated power-generation sector. At this point, precisely because of the complexity and breadth of the debate, it seems unfeasible to consider introducing a comprehensive legal or regulatory framework within the EU.

Introduction

Natural gas raises ambivalent feelings amongst EU members. For some of them, it is still the most convenient bridge between a carbon-intensive past and a decarbonised future, while for others it is rather a source of security concerns. Nonetheless, Europe's demand for gas and its reliance on imports will be growing in the coming years and decades, but at a slower pace than was expected a couple of years ago. In its World Energy Outlook 2010, the IEA announced that "unprecedented uncertainty" best characterizes the development of gas markets. Under such circumstances, categorical judgments should be replaced by cautious assessments. This recommendation comes only a year after the same institution introduced new assumptions into its analysis and drew a picture of a forthcoming "golden era of gas". It only proves that volatility is the name of the game. It is enough to mention the Fukushima accident, with its immediate implications embodied by the German decision to phase-out nuclear power plants. Natural gas has been announced as the major beneficiary of this step even though in the German energy strategy released not even a year ago it almost did not exist. Although this change adds new arguments to the IEA's "golden era of gas" scenario, it also allows for a question about the sustainability and the very existence of a common EU gas policy. Even if one accepts the IEA's new, optimistic global scenario, it does not mean that it would have identical implications all over the world. The European Union seems to face the risk of becoming just an onlooker, reaping some benefits from this process as a free-rider and not as an active participant, as evidenced by the debate on shale gas in which opportunities are being increasingly overshadowed by fears (real and imagined).

What is interesting is that shale gas might become a sort of mental game-changer, altering current energy "love-hate" relationships. On one hand, for supporters of renewables, natural gas emerges now not only as a supplementary source of base-load capacity but as a direct competitor in the power-generation sector, in particular if prices were to remain low. On the other hand, it happens that the most promising geological structures are located in countries that are heavily dependent on a single supplier and looking for new sources. For them, natural gas has ceased to be a necessary evil and has started to be treated as a durable solution to their security-of-supply concerns.

It is the main goal of this report to look at the shale-gas debate in Europe through political and institutional lenses, to track down the interests of member states and other agents and to compare an existing map of the most-promising shale gas areas with a map of interests revealed through the course of discussions with European institutions and member states. Numerous reports already have covered the origins of the U.S. shale-gas revolution, the possibilities for its replication in other parts of the world, including Europe, and the potential geopolitical implications of unconventional gas for the largest gas producers and consumers. In practice, all major challenges already have been identified: geological, technical, economic, regulatory, environmental and social. All but one, political circumstances, because relatively little attention has been devoted so far to its analysis. Since the central goal of this report is to focus on the political discourse in Europe, it will show how this aspect is going to have a profound impact on the future of shale-gas exploration and development. The debate already has spilled across the continent, reaching various groups and institutions. Political parties, advocacy groups and the business community are becoming increasingly involved in the debate, with camps of supporters and opponents already formed and the first battles fought. It seems clear that the scale of challenges in Europe mean that previous political decisions or expected changes would matter most for the business, which is interested chiefly in the stability and predictability of the rules, both at the European and national levels.

From Revolution to Evolution —Looking Into the North American Experience

Specific market, legal and political circumstances make the automatic transfer of the North American experience to Europe impractical, if not impossible. Thus, debating the shale revolution in the EU seems counterproductive. What matters more than another analysis of the origins of the Americans' success is observation of the ongoing debate about the potential for enhancing the regulatory framework caused by growing fears about shale-gas extraction's impact on the environment. It is interesting that the industry is going to face similar challenges, although in the U.S. (and, to a smaller degree, in Canada) it is happeninig ex post facto, after massively scaled production has gone online, while in the EU it will take place before any serious developments have started.

In the Wake of the U.S. Revolution

The surge in U.S. shale gas production resulted from a mix of advantageous factors: high prices for natural gas, federal fiscal incentives, a favourable regulatory system[1] and, perhaps crucial, the ability to slash operational costs and boost productivity thanks to advances in two techniques—horizontal drilling and hydraulic fracturing, often dubbed "fracking." Just how meaningful these occurrences were is evident when looking into the dynamics of shale gas production: In the period between 2000 and 2006, year-to-year increases in production stood at about 17%, while between 2006 and 2010 that figure rose to 48%.

If current U.S. Department of Energy estimates of the reserves and future production are correct, the long-term unconventional gas supply, i.e., in the 2030–2035 time horizon, could satisfy as much as 8% of the total U.S. energy demand. This level of production could offset an anticipated decline in yields from conventional natural gas deposits and allow for a decrease in the amount of imported gas.

At the same time, it needs to be stressed that accounts vary considerably as to exactly how much unconventional gas there is in the U.S. deposits. Subsequent reports about the amount of the resource are useful tools for any interest group intent on influencing public opinion about the direction of U.S. energy policy to shape the debate about the significance of unconventional gas in general.[2] Then again, the differences in estimates with respect to both the reserves and the future level of production can be justified in light of the remarkable innovative potential of the industry and its ability to exploit economies of scale. New drilling techniques lead to a rise in productivity and open new deposits for exploration with only modest increases in capital expenditure. Thus, ambitious forecasts about the volume of production from unconventional deposits can be interpreted as anticipating technological improvements in the industry.

The optimism surrounding the unconventional gas industry also is easily attributable to growing interest by leading U.S. and international oil and gas companies in making inroads into the sector, either via takeovers or by acquiring stakes in existing enterprises. In December 2009, ExxonMobil completed a takeover of XTO Energy, one of the pioneers of the industry, in a $40 billion deal. At that time, it was rightly tipped as heralding an outcrop of similar transactions, if

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[1] Hydraulic fracturing is almost entirely exempt from federal regulation of the natural gas industry. Vesting these competences in state authorities implies that the regulation can differ from one area of shale-gas production to another. Federal agencies such as the Environmental Protection Agency can exercise only limited oversight over hydraulic fracturing.

[2] In 2009, the U.S. DoE put the reserves estimate at 7.6 Tcm. Calculations prepared by U.S. consulting firms and expert panels associated with the gas industry, such as the widely-known Potential Gas Committee, are more ambitious. The PGC, registered as a non-profit association, publishes its estimates of the U.S. unconventional gas potential every two years. In June 2009, the PGC put a 17.5 Tcm tag on the U.S. shale-gas resources. According to the study by Navigant Consulting, the U.S. deposits could hold as much as 23.9 Tcm of shale gas, with a total amount of natural gas of roughly 65 Tcm.

less spectacular.[3] Indeed, Royal Dutch Shell picked up gas fields in north-eastern U.S. in May 2010 after the acquisition of East Resources; and, November 2010 saw Chevron taking over Atlas Energy. Arguably the most notable investment decisions of 2011 came from Australian giant BHP Billiton: First, it picked up production rights in Arkansas from Chesapeake Energy then, following the acquisition of Petrohawk Energy, got hold of deposits in Texas and Louisiana.[4] Oil and gas tycoons recognize the potential of the unconventional gas industry and are unlikely to be discouraged by stories about faulty operations or doubts about the environmental impact of fracking in horizontal wells.[5] It is worth noting these transactions were carried out during a prolonged drop in gas prices. The cumulative effect of the recession and the greater availability of LNG supplies after the opening of new terminals and doubling of LNG storage capacity meant that North American gas prices fell by roughly 50% in the first half of 2008. The current prices are widely regarded as guaranteeing only a modest, in fact minimal, return. An associated element is uncertainty concerning the future prices of gas, which are expected to rise only if the U.S. economy bounces back. Given these ramifications, market consolidation is being further accelerated by the terms of use of the drilling licenses. If a license requires continuous operations to remain valid, operators with limited financial liquidity are forced to sell them. Also, in order to stay afloat, some smaller players tend to drop production from deposits that offer smaller yields or are expected to run out. What follows is that even though prices are low, production does not have to significantly decrease and the market saturation will endure.[6]

The boom in production from shale deposits is accompanied by a debate about the potential negative impacts of fracking on the environment, as borne out by an increase in interest by federal authorities in introducing tighter regulations on the industry. In late 2009, the Environmental Protection Agency (EPA) was instructed by the U.S. Congress to pursue a comprehensive examination of possible links between fracking and the security of potable water resources.[7] The House of Representatives' Committee on Oversight and Government Reform began to pressure the industry to submit information on the chemical makeup of the additives used during fracking. These requests, though, were not backed by any legal instruments that would have obligated the addressees to respond.[8] Apart from these ad hoc measures, a draft bill was introduced that if adopted would have nullified the provision that in effect placed hydraulic fracturing outside the regulations of the Safe Water Act and would have forced the companies to disclose in detail the composition of the fracking fluids.[9] Interestingly enough, the draft bill was only a response to an attempt to actually strengthen industry-friendly regulations.[10] In July 2010, the chairman of the House Committee on Energy and Commerce broadened the list to include drilling operators as entities with access to quintessential details about the actual application of fracking, thus approaching the CEOs of leading U.S. oil and gas companies, such as Occidental

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[3] J. Reimbold, "Could Exxon-XTO deal be a precursor?", *Oil & Gas Financial Journal*, 1 January 2010, www.ogfj.com.

[4] J. Paton, S. Raja, "BHP to Buy Chesapeake Shale Gas Assets for $4.75 Billion", *Bloomberg*, 22 February 2011, www.bloomberg.com; M. Smith, R. Kebede, "BHP Billiton swoops on Petrohawk for $12.1 billion", *Reuters*, 15 July 2011, www.reuters.com.

[5] One of the most widely reported cases of groundwater contamination took place in Pennsylvania in 2008 and early 2009; see: Ch. Batman, "A Colossal Fracking Mess", *Vanity Fair*, 21 June 2010, www.vanityfair.com. At the same time, in 2010 alone, the value of purchases involving U.S. shale-gas companies reached nearly $40 billion; see: T. Bergin, "BHP shale buy show industry shrugs off green fears", *Reuters*, 15 July 2011, www.reuters.com.

[6] S. McNulty, "Low U.S. gas prices to reshape industry", *Financial Times*, 18 October 2010.

[7] The EPA presented a detailed methodology of the study in February 2011.

[8] See: "Memorandum of the Subcommittee on Energy and Environment on Examining the Potential Impact of Hydraulic Fracturing", US House of Representatives Committee on Energy and Commerce, 18 February 2010, www. house.gov.

[9] *Fracturing Responsibility and Awareness of Chemicals Act (FRAC Act)*, introduced on June 9, 2009.

[10] *American Energy Innovation Act*, introduced on May 7, 2009.

Petroleum, Chesapeake Energy, ExxonMobil, BP America and ConocoPhillips. Last, the U.S. Department of the Interior, which is the agency responsible for managing federal lands and their sustainable development, announced that it would approach the companies drilling on federal lands and ask them to disclose the chemical composition of the fracking fluids. These plans have been uniformly criticized by the Republican Party and various industry associations.[11]

Such occurrences testify to the seriousness of the attempts to tighten the regulatory framework that governs the unconventional gas sector and also to the extent of the influence enjoyed by the industry via their lobbying agents from such groups as Energy in Depth or American Petroleum Institute. In fact, the prospect of introducing more stringent regulations is considered to be a possible impediment to the further development of the U.S. shale-gas industry. The ExxonMobil–XTO deal features a provision that allows it to be cancelled if further regulation either renders fracking unprofitable or bans it altogether.

At this point, the adoption of new regulation is unlikely. It has little support in the U.S. Congress after the November 2010 takeover of the House of Representatives by the Republican Party and the Obama administration is interested in enhancing the role of natural gas in the U.S. energy mix. Thus, the debate about the pros and cons of shale-gas production is presumably going to be dominated by the EPA study. Its first phase is scheduled to last until the end of 2012, with the final report due in 2014. The EPA has been asked to look into the whole water-cycle associated with hydraulic fracturing in horizontal wells.[12] The methodology of the study foresees the analysis of both existing and prospective production sites. A focus on the water cycle is based on three considerations. First, fracking in horizontal wells already is subject to regulation on a state level and—according to the current level of technical expertise—does not require any additional regulation. The results of the EPA study are expected to verify this claim. Second, the risk of ground water contamination is highest during the treatment of flow-back water, which holds significant amounts of radioactive materials and heavy metals—a finding already borne out by local water quality tests. Finally, even though water treatment procedures are subject to EPA inspections, it may be necessary to improve flow-back water treatment methods.

The industry is highly supportive of the EPA's activities. The operators point out that the risk to water reservoirs can be significantly lowered as long as the existing state regulations are abided by. Thus, the industry expects that in the worst-case scenario the study will diagnose irregularities in the execution of specific requirements. Gas companies declared their readiness to cooperate and share information with the EPA, aware of the fact that basing the study only on sound technical and scientific data will make it a viable and useful source of expertise. Information sharing is crucial with respect to the technical data from existing wells since the industry is not legally required to submit it. In fact, the industry's voluntary participation in the study further diminishes the probability of introducing new regulations on the unconventional gas sector. Such a tightening of the screw might be interpreted as a hostile act by the industry and could lead to a withholding of technical data, without which the EPA study would be easily labelled as inaccurate and lacking the necessary credibility.

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[11] The criticism is threefold. First, it points to the costs associated with increased regulation and its negative effect on the level of employment in the natural-gas sector. Second, opponents of federal regulation argue that it would be inefficient given the variety of conditions—both geological and socio-economic—in which shale gas is being extracted. Thus, states should remain the sole regulators. Third, calls to reveal and disclose the composition of the fracking fluid are criticized because of their alleged ideological bias towards the oil and gas industry. In other words, even if the calls for increased regulation were heeded, the debate about the dangers inherent in fracking would continue. Such arguments were presented during a conference "The Promise and Perils of Hydraulic Fracturing: Best Answers to the Hardest Questions", organized by the Heritage Foundation on 30 November 2010, in Washington, DC. See the video recording at www.heritage.org/Events/2010/11/Hydraulic-Fracturing.

[12] Starting with the impact of withdrawing large quantities of water from the local water system, followed by the possible effects of contaminating notable water reservoirs with fracking fluids, especially during the actual fracking jobs, and ending with the assessment of risk of contaminating the groundwater with the side-product of fracking, i.e., the so-called flow-back water.

Still, in order to further lower the risk that the EPA study would feature recommendations to adopt federal legislation dealing with hydraulic fracturing, the industry is putting considerable effort into strengthening the so-called "best practices" of unconventional gas production, especially those that limit the arduousness of operations, and enhancing the exchange of information with local communities.[13] The industry hopes that this kind of "soft regulation" will allow it to avoid obstacles to further expansion on the state level.

Indeed, deliberations about introducing new regulations are taking place in virtually all areas of shale-gas production, with perhaps the most spectacular ones taking place in the states of New York and Pennsylvania. The course of these deliberations can hardly be considered representative of the U.S. as a whole, not least because as yet these areas represent a meagre share of total gas production in the U.S.[14] Still, both cases are worth examining since they originated from one of the most promising North American shale plays, which was expected by the U.S. Department of Energy to offer the largest long-term increase in the supply of gas. These forecasts are based on the dynamics of production increases in the period between 2007 and 2009.[15] Shale gas became an issue in these states almost in parallel with the onset of nationwide "shale fever", i.e., when tapping unconventional gas deposits was tipped as one of the pillars of the United States' long-term energy policy, and because its growing scale already had begun to attract public attention both in the U.S. and in neighbouring Canada.

In the case of New York, doubts were cast on the permission for exploration and production in the direct vicinity of key reservoirs that supply water to the city of New York. In 2009, New York state authorities gave a green light to fracking in these areas, but that decision was reversed in August 2010 following a fierce campaign by pro-environment groups and the fallout from the Deepwater Horizon accident. A special draft regulation was prepared that would ban fracking in the whole of New York state. If passed, this unprecedented regulation would have forced the entire natural gas industry out of the state. All in all, the idea of a comprehensive moratorium was replaced with a decision to suspend the issuance of new drilling permits until a new environmental impact statement on the effects of fracking had been prepared.

The statement was issued in July 2011. It is a clear indication of the severity of doubts about the safety of water reservoirs and the intensity of the debate about shale-gas extraction techniques. The statement recommends a ban on gas exploration and production on all state-owned lands, in wildlife refuges and in areas adjacent to key water reservoirs. Drilling would be permitted on private lands, leaving nearly 80% of the geologically auspicious areas open to the industry, yet only after making good on a number of conditions governing the water cycle.[16] The statement is non-binding in nature, but it is certain to frame the statewide deliberations about regulating the shale-gas industry. Whatever the outcome, actual production will not begin until

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[13] Efforts to manage the water resources in a more responsible manner are being undertaken by operators in Texas, regardless of similar attempts by state authorities.

[14] There is no large-scale production of shale gas in New York so far. Production in Pennsylvania amounted to a mere 2% of nationwide output.

[15] The Marcellus play is much larger than the two most-productive U.S. shale-gas plays at the moment, i.e., the Barnett and Fayetville plays. In the period between 2007 and 2009, production rose sixteen-fold in Pennsylvania and thirteen-fold in Western Virginia. In general, the shale-gas output from the northeastern U.S. rose four times in this period, but it still accounts for only 4% of nationwide production; see: T. Considine, R. Watson, N. Considine, *The Economic Opportunities of Shale Energy Development*, Manhattan Institute–Center for Energy Policy and the Environment, p. 3, www.manhattan-institute.org/cepe.

[16] K. Hall, "New York DEC Recommends Lifting Moratorium on Hydraulic Fracturing", *Oil & Gas Law Brief*, 9 July 2011, www.oilgaslawbrief.org. Other recommendations included collecting the flow-back water in sealed tanks as opposed to open tanks, which is the dominant procedure in the U.S.; introducing permits to pump large amounts of water for the purposes of fracking; applying additional safety measures to prevent the penetration of potable water reservoirs and water wells by gas from shallow deposits; introducing more stringent procedures for the treatment of flow-back water, akin to the treatment of water contaminated by the pharmaceutical industry; obligating the industry to make known to the general public the detailed composition of all substances used during fracking.

the new legislation comes online, and that won't happen before 2012, i.e., after the public consultations have been finalized. Even then, production will proceed only if the industry finds the new regulatory framework competitive.[17]

The tendency to limit the area open to the activity of the shale-gas industry is evident in Pennsylvania as well. A *de facto* moratorium on new drilling on state land was in place between October 2010 and February 2011. The moratorium was introduced with an official acknowledgment that the expansion of drilling for shale gas could pose a threat to Pennsylvania's forest industry, one of the pillars of the state's economy.[18] The operators were required to obtain an environmental impact assessment of their production processes as a condition for receiving a license. The chances that the assessment would be positive were scant for two reasons. First, the range of factors that could be taken into consideration when making the necessary decisions was exceptionally broad.[19] Second, already in August of 2010 the Pennsylvania Department of Conservation and Natural Resources (DCNR) issued an opinion that equated the issuance of additional drilling permits with a violation of the "ecological integrity and wild character" of the state forest system.[20] It was not until the DCNR was removed from the licensing equation in late February 2011 that the moratorium was effectively done away with.

Canada's Shale Gas Experience

Canada is the third-largest natural-gas producer in the world, with a yearly output of about 160 billion cubic metres (Bcm). Proven reserves are estimated at 1.7 trillion cubic metres (Tcm), but the amount of marketable natural gas is currently estimated at 12.4 Tcm. Rapidly depleting conventional deposits amount to one-third of total natural gas resources. Shale gas deposits alone are believed to hold anywhere from 11 Tcm to 30 Tcm. When coupled with other unconventional gas reservoirs, i.e., tight gas and coal-bed methane, the figure could rise to 100 Tcm.

The Canadian and U.S. natural gas industries are closely interlinked. Almost 90% of U.S. natural gas imports come from Canada, spot-market transactions and futures contracts alike follow the same wellhead prices (long-distance transportation costs and local distribution are still set at the national and local/state levels, respectively) and Canadian companies team up with U.S.-based operators.[21] Both the United States and Canada follow a decentralized model of natural resources management, with the bulk of regulatory prerogatives vested in the state/provincial authorities. Still, both countries' experiences with shale gas differ. The key distinction lies in the allocation of mineral rights. In the United States, mineral rights belong to the landowner, be it the authorities (federal and state) or private persons. As a rule, Canada's natural resources belong to the Crown, i.e., the provinces, regardless of the ownership of the

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17 D. Hakim, N. Confessore, "Cuomo Will Seek to Lift Ban on Hydraulic Fracturing", *New York Times*, 30 June 2011, www.nytimes.com.

18 The government of Pennsylvania estimated that the state's forest industry could be worth as much as $6 billion; see: "Governor Rendell Signs Moratorium Protecting Sensitive State Forest Land from Future Natural Gas Leases", Pennsylvania–Office of the Governor, 28 October 2010, www.dcnr.state.pa.us.

19 Pennsylvania's Department of Natural Resources was instructed to take into account the following criteria: the safety of endangered species; quality of scenic viewsheds; public recreation areas; high-value trees; air quality; intensity of the utilization of local roads, including road placement and construction of new routes; see: "PA governor rescinds ban on Marcellus Shale drilling in state forests", *World Oil*, 28 February 2011, www.worldoil.com.

20 See the website of the Pennsylvania Department of Conservation and Natural Resources for "Impacts of Leasing Additional State Forest Land", www.dcnr.state.pa.us/forestry/marcellus/ moratorium.html.

21 Canadian oil and gas companies often use the U.S. experience to promote unconventional-gas production; see the special publication prepared by Canada's natural gas industry: "Canadian Natural Gas. Full Potential: Unconventional Gas Development in Canada", www.canadiannaturalgas.ca.

land.[22] As a result, a company needs to negotiate separately the conditions under which it will access the land (with the landowner) and the financial and safety modalities of future production (with the provincial authorities and an independent regulatory agency, respectively). The separation of land ownership and mineral rights strengthens the provincial authorities, whose task is to balance the freedom of the industry to explore and produce the resource and expand distribution networks and processing potential with the right of the landowners to receive adequate and justified financial compensation (rent) for granting access to their property. Thus the Canadian model limits the risk of bringing the natural gas industry to a standstill.

Provincial authorities are independent in setting the royalties, which are a direct source of income for the province.[23] The modalities of the royalties system—such as rates or deductions as well as the general rules governing the execution of the drilling license or permit, including its duration and expiry conditions (one of the most widespread requirements is for uninterrupted production or activity)—can well decide the success or failure of the gas industry in general. Canada's western provinces—British Columbia (BC) and, to a lesser extent, Alberta[24] —are the unquestionable success stories of shale-gas development. For example, the BC royalties system has been equipped with an elaborate set of incentives and investment deductions, intended to promote exploration and drilling in regions with an underdeveloped infrastructure as well as encourage production from hard-to-access, and thus, less-profitable deposits. BC and Alberta's royalty regimes differ on a number of accounts, which is a natural consequence of the degree of differences in the development of the oil and gas sector in these provinces. Still, the regulatory framework was drafted and put into place in close cooperation with the industry, echoing the cognizance of the need to ensure the profitability of production.[25]

The importance of sound cooperation and information exchange between the industry and the provincial authorities is evident from the course of events in Quebec in eastern Canada. Quebec's shale gas deposits could hold as much as 10% of the nation's total reserves. Oil and natural gas together account for 50% of the province's energy supply, and Quebec is home to a

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22 This can vary depending on the province. In Alberta, for instance, the province owns 81% of the land and minerals. The rest, i.e., 19%, is freehold, meaning that the landowner (descendants of early settlers in this area and corporations that developed the infrastructure of the province at the early stages of settler activity) can have title to the minerals as well. However, this does not apply to natural-gas deposits, since at the time that the land titles were being awarded, gas was not considered to be a valuable resource. Hence, in the vast majority of cases the natural-gas rights stayed with the Crown.

23 Royalties and fees received from the companies during the licensing process for exploratory activities and production are both direct sources of income for the provinces. Any fees that benefit the landowners are calculated based on the so-called "alternative income", i.e., revenue from other possible enterprises on a given piece of land. If the landowner and the operator cannot reach an agreement, the case is submitted to a federally-mandated Surface Rights Board and arbitrated.

24 Western provinces supply approximately 75% of Canada's natural-gas output. Alberta still has relatively little experience with shale gas—only 300 wells have been drilled—but is the largest producer of coal-bed methane and conventional natural gas.

25 The oil and gas industry has been present in Alberta for more than 75 years. British Columbia (BC) has had significantly less experience in this context. In order to promote natural gas exploration, the BC government decided not to set a minimum royalty rate. Interestingly enough, Alberta's rich experience with regulating the oil and gas industry did not prevent it from committing serious mistakes when putting in place a new regulatory framework in 2007 and 2008 with declining gas prices on the North American market and growing interest in shale-gas exploration. The government of Alberta failed to communicate its plans with respect to the modalities of the new regulations with the leading oil and gas companies. When faced with exceedingly high royalty rates for production, the industry threatened to transfer the bulk of its activities to neighbouring British Columbia. The authorities backed off and re-drafted the regulations in question. In off-the-record conversations, the representatives of Alberta's regulatory agency acknowledged that the government neglected communication with the public as well when it failed to put in place a sound information campaign about the details of coal-bed methane exploration and production a few years earlier. Thus, Albertans reacted with scepticism to this new type of activity. This could suggest that the government of Alberta overestimated the level of support of the citizenry for the oil and gas industry as a result of the long-standing tradition of mineral resources production in the province.

considerable part of Canada's refining capacity. Still, the local communities reacted with scepticism to the prospect of shale-gas exploration and production. The province lacks the tradition of large-scale, industrial production of energy resources (the entire gas supply of more than 210 billion cubic feet, or Bcf, is imported from western provinces), it's electricity supply is dominated by hydropower (95%), and local public opinion could have been influenced by debates happening south of the border, i.e., in New York and Pennsylvania.

In May 2011, a combination of these factors led the provincial government to commission a report on the possible impacts of hydraulic fracturing on the environment. The group tasked with preparing the report included representatives of the authorities, the scientific community, members of civil society and the oil and gas companies present in Quebec. At the same time, the Ministry of Sustainable Development, Natural Environment and Parks tabled two draft regulations intended to increase the transparency of the activities of oil and gas companies until the report had been completed and a full-fledged regulatory framework had been put in place. In addition, the draft bills were supposed to help counter arguments of allegedly insufficient oversight of the industry and dissolve some of the public distrust towards domestic gas production.[26] The information that would be obtained thanks to the new regulations would serve as a technical basis for the report. Until the entry into force of the regulations, the operators would be expected to provide technical data voluntarily. Ultimately, however, the companies present in Quebec decided to boycott the preparation of the report, thus showing their discontent with three issues: first, the prospect of binding the industry with regulations that would raise operational costs; second, the threat of applying the regulations to drilling sites already functioning; and, third, the sluggishness of the provincial bureaucracy with respect to streamlining and simplifying administrative procedures in order to adjust them to the demands of shale gas production. Once the industry concluded that any further activity would be too risky given the uncertainty of the future course of regulatory reform, the situation evolved into a *de facto* moratorium.[27] The most active operators began to consider a complete withdrawal from Quebec. This, in turn, could negatively impact the quality and reliability of the environmental report, because the provincial government would be left with preliminary technical data from a dozen and a half exploratory drills. Large-scale, industrial extraction of the resource has not begun yet.

Attempts have been made to increase the transparency of the activities of the shale gas industry and to develop greater awareness of its actions amongst the public in neighbouring New Brunswick. It is clear that the draft regulations that are under consideration since June 2011 have been inspired by the experiences of other existing or potential areas of shale-gas production in North America. The proposed bill features an obligation to disclose the composition of the fracking fluid or to conduct tests that would eliminate the risk of ground-water contamination. The draft legislation foresees the creation of a security fund, with direct contributions from the operators. The fund would be activated in the event of water

[26] The first draft bill laid out the requirements of the information policy of the companies intending to apply for exploration or production licenses and/or permits. These companies would have had to disclose detailed information concerning the amount of chemical additives to be used in new projects as well as a score of other data describing the scale of the project. The second draft bill applied to existing production wells and facilities. It required the disclosure of detailed information concerning the management of water resources, reports of possible hazards to water reservoirs in the direct vicinity of the site in question as well as transparency with respect to the chemical composition of fracking fluids and other chemicals used in the industrial process.

[27] Another factor that impacts profitability in the oil and gas mining sector is the length of procedures necessary to obtain licenses and permits in comparison with other areas of shale-gas production. Quebec ranks far lower than Alberta and British Columbia (it lasts three times longer to obtain an exploration permit or an operations license) or even Texas and Pennsylvania.

contamination, whereas the burden of proof would lie with the industry and not with local communities or individuals.[28]

The provinces are thus free to calibrate their royalties systems or set the conditions for awarding drilling permits and licenses, which in effect hands them the reins of the province's energy policy. However, in matters of environmental protection, the provincial governments are often required to cooperate with federal agencies. One instance of shared competences is the procedure to issue an environmental assessment. The provinces are independent in setting the criteria for applying an environmental assessment to a given energy project. By and large, these standards focus on the type and scale of the project. In British Columbia, the environmental assessment can be conducted with respect to transmission pipelines, gas-storage facilities and gas-processing plants.[29] In measuring the scale of the project, the benchmarks could involve the processing and/or treatment capacity or the technical details of a pipeline.[30] In addition, if a project in question involves federal support, either via direct financing or because it is conducted on federal land, or if the federal authorities are the proponents of the project, a provincial environmental assessment needs to be supplemented with a federal examination of the project's environmental impact, unless such a procedure is deemed redundant.[31] A federal environmental assessment is conducted by the National Energy Board, which is authorized to regulate inter-provincial energy projects, i.e., projects involving at least two provinces (that include a gas-processing plant that feeds into the nationwide system of natural gas supply), or projects of an international scope, such as liquefaction terminals, export-oriented transmission pipelines (in effect, mainly for deliveries to the United States), including electrical grids.

Golden Era of (Shale) Gas?

Shale gas is no longer just a game-changer, that is to say an external influential variable. In the last couple of years it has become an integral part of the energy system and as equally vulnerable to market fluctuations as other components. Therefore, the prospects of shale-gas development outside North America will depend to a large extent on developments in international gas markets, such as the future relationship between demand and supply, price relations (LNG vs. pipelines or spot vs. long-term contracts) and movements, costs of production, shape of climate policies and specific local challenges. A strong feedback loop will be observed between global and local conditions.

According to the IEA WEO 2010, the shale-gas revolution in the U.S. and the possibility of its replication elsewhere might have a significant impact on gas markets in coming years. World proven gas reserves in 2008 accounted for 184 Tcm, half of which were located in Russia, Iran and Qatar. The geographical concentration is much higher than it is for oil. The IEA estimated recoverable conventional reserves to be 404 Tcm, with unconventional reserves of almost the same volume and more evenly distributed all over the world. Unconventional reserves compose about 12% of global production, and this share is expected to double by 2035.

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28 "Province announces stronger requirements for natural gas development", News Release–Department of Natural Resources, Environment, Energy, 23 June 2011, www2.gnb.ca.

29 An environmental assessment also may be conducted with respect to the projects that are only indirectly associated with energy projects and shale-gas production, e.g., deepwater wells, water-treatment facilities, or large-scale infrastructure projects.

30 Detailed criteria are set by the Environmental Assessment Act–Reviewable Projects Regulation of 2002 (with later changes), retrievable from www.bclaws.ca.

31 Canada's federal law lists a number of cases in which a project can be excluded from an environmental assessment. Exemptions are possible with respect to projects that are expected to have insignificant environmental effects. An environmental assessment is not necessary when a project is carried out in response to a national emergency, in the interest of public health or safety, or in order to avoid damage to property or the environment. Such exemptions would be rather unlikely in case of energy projects such as inter-provincial transmission pipelines.

In April 2011, the U.S. Energy Information Administration published an initial assessment of world shale-gas resources outside the United States. In total, technically recoverable reserves were estimated at 187 Tcm, with the largest potential expected in China (36 Tcm), the U.S. (24.5 Tcm), Argentina (22 Tcm), Mexico (19 Tcm), South Africa (14 Tcm), Australia (11.5 Tcm), Canada (11 Tcm), Libya (8 Tcm), Algeria (6.5 Tcm), Brazil (6.5 Tcm), and two promising European holders—Poland (5.3 Tcm) and France (5.1 Tcm). In general, European reserves look relatively modest. Other potentially shale-rich countries are Norway (2.3 Tcm), Sweden (1.2 Tcm), Denmark (0.65 Tcm), UK (0.56 Tcm), Netherlands (0.48 Tcm) and Germany (0.22 Tcm). Amongst non-EU countries, the EIA studied Ukraine (1.2 Tcm) and Turkey (0.42 Tcm). It is highly unlikely that Europe would become a world-class gas producer. However, its technically available and economically feasible reserves might significantly improve its position vis-a-vis current gas suppliers.[32]

Dynamic developments in gas markets led the IEA in June 2011 to prepare a special report on natural gas developments under so called "Golden Age of Gas Scenario", which included new assumptions leading to a more positive outlook for gas industry. Among them were an even bigger increase in demand for gas by China, less growth in the nuclear sector (because of a combination of the expiring operational life of many existing nuclear power plants and the direct consequences of the Fukushima accident) and more natural gas usage in road transport. Also important are the abundant volumes of gas, both conventional and unconventional, that will keep prices below the levels expected in the WEO 2010. The world is expected to consume in 2030 even more gas than anticipated last year with growth fuelled by non-OECD countries, in particular China, which is thought will reach the EU's current level of gas consumption by 2035. The IEA claims that global gas reserves and production capabilities will easily follow the increase in demand and that many regions are able to increase gas production. China will join the group of the largest producers. This new global gas landscape also will be shaped by developments in unconventional gas production, which will cover more than 40% of expected growth, with the most promising centres of extraction in North America, China and Australia. However, at the same time, the IEA expressed reservations that "the future production projections are subject to a large degree of uncertainty, particularly in regions where little or no such production has been undertaken to date"[33]. The IEA optimistically assumes, though, that the costs of production, in particular for unconventional gas, will drop as the North American experience spreads to other parts of the world and would-be shale- or tight-gas producers encourage investment in order to reduce their reliance on imports.

However, the IEA does not expect shale gas to become a game-changer for Europe by at least the end of this decade. According to the IEA, gas production in OECD member states in Europe will decline from about 310 Bcm in 2008 to 210 Bcm in 2035. Conventional gas will dominate the supply picture for the whole period, with unconventional exploration and production rising, in particular in Poland, but still with limited broader implications. Numerous challenges must be overcome to adjust shale-gas developments to European regulatory, legal, economic and social circumstances. Such a view is a result of the global perspective taken by the IEA. That is true if one treats the EU as a single energy entity. Yet, in terms of fossil fuel production and energy mix, member states have an upper hand. Thus, even if shale gas is not going to change the whole EU gas sector, it may become a game-changer both locally and regionally.

The international markets already are being affected by the North American shale-gas boom. A surge of production in the U.S. and Canada has led to surpluses of LNG, which had to be redirected from the North American market to Europe and Asia. This process was further strengthened when additional regasification capacity went online in the past few years. In the

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[32] U.S. Energy Information Administration, *World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States*, April 2011, www.eia.gov/analysis/studies/worldshalegas/pdf/fullreport.pdf.

[33] Are We Entering a Golden Age of Gas?, World Energy Outlook 2011. Special Report, June 2011, p. 30.

long run, the North American natural gas market could play a double role. First, if gas prices were to remain low, an "escape" of gas from North America to energy-thirsty East Asian consumers is in the cards. Following a drop in demand for the Canadian network gas, the Canadian energy companies decided to turn the first LNG terminal on the Canadian west coast from a regasification plant to a liquefaction facility. The plant is expected to be operational by 2015. A similar step, i.e, exports of domestically produced natural gas, would be less likely in the United States. Both the American political elites and the public opinion are opposed to exports of energy resources, and this protectionism of sorts will be hard to overcome at least until the U.S. economy becomes less dependent on foreign oil. Second, the United States could, however, become an important player in the global LNG market thanks to the capacity of American gas-storage facilities. In fact, the U.S. is tipped to become the "market of last resort" for LNG. U.S. terminals could serve as intermediaries in sales of gas to third countries, or—if the global price of the resource were competitive—offer it to local, i.e., American, buyers. Both scenarios are predicated on forecasts of steady growth in LNG demand in East Asia and, as a result, competitive market prices. China is still something of an enigma because of the uncertainty about the size its own shale gas deposits. In Japan, however, these predictions were, in fact, strengthened in the months following the incident in Fukushima. It was evident that once the nuclear power plants went offline, the sharp drop in energy generation could only be mitigated by emergency LNG imports. This, in turn, led to a price spike and fuelled a debate about the future level of gas prices.[34]

In the WEO 2010 report, the IEA suggested that though oversupply would reach its peak of 200 Bcm in 2011 but it would stay for the next three or four years. However, in the long run and given the expected rise in demand in Asia, the gas glut is going to disappear and prices will move upward (in 2010, demand grew by about 7.5%). According to the IEA, demand in Europe is expected to recover rather slowly, which will make the return to a pre-crisis utilization of pipelines (given that new projects are underway) a longer process. Hence, a certain window of opportunity opens up for European buyers to reinforce pressure on exporters for greater contractual flexibility. Also, a significant drop in spot prices on the European market put pressure on the largest gas exporters that are relying on long-term, oil-indexed, inflexible contracts. Several European companies (E.On, GdF) successfully renegotiated contracts with the largest pipeline gas providers, including Gazprom. Take-or-pay clauses were weakened and spot prices were included into the formula. These concessions were done on a temporary basis and depend now on the strength and prospects of the buyers' market

According to the IEA, in the short-to-mid term, pipeline transport will suffer most among other segments of the gas industry. The projects under construction will contribute to a capacity surplus. Long-distance multinational pipelines will lose their attractiveness because of the complexity of the investment process, political circumstances and high costs. Except for Nord Stream, which is being finalized, the future of large international pipeline projects, such as Nabucco or South Stream, does not look bright because of probable demand stagnation in Europe and LNG deliveries, let alone the prospects for shale-gas production. What brings difficulties for external suppliers creates new possibilities for potential, new EU producers. A transparent regulatory framework and facilitated access to upgraded and new networks are indispensable for shale-gas production to be developed. In particular, the role of local infrastructure and interconnectors between separated markets cannot be overestimated because at least in the beginning shale gas would be consumed close to production centres. Easy access to a transmission system and thus, to market will be crucial for the economic feasibility of any large-scale undertaking. Now, the EU is divided into separate national gas markets with regional cooperation emerging. The European Commission emphasizes the need to change this picture to eliminate existing physical and legal barriers for new entrants. It is clear that large, vertically

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[34] See K. Gibbs, D. Wochner, *Special Report: Liquefied natural gas and North American shale gas: Room for both?*, July 2010, www.hydrocarbonprocessing.com; M. Ridley, "*The Shale Gas Shock*", *The Global Warming Policy Foundation*, London 2011, www.thegwpf.org.

integrated gas companies based in Germany, France or Italy are not very enthusiastic about liberalization plans, especially ownership unbundling. Incumbent companies are by nature reluctant to open their markets to other players, especially to big ones. So, it should not be surprising they look nervously at shale-gas developments. Some of them seem to pretend that shale gas does not matter for Europe (E.On), while others cautiously try to enter this market (Total). But their position is not going to be decisive if a proper market environment for shale-gas development is established by the EU and member states.

Table 1. Natural Gas Demand in the EU by 2030, According to the IEA, PRIMES and Eurogas

Projected EU Gas Demand (Bcm)	2015	2020	2030
WEO 2009 (Reference)	535	567	622
WEO 2010 (New Policies)	540	558	591
WEO 2010 (Current Policies)	–	563	624
GAS Scenario	553	587	621
PRIMES 2009 (Baseline)	548	555	526
PRIMES 2009 (Reference)	523	493	472
EUROGAS (Base case)	563	583	605
EUROGAS (Environmental)	–	613	647

Sources: *World Energy Outlook 2010, EU Energy trends to 2030–Update 2009, Long Term Outlook for Gas Demand and Supply 2007–2030, Eurogas 2010. Are We Entering a Golden Age of Gas?,* IEA 2011.

To consider the future of shale gas in Europe it is worth looking into demand-side perspectives given by the IEA and the European Commission (the PRIMES model). Both institutions claim that EU gas demand will be growing along with import reliance on non-EU suppliers due to a decrease in indigenous production. However, the expected demand-and-imports growth rate is significantly lower now than was anticipated a few years ago before the economic crisis. Differences between various projections concerning gas demand in 2030 reach about 150 Bcm, which roughly equals the level of EU gas imports from Russia. Import reliance is also thought to rise more slowly than expected, although numerous factors will matter, including investments in gas-fired power plants, the price of allowances for CO2 emissions, the future of nuclear energy after Fukushima and, last but not least, the decisions of governments (some of whom are afraid of a rising dependence on gas imports, while others are indifferent).

However, turning a blind eye to ever-changing scenarios would be a mistake. Such reports are not only sophisticated extrapolations of visible trends but also messages of high political and market value. In theory, they are just supposed to draw a hypothetical picture of a future based on certain assumptions. In practice, they inevitably become a variable in themselves and one that might have a direct impact on developments. The very fact that the IEA considers this to be a "golden age of gas" matters for market players and governments that might reconsider their strategies in response to these expectations. For example, strong signal that the EU is determined to be even more ambitious in reaching climate policy goals would be a clear incentive for investors to concentrate on the green sector, where stability and public support can be anticipated. On the other hand, uncertainty about gas demand as seen in recent scenarios, might discourage some market players from making planned investments. As a matter of fact, however, the present volatility in the energy markets and uncertainty about the

EU's economic path make such projections very sensitive to any change in domestic and external conditions.

The Involvement of European Union Institutions

European Council

In February 2011, the European Council held a meeting devoted specifically to energy issues. In the seventh paragraph, the Conclusions of the Heads of State highlighted that a further strengthening of the security of energy supplies requires an assessment of Europe's potential for the sustainable extraction and use of conventional and unconventional (shale gas and shale oil) fossil fuel resources.[35] Because the European Council stressed the importance of unconventional gas deposits located in the EU, it meant to a large extent a success for Poland, which probably holds the largest reserves of all the member states. In accordance with Article 15 Paragraph 1 of the Treaty on the European Union (TEU), the European Council defines the EU's political directions and priorities.[36] Thus, the issue of unconventional gas, including shale gas, was officially incorporated into the EU's political debate.

Council of the European Union

Along with the position of the European Council of 4 February 2011 and two communications by the European Commission, i.e., *"Energy 2020—A strategy for competitive, sustainable and secure energy"* and "*Energy infrastructure priorities for 2020 and beyond",* the EU Council for Transport, Telecommunications and Energy adopted the relevant conclusions.[37] They defined short-, medium- and long-term (2020–2050) priorities for the European energy strategy. The EU Council stated that, "[i]n order to further enhance its security of supply, the EU's potential for sustainable extraction and use of conventional and unconventional (e.g., shale gas, shale oil) fossil-fuel resources should be assessed, in accordance with existing legislation on environment(al) protection". Thus, the EU Council linked the question of the potential production of unconventional gas to the two general objectives of EU energy policy: security of supply and sustainability.

The inclusion of unconventional gas to the EU agenda envisages an emerging debate about potential reserves and production and added it to the calendar run by the rotating presidency of the EU Council. The 18-month program of the Council prepared by the presidency trio of Poland, Denmark and Cyprus notes that "while the swift deployment of this infrastructure program will support the EU diversification drive, due importance will also be given to indigenous energy sources (conventional and unconventional) and notably to renewable sources of energy".[38] Since the presidency is supposed to play the role of neutral moderator within the EU Council the increasingly controversial issue of unconventional gas has not appeared in the calendar as a separate topic. Official documents reveal hardly anything about the perception of shale gas in the EU.

In the second half of 2011, the presidency of the EU Council was taken over by Poland, where shale gas climbed to the top of the internal political agenda. Nevertheless, unconventional resources were not mentioned explicitly in the program of the presidency,

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35 *European Council. Conclusions*, 4 February 2011, EUCO 2/1/11, p. 3.

36 *Treaty on the European Union, consolidated version,* OJ EU C83 v.53, 30.3. 2010.

37 *Draft Council conclusions on Energy 2020: a strategy for a competitive, sustainable and secure energy,* DOC 6207/1/11 REV 1, 18 February 2011.

38 *18 month programme of the Council (1 July 2011 -31 December 2012)*, 11447/11, Brussels 17 June 2011, p. 57.

which probably was a recognition of the necessity of remaining nonpartisan while tackling the current EU agenda. It appears, however, in the context of the presidency's priorities (e.g., during the conferences that opened the Polish presidency in the EU Council), though it was usually bound to the problem of security of supply.

European Commission

In November 2010, the Commission published the Energy Strategy for 2011–2020.[39] Its declared goals were as follows: fulfilment of climate policy objectives, completion of the single energy market, development of electricity and gas transmission networks, implementation of a strategic plan for the development of energy technologies (SET-plan) and the enhancement of external energy policy. The Commission also called for a new approach to member states' own resources, given their roles in ensuring the security of supply. It also drew attention to developments in technology that enable the exploitation of new resources in an economically and ecologically rational way, which is especially important in the case of what were once unavailable unconventional gas resources. The Commission warned of the illusion that the drop in gas prices due to a surplus in supplies would be permanent. It saw a risk that this impression might discourage investments in gas production and transportation projects. This concern applied not so much to EU countries as to external suppliers who are anxiously watching the changing conditions in Europe. In fact, however, the Commission did not pay much attention to the problem of domestic resources, focusing mainly on demand-driven policy. The idea of shrinking domestic supplies has been so embedded in European debate that it is really difficult now to overcome a certain mental inertia responsible for a complete negligence to the EU's own fossil resources. Shale gas triggered the placement of indigenous resources again on the energy landscape of the EU. A new variable was introduced almost overnight to EU energy policy-making. For this reason, the Commission initially took a very cautious position with the official argument of a lack of sufficient knowledge. Since the end of 2010, however, the Commission has been paying more attention to the role of unconventional resources in the EU energy mix.

In September 2010, the Commission indicated that, for instance, public funding of pilot projects for the exploration of shale gas were not appropriate because: (1) the industry itself had the capacity to develop proper technologies, (2) the deposits had not yet been identified in Europe, making it highly unlikely that production would occur in the near future, and (3) the current data were incomplete and the possibility of gas extraction from unconventional deposits had not been unequivocally confirmed (either technically or economically).[40] Nevertheless, in November 2010 in an interview given to Polish daily "Gazeta Wyborcza", EU Commissioner for Energy Günther Oettinger emphasized that the exploitation of shale gas is in the interest of the EU and represented an opportunity for Poland to reduce dependence on imports of this commodity.[41] In January 2011 and in response to a query from deputy to the European Parliament, the Commissioner stated that "the EC gathers proactively information and data in order to assess and map independently the shale-gas potential in Europe".[42] At the same time, in the face of growing controversy surrounding the first test wells (in Germany and the UK), on 18 January 2011 Commissioner Oettinger's spokesman confirmed that the European Commission

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39 *Energy 2020. A strategy for competitive, sustainable and secure energy,* Communication from the Commission to the European Parliament, the Council, the European Social and Economic Committee and the Committee of the Regions, COM(2010) 639 final, Brussels, 10 November 2010.

40 *Written question by Reinhard Bütikofer to the Commission*, 4 March 2010 r., *Answer given by Mr Oettinger on behalf of the Commission*, 03 June.2010, www.europarl.europa.eu; information obtained from inquiries to the representatives of EU institutions between 8 and 10 October 2010.

41 A. Kublik, "Komisarz UE Günther Oettinger: Gaz łupkowy szansą dla Polski," *Gazeta Wyborcza*, 30 November 2010, www.wyborcza.biz.

42 *Written question by Bogusław Sonik*, 20 December 2010 r., *Answer given by Mr Oettinger on behalf of the Commission*, 19 January 2011, www.europarl.europa.eu.

perceived shale gas as a chance for the European energy market.[43] Speaking in the European Parliament on 9 March 2011, Commissioner Oettinger retained the reticence typical of the European Commission and drew the deputies' attention to the challenges accompanying the development of unconventional gas resources. Nevertheless, he also noted that these resources may play an important, complementary role in the EU's energy balance. The statement was clearly formulated in a manner to exclude the assignment of the EC to either the camp of followers or opponents of the development of shale gas. However, it is evident that under the pressure of events the EC was obliged to express its position and, thus, the debate took on a broader dimension.

The European Commission also monitors the process for granting permits for the exploration and production of hydrocarbons, including shale gas. It verifies whether this process proceeds in accordance with EU legislation. On 3 December 2010, the EC lodged a *complaint against Poland* at the Court of Justice in connection with Poland's failure to comply with its obligations of Directive 94/22/EC on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons.[44] The EC also is preparing a legal assessment aimed at reviewing EU and national regulations on shale gas. Directive 94/22/EC and the relevant EU legislation on environmental protection and public health are to be evaluated. The regulations of select member states, namely France, Germany, Poland and Sweden, were chosen because of the number of the licenses obtained and, in the case of Sweden, because of its experience in shale-gas exploration.

The European Commission expressed the need to include both citizens and representatives of NGOs in the wider European debate about the extraction of shale gas. The EC also is involved, within the Fossil Fuels Forum in Berlin, in talks with the private and public sectors. At a meeting in October 2010, the forum participants raised the question of the importance of local deposits of fossil fuels and supported the idea to create a code of good practices concerning mining operations.[45] Discussions on these issues will continue at the next meeting, scheduled for October 2011. One of this year's sessions is devoted to the regulatory framework, sustainable practices and perspectives for unconventional gas.[46]

The commissioners for the Environment, Janez Potočnik, and for Climate Action, Connie Hedegaard, recently participated on behalf of the European Commission in an ongoing inter-institutional debate.[47] It is a result of the wider tendency to shift the accent on the shale gas debate from the energy security to the question of environmental footprint. Also contributing to

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43 "Protests spread over first European shale gas well", *Euractiv*, 18 January 2011, www.Euractiv.com.

44 *Action brought on 3 December 2010—European Commission v Republic of Poland*, (Case C-569/10), Official Journal of the European Union C 46/6, December 2011. According to the European Commission, the provisions of the Polish legislation on "Geological Work and Mining" do not give the whole proceedings leading to authorization for prospecting, exploration and production under a tender procedure, infringe the principle of equal access to activities. Finally, the EC charges that the appraisal of the submitted offers is not transparent.

45 *6th European Fossil Fuels Forum, 18-19 October 2010, Berlin. Consclusions of the Chair*, European Commission, DG for Energy, Brussels, 28 October 2010, www.ec.europa.eu.

46 Draft agenda of the 7th European Fossil Fuels Forum, Berlin 24-25 October 2011, www.ec.europa.eu.

47 See: *Question for written answer by Davida Casa*, 26 May 2011; *Answer given by Commissioner Potočnik,* 18 July 2011; *Question for written answer by Chis Davies,* 26 May 2011; *Answer given by Commissioner Hedegaard,* 22 June 2011; *Question for written answer by Bas Eickhout,* 3 May 2011; *Answer given by Commissioner Potočnik,* 9 June 2011; *Question for written answer by Oreste Rossi,* 4 May 2011, *Answer given by Commissioner Hedegaard,* 16 June 2011; *Question for written answer by Gilles Pargneaux,* 14 April 2011, *Answer given by Commissioner Potočnik,* 18 May 2011; *Question for written answer by Herbert Reul,* 13 January 2011, *Answer given by Commissioner Hedegaard,* 23 February 2011, *Written question of Bas Eiskhout to the European Commission*, 3 May 2011; *Answer given by Commissioner Potočnik*, 9 June 2011, www.europarl.europa.eu.

this evolution were recently published reports released by the Tyndall Centre For Climate Change Research and Cornell University.[48]

In a response issued on 9 June 2011 to a parliamentary question, the Commissioner for the Environment pointed out that shale gas operators must comply with requirements under the EU regulations on the registration, evaluation and authorization of chemicals (REACH) and the establishment of a European Chemicals Agency. This agency is reviewing registration dossiers submitted by the industry for a series of chemicals used in hydraulic fracturing. The purpose is to evaluate whether the submitted dossiers indicate cases when the registered substances were used in hydraulic fracturing.[49] Yet, answering to calls from some MEPs for suspending exploration undertakings in individual member states, the EC underlined that according to the treaties the establishment of the conditions to exploit energy sources remains at the national level.

If it turns out that there are vast, technically and economically available resources on the EU's territory, the EC will face a dilemma about whether it should support the development of a new energy source or whether referring to the subsidiarity rule it should leave those activities to the member states and focus on renewable resources and decarbonisation. Ignoring unconventional resources, however, would actually mean giving consent to the multi-annual financial transfers abroad for payments for imported gas instead of establishing proper conditions so those means could serve the development goals of the EU.

The European Parliament

Without a doubt, the European Parliament has showed by far the greatest interest in unconventional resources among the EU institutions. On 25 November 2010, the EP adopted a resolution on the European Commission's document: "Towards a new Energy Strategy for Europe 2011-2020".[50] Shale gas appeared in this text in the part devoted to financing energy policy and promoting energy research, development and innovation.[51] The EP called on the European Commission to:

- draft an analysis before the end of 2011 regarding the future of the world and European gas markets, including the influence of shale gas on the gas market in the U.S. and the interaction between the potential development of the shale-gas market in the EU and the security of supply and gas prices in the future;
- promote and support environment-friendly pilot projects about the usage of unconventional local energy sources;
- support member states in geological research aimed at assessing the amount of available reserves of shale gas in Europe;
- support and evaluate the profitability of the national production of shale-gas resources and how they affect the environment; and,
- include the findings in the future long-term EU strategy.

The debate in the European Parliament was mainly initiated by the deputies of the groups of the European People's Party and Greens. The discussion about potential profits arising from production of unconventional gas and the associated environmental risks is found in

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48 R. Wood, P. Gilbert, M. Sharmina, K. Anderson, independent consultant A. Footitt, *Shale gas: a provisional assessment of climate change and environmental impacts,* Tyndall Centre For climate Change Research, see: www.tyndall.ac.uk; R.W. Howarth, Renee Santoro, A. Ingraffea, *Methane and the greenhouse-gas footprint of natural gas from shale formations*, Cornell University, see: www.cce.cornell.edu.

49 *Written question of Bas Eickhout to the European Commission*, 3 May 2011; *Answer given by Commissioner Potočnik*, 9 June 2011.

50 506 MEPs supported the resolution, 52 MEPs were against, while 62 abstained.

51 See: *Resolution of 25 November 2010 of the European Parliament on Towards a new Energy Strategy for Europe 2011-2020 (*2010/2108 (INI), www.europarl.eu.

resolutions, parliamentary questions and written declarations. This form of activity, although of a non-binding character, may influence the shape and direction of the Commission's work as it is related to unconventional gas resources.

In this debate, the deputies to the European Parliament have suggested the EC:[52]

- to include in the new multiannual financial framework 2014–2020 revenues allocated for geological research aimed at assessing the potential resources from unconventional gas and the possibilities for production;
- to undertake an introductory analysis of the potential resources from unconventional gas in Europe;
- to support geological research in order to assess the potential of the existing sources and exploration perspectives in Europe;
- to analyze the potential influence of shale-gas production on the security of supply (increasing the diversification of the sources of supply); and,
- to analyze the influence of exploration technology on the environment.

In the ongoing debate about the potential exploitation of shale gas, the environmental dimension started to dominate other issues. Regulations pertaining to environmental law may have a more significant influence on the sector's development than those that refer to energy policy.[53] In February 2011 at a meeting of coordinators of the committee on the environment, public health and food safety (ENVI), a decision was taken that the study on the environmental impacts of shale-gas and shale-oil production would be drafted.[54] It is worth noting that the commission has a strong political impact on the EP's final view on legislative works regarding environmental issues.

Authors of the report "Impacts on shale-gas and shale-oil extraction on the environment and on human health",[55] published in June 2011, indicate that exploration and production of shale gas threatens to devastate the landscape and carries a risk of serious pollution of surface water. They also questioned the safety of the chemical substances that are essential for hydraulic fracturing. The potential contribution of shale-gas production to greenhouse gas emissions also was signalled in the report. It was underlined, however, that based on available data so far it is impossible to give a full evaluation on this problem. The authors of the study recommended the

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52 See: *Question for oral answer to the Commission by Bogdan Kazimierz Marcinkiewicz, Pilar del Castillo Vera, Andrzej Grzyb, Marian-Jean Marinescu, Paul Rübig, Alejjo Vidal-Quadras, Maria Da, Graca Carvalho, Herbert Reul,* 14 October 2010; *Written question by Reinhard Bütikofer to the Commission*, *op.cit.; Question for written answer by Konrad Szymański to the Commission*, 28 October 2010, www.europarl.europa.eu.

53 See: Question for written answer to the Commission by David Casa, 26 May 2011; Answer given by Commissioner Potočnik, 18 July 2011, www.europarl.europa.eu. EU environmental regulations of high importance for shale gas production: *Directive no* 85/337/EEC *on the assessment of the effects of certain public and private projects on the environment*, OJ EU, L 175, 5.7.1985, pp.40-48; D*irective no 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy*, OJ EU, L 327, 22.12.2000, pp. 1–73; *Directive 2006/118/EC of 12 December 2006 on the protection of groundwater against pollution and deterioration,* OJ EU, L 372, pp. 19-31; *Regulation (EC) no 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC,* OJ EU, L 396, 30.12.2006, p.1*;* Directive *no 79/409/EEC* of on the conservation of wild birds, OJ EU, L 103, 25.04.1979 pp. 1-18.; *Council Directive no 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora,* OJ EU, L 206, 22.07.1992, pp. 7-50.

54 *European Parliament. Committee on the Environmental, Public Health and Food Safety. Coordinators' meeting*, 17 February 2011, www.europarl.europa.eu.

55 S. Lechtenböhmer, M. Altmann, S. Capito, Z. Matra, W. Weindrorf, W. Zittel, , *Impacts on shale gas and shale oil extraction on the environment and on human health,* report commissioned by ENVI, June 2011, www.europarl.europa.eu.

adaptation of national and EU legislation to the specifics of hydraulic fracturing as well as the stronger involvement of local authorities in the decision-making process concerning shale-gas production projects. In addition, they also suggested conducting an analysis on the EU level of possible violations in the process of exploration and production. After the report had been published, the chairman of the ENVI committee, Jo Leinen (the Group of the Progressive Alliance of Socialists and Democrats), in his interview with "Guardian" pointed out that it was essential to adopt EU-wide regulations that would restrictively regulate the production of shale gas. Although Leinen has not revealed the proposed details for such a law, such a directive might enforce certain limits and impose a financial penalty on the production of shale gas depending on the scope of its impact on the environment.[56] Thus, the sustainability of exploration activities, especially hydraulic fracturing, became a matter of concern not only for the Greens but also others.

In light of the concerns raised in the EP and in some member states over shale-gas production on a commercial scale, the suggestion to institutionalize a dialogue on shale gas with representatives of NGOs and other private-sector entities has gained traction. Similarly, improving transparency about the chemical substances used in hydraulic fracturing or assessing the potential effects of unconventional gas production on the fulfilment of the EU's climate-policy goals (in particular, the reduction of greenhouse gas emission) are also widely discussed.[57]

The most radical proposal of those discussed in the European Parliament was expressed in a written declaration from 6 June 2011 and released by a group of MEPs consisting of representatives of major political groups (European People's Party, the Greens, the Progressive Alliance of Socialists and Democrats, the Alliance of Liberals and Democrats for Europe, and European Conservatives and Reformists) who called for a Europe-wide moratorium on shale-gas exploration and production.[58]

The scope of the possible intervention of EU institutions in the process of exploration and production of unconventional gas in individual member states is an important element in the inter-institutional debate. According to the provisions of the Treaty on the Functioning of the European Union (Art. 194 Section 2 l. c TFEU), however, the right to determine the conditions for exploiting energy resources, the choice of energy sources and the general structure of its energy supply belongs to the member states.[59] It means that all legal acts suspending exploration work should be adopted at the national level (e.g., by France).

However, it should be kept in mind that Art. 194 should be applied without prejudice to the treaty provisions that set EU environmental policy. In implementing this policy, the EU Council, acting only unanimously in accordance with special legislative procedure and after consulting the European Parliament, the Economic and Social Committee and the Committee of

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[56] F. Harvey, "Influential MEP calls for shale gas regulation", *Guardian*, 30 June 2011, www.guardian.co.uk.

[57] See: *Question for written answer by Bas Eickhout*, 3 May 2011; *Answer given by Commissioner Potočnik,* 9 June 2011, *op. cit.*; *Letter to Commissioners: Oettinger, Potočnik, Hedegaard by members of the European Parliament R. Bütikofer, M. Rivasi, J. Bové, B. Eickhout, S. Bélier*, Brussels, 14 April 2011, www.archive.greens-efa.eu.

[58] See written declaration pursuant to Rule 123 of the Rules of Procedure on shale-gas and oil exploration 0032/2011 from 6 June 2011, "written declaration of not more than 200 words on a matter falling within the competence of the European Union which does not cover issues that are the subject of an ongoing legislative process should be submitted by up to five MEPs. Where a declaration is signed by a majority of Parliament's component members, the president notifies Parliament accordingly and publish the names of the signatories in the minutes and the declaration as a text adopted." The written declaration ceases within the period of 6 October 2011 in case the required number of signatures have not been gathered.

[59] Treaty on the Functioning of the European Union, O.J. C 83 of 30.3.2010.

the Regions, may adopt measures significantly affecting a member states' choice of energy sources and the general structure of its energy supply (Art. 192 Section 2 l. c TFEU).

At the same time, the member states are entitled to introduce more-stringent measures to achieve the objectives of EU environmental policy. Those member states planning to introduce such measures should make them compatible with the treaties and notify the Commission (Art. 193 TFEU).

Shale Gas—Public Debate in Select EU member States

Given the complex combination of geological, regulatory, environmental and social challenges, it seems obvious that what will be equally vital for the development of the unconventional gas branch in Europe are political decisions, in particular on a national level where key powers are embedded. Therefore, it is important to follow public debates on unconventional-gas exploration and production. The countries were selected based on the following criteria:

First of all, it is important to look at debates in the largest economies of the EU that also are significant consumers of gas, which are Germany, France and the UK. They also are the most influential as far as shaping EU energy policy is concerned. Second, it would be interesting to look at current EU/EEA natural-gas producers and their attitudes about new developments. That is why the Netherlands and Denmark were chosen as well as non-EU member Norway, which is intimately connected with the EU through the European Economic Area. Last but not least, Poland's situation is analyzed because it is quite a specific one. Furthermore, our choice of countries overlaps with a list of the most-promising holders of unconventional gas reserves in the EU, according to the U.S. EIA report of April 2011. Of course, political debate is not limited to these countries since it has been spreading all over the EU in recent months. But, we believe that our choice can be a useful test sample.

Numerous factors seem to be decisive when taking certain positions in the debate on shale gas, including: the various energy landscapes of individual member states; miscellaneous energy mixes with no common denominator; different approaches to security of supply rooted in both objective (level of diversification, import dependence) and subjective (threat perception) variables; an incompatible, dysfunctional EU internal gas market still in its infancy; underdeveloped regional cooperation; and, a preference for bilateral policies in relations with third parties. These differences inevitably translate into different orders of priorities for each member state. Needless to say, unconventional gas serves the interests of some countries, while it contradicts the preferences of others. Moreover, it is not only policy makers that carefully watch the developments but also the energy industry, including both the gas and oil business and "green energy" interest groups.

Participants in the European debate typically focus on three issues: market (economic feasibility), ecology (environmental footprint) and security (lowering import dependence). Central European states obviously tend to concentrate on the security dimension, pointing out that unconventional gas might significantly decrease their vulnerability to potential gas supply disruptions from a dominating supplier. Poland is the most unequivocal in this matter because it is thought to be the most-promising area for shale-gas production.

For such countries as France and Germany, security of supply has a different meaning. It is not about diversification because they are well-diversified (although after Germany's nuclear reactors are phased out this problem might re-emerge there). Gas used to matter in the context of EU climate policy and emission-reduction goals, but shale gas now has ceased to be considered part of the solution for developing a low-carbon economy-and-energy system. One cannot ignore the political and economic interests related to links between some Western European states and Russia, or to be more precise, between some major European gas companies and Gazprom. Common infrastructure projects (pipelines and underground storage

facilities) are more important for them than the new "domestic" sources of supply in neighbouring Poland. Shale gas is like each and every market novelty and brings opportunities as well as risks, so states and companies must do their calculations and SWOT analyses. Yet, the industry's cautious attitude of a wait-and-see position is likely to change if shale-gas production proves to be profitable. The influence of monopolies or oligopolies should not be underestimated. By their very nature, existing companies are defensive and interested in preserving market domination. They typically control the infrastructure and make access to the market for new players very difficult. That is why further liberalization and the integration of the EU market under a transparent regulatory framework might be crucial for the unconventional gas business.

What is interesting is that shale gas is perceived for some as an obstacle, while for others it is a chance to move faster towards reaching climate-policy goals. On the one hand, countries such as Denmark and Sweden, which in the long-run plan to withdraw completely from the use of fossil fuels and turn to renewable sources, are not very determined to develop a new mining industry. The companies might try to utilize the potential thought to be there, but they agree not going to change the energy-policy orientation of either of those states. On the other hand, EU members that are heavily dependent on coal in power generation (Poland in particular) are looking now at the potential for shale gas to be a transition fuel, one that finally has no security trade-offs and only opportunities to move in a less costly way to a low-emission future. For a majority of environmentalists, shale gas has become the obvious enemy, even more vicious than coal, mainly because of its possible adverse impact on renewables.

Germany

In September 2010, Germany adopted an "Energy Concept for an Environmentally Sound, Reliable and Affordable Energy Supply till 2050", which focused mainly on support for the development of green energy and the extension of the use of nuclear power plants.[60] By 2050, the gross electricity consumption from renewable sources should increase to 80%, while nuclear energy should be considered a bridge technology between hydrocarbons and renewables.[61] Investing in "green energy" is supposed to decrease Germany's dependence on fossil fuels, including natural gas, which interesting was not adequately noted in the long-term concept. However, the German government underlined the significance of resource security and the further need to support German enterprises involved in international infrastructure projects.[62]

The Fukushima nuclear power plant breakdown after the tsunami in March 2011 led to the nearly overnight reorientation of German energy policy, as embodied by the government's decision of 30 May 2011 to withdraw from nuclear energy by 2022 ("Atom Ausstieg").[63] In the beginning of June 2011, the package of legislative proposals constituting a new legal framework for an atom-free energy policy was issued.[64] The energy deficit is supposed to be covered mainly by even more heavily promoted renewables. However, for energy security reasons, in addition to the gas- and coal-fired power plants currently under construction an additional capacity of 10 GW would be required.[65] Neither the energy concept for 2010 nor the new framework for an

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60 *Energiekonzept für eine umweltschonende, zuverlässige und bezahlbare Energieversorgung*, 28 September 2010; see: www.bmwi.de.

61 *Ibidem*, p. 6.

62 *Ibidem*, p. 31.

63 See: www.bundesregierung.de/Content/DE/Mitschrift/Pressekonferenzen/2011/05/2011-05-30-pk-bk-bm-energiekonzept.html.

64 For a list of the issued legislative projects and their descriptions, see: *Der Weg zur Energie der Zukunft- sicher, bezahlbar und umweltsfreundlich, Eckpunkte für ein energiepolitisches Konzept,* www.bmwi.de.

65 *Ibidem*.

atom-free energy policy has taken so far into account the potential influence of domestic unconventional-gas production.

A debate about the possible consequences of a resources deficit in the economy has developed in Germany, where the industry is heavily dependent on raw material imports.[66] In October 2010, the German government adopted a raw-materials strategy and the German Mineral Resources Agency was established. The tasks of this agency include providing advisory services to companies and support for the federal government in setting up and implementing programs concerning the exploration and extraction of raw materials in Germany as well as cooperation with resource-abundant countries. Within the assigned tasks, the agency in cooperation with the state geological authorities would analyze the potential for shale gas.[67] The strategy notes that if shale gas is extracted with environmentally friendly methods in use, it might increase the significance of domestic energy sources.[68] At the request of the Federal Ministry of Economics and Technology, the agency initiated Project "Niko", which aims to assess and evaluate the prospects for unconventional gas production by the in-depth investigation of geological formations. This project should be finalized by 2015 and overlaps with other initiatives undertaken by the industry and academic institutions.[69] These under development projects are GeoEN,[70] initiated by the Federal Ministry of Education and Research and being implemented within the Brandenburg pilot project "Spitzenforschung und Innovation in den neuen Ladern", and GASH (Gas Shale for Europe). The aim of the latter project is to assess the various formations of shale gas.[71] The project is being developed with no connection to any governmental initiatives, but it might be helpful to German policy-makers who need to gain up-to-date information.

On the one hand, the German government seems to recognize the potential benefits arising from unconventional-gas production, as evidenced by the tasks assigned to the agency. On the other hand, it tends to show restraint in the evaluation of the possible consequences of shale-gas production.[72] In the federal government's reply to a parliamentary inquiry from May 2010, it was indicated that there is still no confirmed data about the amount of unconventional resources on German territory.[73] Only in September 2010 was it pointed out that there are no plans to either order or carry out any research concerning the environmental impact of unconventional-gas extraction because priority had been given to the issues touched upon in the energy concept.

The likely impacts of hydraulic fracturing on the environment and human health began to dominate the ongoing discussions at both the regional and federal levels. Project "Niko" was launched in February 2011, with a clear environmental profile.[74] In May 2011, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety noted possible threats to the natural

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66 A. Kwiatkowska-Drożdz, *Deficyt surowców naturalnych – implikacje dla niemieckiej polityki,* 8 February 2011, Ośrodek Studiów Wschodnich, www.osw.waw.pl.

67 Agency tasks indicated in the *Rohstoffstrategie der Bundesregierung Sicherung einer nachhaltigen Rohstoffversorgung Deutschlands mit nicht-energetischen mineralischen Rohstoffen,* p. 20, see: www.bmwi.de.

68 *Ibidem*.

69 Bundesanstalt fü Geowissenschaften und Rohstoffe, *Niko: Erdöl und Erdgas aus Tonsteinen-Potenziale für Deutschland*, www.bgr.bund.de.

70 In GeoEn are involved: Helmholtz Centre PotsdamGFZ German Research Centre for Geosciences, Universität Potsdam (UP) and Brandenburg University of Technology Cottbus (BTU).

71 See: www.gas-shales.org.

72 See: Answer of the federal government as of 27 May 2010 to the parliamentarian question, Drucksache 17/1867, www.dip21.bundestag.de, Answer of the federal government as of 28 September 2010 to the parliamentarian question, Drucksache 17/3029, www.dipbt.bundestag.de.

73 *Ibidem*, Answer of the federal government as of September 28, 2011.

74 Bundesanstalt für Geowissenschaften und Rohstoffe, *Niko, op. cit.*

environment related to the shale-gas extraction process[75]. At the same time, because an exact evaluation of the environmental impact of this activity is not available, the ministry pointed the need to explain the question marks regarding groundwater safety and other concerns.[76]

In an interview given to *Westfälische Nachrichten*, Federal Minister for the Environment, Nature Conservation and Nuclear Safety Norbert Roettgen pointed that until the results of an environmental impact assessment of hydraulic fracturing are revealed, the method should not be applied.[77] In August 2011, the Federal Environment Agency (das Umweltbundesamt) released an assessment report on shale-gas extraction in Germany that pointed out the potential threats. It recommended strengthening environmental regulations by introducing an obligatory impact assessment for each drilling site and the entire gas production field, a disclosure of the exact content of the fluids used in the process and to forbid hydraulic fracturing in sensitive regions, for instance, close to sources of drinking, mineral and spring water.[78]

It is mainly the Die Grünen (Green) party that has been initiating the political debate about shale gas. In parliamentary questions, its representatives were mostly interested in the environmental footprint of unconventional-gas production. They also pointed to the lack of transparency in the allocation of permits and test drillings and called for an open-information policy.[79] On 13 April 2011, Die Grünen representatives introduced a motion in the Bundestag in which they called for holding up hydraulic fracturing until a full risk-assessment of the method (based on the U.S. experience) was released and threats to humans and the environment were excluded.[80]

In a similar motion, representatives of the Die Linke (Left) party requested in June 2011 more radical action from the federal government, i.e., a ban on hydraulic fracturing.[81] Both of these motions requested a strengthening of the current regulatory framework, including amendments to the Mining Law and a regulation requiring an assessment of the impact of mining projects on the environment. The motions were debated on 30 June 2011 in the Bundestag. The various approaches of the political parties to the problem of unconventional gas exploitation could be identified during this discussion.[82] The representatives of the governing coalition seemed to recognize in shale gas the chance to enhance the security of supply by

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75 Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit*, Grundwasserrisiken-Hydraulic Fracturing,* www.bmu.de.

76 *Ibidem*.

77 It is worth mentioning that Norbert Roettgen is at the same time the CDU chairman in the region North Rhine-Westphalia. His views were expressed in the interview with *Westfälische Nachrichten*: "Schwerer Schaden für das Land*", Westfälische Nachrichten*, 30 July 2011, www.westfaelische-nach richten.de.

78 Overview of the existing legislation inluded in the report, *Einschätzung der Schiefergasförderung in Deutschland- Entwurf ,* Umweltbundesamt, www.umweltbundesamt.de.

79 O. Krischer; *Hintergrundpapier zu Unkonventionellem Erdgas*, Berlin, 5 November 2010, www.gruene-bundestag.de.

80 Antrag der Abgeordneten O. Krischer, H.J. Fell, B. Höhn, .S KottingUhl, U. Kurth (Quedlinburg), N. Maisch, Dr. H. Ott, D. Steiner, C.Behm, B. Herlitzius, W. Hermann, U. Höfken, Dr. A. Hofreiter, I. Nestle, F. Ostendorff, M. Tressel, D. Wagner, Dr. V. Wilms, K. Gehring, K. Keul und der Fraktion BÜNDNIS 90/DIE GRÜNEN*, Transparenz und Kontrolle bei der Förderung von unkonventionellem Erdgas in Deutschland,* Drucksache 17/5573, 13 April 2011, www.dipbt.bundestag.de.

81 Antrag der Abgeordneten J.Voâ, dr. B. Höll, E. Bulling-Schröter, H. Behrens, M. W. Birkwald, S. Daďdelen, Dr. D. Dehm, H. Dittrich, A. Hunko, U. Jelpke, H. Koch, R. Lenkert, U. Lötzer, D. Menzner, R. Pitterle, I. Remmers, M. Schlecht, S. Stüber, Dr. A. Troost, K. Vogler, S. Wagenknecht und der Fraktion DIE LINKE, *Keine Erdgasförderung auf Kosten des Trinkwassers- Fracking bei der Erdgasförderung verbieten,* Drucksache 17/6097, www.dipbt.bundestag.de.

82 Deutscher Bundestag Stenografischer Bericht 117. Sitzung Berlin, 30 June 2011 r, see: www.dipbt.bundestag.de.

lowering the country's import dependence.[83] At the same time, being aware of the risks associated with shale-gas production, they seemed to support improving the transparency of the process and the application of high environmental standards (such as excluding hydraulic fracturing in areas with protected water sources).[84] According to a representative of the Sozialdemokratische Partei Deutschlands (SPD) party, it is essential first to examine the potential harm of the applied method and then establish a proper legal framework regulating the exploration and extraction of unconventional gas.[85]

In Germany, the issuance of permits for the exploration (in German, "Erlaubnis") or extraction of hydrocarbons ("Bewilligung") is within the purview of the regions. The proceedings are undertaken in front of competent regional authorities.[86] Drilling works, including test wells, require the approval of an operational plan by these bodies ("Betriebsplanzullasung").[87] Unconventional gas is being explored mainly on the territory of North Rhine-Westphalia, Lower Saxony, Baden-Wuttemberg and Thuringia. So far, concessions have been granted to some entities, including Exxon Mobil, BNK Petroleum Inc., 3Legs Resources Group, Realm Energy International, Wintershall Holding GmbH.

North Rhine-Westphalia attracts the particular interest of energy companies. As yet, 20 concessions for the exploration of hydrocarbons have been issued.[88] However, regional authorities remain cautious in their statements.[89] Concerns are expressed not only by the governing coalition of SPD and Die Grünen but also by local representatives of the Christlich Demokratische Union Deutschlands (CDU) party.[90] The escalation of social protests and fears of possible environmental side effects have made regional authorities suspend the issuance of concessions until the results of a commissioned report about the implications of unconventional-gas extraction are published.[91] Wide resistance to the test drillings led to proposals to amend the Mining Law of 1982[92] and the ordinance on environmental impact assessments of mining projects.[93]

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83 *Ibidem*, p.13563.

84 *Ibidem*, p.13566.

85 *Ibidem*, p. 13565.

86 See Bundesberggesetz (BBergG), www.gesetze-im-internet.de.

87 Conditions that need to be fulfilled expressed in Art. 55 of the Mining Law, Bundesberggesetz (BBergG), www.gesetze-im-internet.de.

88 Data reflects factual state as of 31 July 2011, www.bezreg-arnsberg.nrw.de.

89 *Potenzial für Erdgasförderung in NRW noch unklar / Minister Voigtsberger: "Bürger-, Umwelt- und Sicherheitsbelange stehen an erster Stelle!,* 4 November 2010, www.nrw.de, and other relevant information on the website of Arnsberg, www.bezreg-arnsberg.nrw.de.

90 Antrag der Fraktion der CDU *Unkonventionelle Erdgasvorkommen: Grundwasser schützen - Sorgen der Bürger ernst nehmen - Bergrecht ändern,* 25 January 2011, see: www.landtag.nrw.de.

91 Exxon Mobil stellt Wasserrechtsantrag, 28 March 2011, Pressemitteilungen der Bezirksregierung, www.bezreg-arnsberg.nrw.de, Das Warten auf Fracking- Gutachten, "Der Westen", 13 July 2011, www.derwesten.de, S. Lechtenböhmer, Wuppertal Institute for Climate, Environment and Energy, M. Altmann, Ludwig- Bölkow Systemtechnik GmbH, s. Capito, Ludwig- Bölkow- Systemtechnik GmbH, Z. Matra, Ludwig-Bölkow- Systemtechnik GmbH, Mr. W. Weindrorf, Ludwog- Bökow-Systemtechnik GmbH, W. Zittel, Ludwig-Bökow-Systemtechnik GmbH, Impacts of the shale-gas and shale-oil extraction on the environment and human health, study commissioned by the Committee for Environment, Public Health and Food Safety of the EP, June 2011, p. 15.

92 From the initiative of the president of Arnsberg district a task group was established which will cope with the process of drafting the proposals to amend the Mining Law, see: *Überarbeitung notwendig*, Pressemitteilungen der Bezirksregierung, 18 January 2011, www.bezreg-arnsberg.nrw.de.

93 Verordnungsantrag des Landes Nordrhein-Westfalen*, Entwurf einer Verordnung zur Änderung der Verordnung über die Umweltsverträglichkeitsprüfung bergbaulicher Vorhaben*, Drucksache 388/11, 29 June 2011, www.bundesrat.de.

In 2009, the authorities of Lower Saxony proved their interest in recognizing the potential of unconventional gas by initiating cooperation between Clausthal University and Rice University (Houston), covering unconventional-gas extraction-technology development and student and scholar exchange programs.[94] However, concerns about potential environmental external costs have been growing among the public. This issue also has been debated in the regional parliament. Similar concerns can be observed in Baden-Wuerttemberg.[95]

It cannot be ruled out that the view of German companies might be influenced by their cooperation with Gazprom, which especially after especially "Atomausstieg" may reach a new dynamics. However, it is worth underscoring that during intergovernmental German–Russian consultations in July 2011, Russia's offer to increase the gas supply did not create awe or huge enthusiasm amongst German policy-makers.[96] Yet, as noted by EU Commissioner Gunther Oettinger, it is almost certain that in light of the phase-out of its nuclear power plants gas would be adriver of Germany's growth.[97] In contrast to its German competitors, Exxon Mobil, which in 2009 spent €185 million on the exploration of unconventional gas,[98] represents a different view of the gas market in Germany. The company probably is counting on that gas from domestic sources may become competitive to LNG and Russian gas.

Fears about drinking-water contamination and other environmental side-effects of hydraulic fracturing have mobilized a growing number of opponents of unconventional-gas production who have gathered under the increasingly popular initiative "Gegen Gasbohren" (its motto in English is "Stop Fracking").[99] They are particularly active in those regions where the first drilling tests are expected.

Although, a major political discussion is taking place at the regional level, it seems to be turning dynamically into a nationwide debate. This may be influenced by the latest demands to amend the existing Mining Law, discussions about the availability of raw materials as well as a better-organized form of public protests against hydraulic fracturing in Germany. More often, unconventional gas also has been covered by media. Press releases focus, however, mainly on the environmental aspects of unconventional-gas exploration.

France

The widespread use of nuclear energy in power generation makes the French economy less reliant on natural gas in comparison to other Western European countries. The specific energy mix and successful diversification of sources of oil and gas supply made energy supply concerns a second-rank issue for French energy policy. This heavily contributes to the country's current approach to unconventional gas.

An interest in shale gas appeared in France at the expert level three years ago. Potentially gas rich areas were identified in the southeast of the country, and in March 2010, Minister for

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94 Speech given by then Lower Saxony Prime Minister, Christina Wulff, current President of Germany on 1 October 2009, at Rice University, www.bakerinstitute.org, *Der Gas- Scheich von Hannover,* 2 October 2009, "Focus", www.focus.de.

95 On the regional parliament level the representatives of SPD are active, see: Antrag der Abg. Rosa Grünstein u.a. SPD, *Unkonventionelle Gasförderung: Fracking im Land verhindern,* Drucksache 15/217, 7 July 2011, www.landtag-bw.de.

96 Increasing the proportion of Russian participation in gas imports to Germany as well as the presence of Russian companies on the German market were discussed during the intergovernmental German–Russian consultations that took place on 18–19 July in Hanover, see: J. Ćwiek- Karpowicz, "A New Stage in German–Russian Energy Cooperation?," *Bulletin PISM*, No 80 (297), 3 August 2011, www.pism.pl.

97 J. Chaffin, "Europe poised to rely on natural gas", *Financial Times*, 30 May 2011.

98 Interview with the Chairman of the Board of Exxon Geront Kalkoffen, "Exxon hofft auf Miliardenlöse und tausende Jobs", *Handelsblatt*, 24 January 2011, www.handelsblatt.com.

99 See: www.gegen-gasbohren.de.

Ecology, Energy, Sustainable Development and the Sea Jean-Louis Barloo granted three exploration licenses (two for Schuepbach Energy Company LLC and one for Total). They cover an area of more than 9,000 square kilometres in the departments of Drôme, Vaucluse, Gard, Hérault, Aveyron and Lozčre. In the absence of public consultation on possible shale-gas exploration and production in France or the dissemination of information about the granted concessions, the public debate on this issue started only in mid-December 2010. Its initiator is the small, centrist, pro-environment political party Citizenship, Action, Commitment to the XXI century (CAP21). While calling on 20 December 2010 for the implementation both in France and in Europe of the moratorium on shale gas production, Corinne Lepage, France's Minister of Environment in 1995–1997, President of CAP21 and Member of the European Parliament (Alliance of Liberals and Democrats for Europe), cited a lack of: (1) relevant regulation that shale-gas exploration and production would comply with the necessity to obey appropriate environmental, sanitary and social standards, (2) logic and rationality in the promotion of this kind of mining that affects adversely the development of renewable energy and (3) any public or political debate in France on the issue. According to Lepage, the moratorium should continue until assessments about the impact on the environment of the exploration and production technologies now in use have been prepared and relevant legislation that would guarantee access to information and protection of population and environment have been introduced.[100] CAP21 also launched a special website devoted to the problem of shale gas[101] and developed an online petition about the moratorium on shale-gas extraction, which by the end of March 2011 (31 March was the deadline to collect signatures) had been signed by more than 8,000 citizens.[102] The party also referred to the French Council of State regulation adopted by the government on 20 January this year amending the mining code to significantly simplify the procedures that concern the exploration and production of liquid hydrocarbons.[103]

Also, the Association Amis de la Terre and José Bové, Member of the European Parliament (Greens/European Free Alliance), joined the action. He calls for an automatic cancellation of the concessions granted in March last year[104] and, in addition, prepared the petition "Shale gas? No, thank you", under which he collected the signatures of nearly 107,500 Internet users (as of 1 August 2011).[105] These activities have contributed not only to an increase in public awareness of the shale-gas issue but also have strengthened cooperation between departmental authorities of those areas where concessions were granted.

On 26 January and in response to a query by a deputy to the French National Assembly, Pascal Terrasse, France's Minister of Ecology, Sustainable Development, Transport and Housing Nathalie Kosciusko-Morizet announced that the mining law did not permit the introduction of a moratorium on the exploitation of shale gas. At the same time, she ruled out the possibility of extraction in France "in such a way as it is the case in some countries, particularly in the U.S. [...] with the use of technology that is destructive and dangerous to the environment".[106] Given the growing public pressure, on 2 February Kosciusko-Morizet emphasized that the possible exploitation of shale gas would serve only to limit imports of gas and in no way would question commitments on renewable energy sources. The minister also added that together with Eric Besson, the minister for Industry, Energy and Digital Economy, they had decided to entrust the General Council for Industry, Energy and Technology and the

100 C. Lepage, *Pour un moratoire immédiat sur l'exploitation des gaz de schiste*, www.rue89.com.

101 *De l'eau dans le gaz*, www.deleaudanslegaz.com.

102 *Cyber action N° 389: pour un moratoire sur l'extraction de gaz de schiste*, www.cyberacteurs.org.

103 *Gaz et huiles de schiste.CAP21 attaque le nouveau code minier devant le Conseil D'Etat et demande la saisine du Parlement*, www.deleaudanslegaz.com.

104 "José Bové: L'Etat a decidé de l'ometra sur le gaz de schiste", *Le Monde*, 21 January 2011, www.lemonde.fr.

105 See: www.petitions24.net/gaz_de_schiste__non_merci.

106 *Questions au Gouvernement*, 26 January 2011, www.assemblee-nationale.fr.

General Council for Environment and Sustainable Development with the mission to assess the challenges posed by the exploitation of shale gas, especially for the environment.[107] The result of this mission was to be a draft and final reports to be published, respectively, by 15 April and 31 May. The ministers informed the relevant industries about the this undertaking during a meeting organized on 10 February. Schuepbach Energy Company LLC and Total decided then "not to perform any drilling and [...] any technical operation on the ground until the conclusions will have been drawn from the report [...]".[108] According to Minister Besson, however, these activities do not mean that France has "shut the door in front of shale gas".[109]

Since March 2011, parliamentary debate on the exploration and eventual production of shale gas has significantly stepped up. On 2 March, the National Assembly Commission on Sustainable Development and Land Development tasked deputies François-Michel Gonnot (Union for a Popular Movement, or UMP) and Philippe Martin (Socialist, Radicals, and the Citizen) to prepare by 8 June an informational report about the challenges of exploration and production of shale gas.[110] At nearly the same time, on 3 March, 80 MPs of various political parties signed a parliamentary motion against the exploitation of shale gas, demanding the cessation of any such work in France.[111]

In response to increasing political pressure, Prime Minister François Fillon wrote a letter dated 11 March and addressed to the Minister for Ecology, Minister for Home Affairs and Minister for the Economy that recommended the initiation of appropriate administrative procedures that would prevent the start of any drilling before the publication of the reports and the carrying out of appropriate information campaigns and public consultations.[112] Thus, any exploration work has been officially suspended until mid-June 2011. At the same time, the minister of ecology announced during the plenary session of the National Assembly on 23 March that until 20 April the government will present proposals for changes in the mining code that would introduce public consultation procedures to the authorization to seek unconventional sources of gas.[113]

At the end of March and the beginning of April 2011, the National Assembly received three proposals for laws on the regulation of the exploration and production of shale gas—one was prepared by Socialist Jean-Marc Ayrault, another by Christian Jacob from UMP and the third by Jean Louis Barloo, the deputy and former minister of ecology who in March 2010 granted the exploration licenses. All of these initiatives contained the idea of a ban on the exploration and production of shale gas in France. In early April, the government gave its support to Jacob's proposal and at the same time decided that the law would be passed under an

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107 *Questions au Gouvernement*, 2 February 2011, www.assemblee-nationale.fr. See *Note ŕ l'attention de Messieurs Pascal Faure, Vice-président Conseil général de l'industrie, de l'énergie et des technologies et de Christian Leyrit, Vice-président le Conseil général de l' environnement et du développement durable*, www.developpement-durable.gouv.fr.

108 *Nathalie Kosciusko-Morizet et Eric Besson on réuni les industriels détenteurs de premis de recherche d'exploration de gaz ou d'huiles de schiste*, Paris, 10 February 2011, www.developpement-durable.gouv.fr.

109 "Besson: La France n'a pas fermé la porte au gaz de schiste", *Libération*, 16 February 2011, www.liberation.fr.

110 *Commission du développement durable et de l'aménagement du territoire, Compre rendu no 30*, Mardi 1er Mars 2011, www.assemblee-nationale.fr.

111 *Motion parlamentaire contre l'exploitation du gaz de schiste*, 3 Mars 2011, www.pascalterrasse.com.

112 *Le Premier ministre ŕ Madame la ministre de l'Ecologie du Développement durable, des Transports et du Logement, Monsieur le ministre de l'Interieur, de l'Outre-Mer, des Collectivités territoriales et de l'Immigration, Madame la ministre de l'Economie, des Finances et de l'Industrie*, Paris 11 mars 2011, www.gouvernement.fr.

113 *Premičre séance du mercredi 23 mars 2011*, www.assemblee-nationale.fr.

expedited procedure, allowing only one reading in each chamber.[114] The proposal prepared by the UMP deputy provided primarily for a ban on exploration and production using hydraulic fracturing, and the cancellation of previously granted licenses. The Commission on Sustainable Development and Land Development was designated to take up the issue but decided, nevertheless, also to examine the proposals from the Socialists.[115] This proposal was a much more radical one and provided for introducing a complete ban on the exploration and production of both gas and oil shale on the territory of France and the cancellation of any concessions to search for deposits of liquid or gaseous hydrocarbons.[116]

A preliminary version of the report prepared by the General Council of Industry and Technology and the General Council of Environment and Sustainable Development was published on 21 April. This document pointed out the probable abundance of both shale gas and shale oil and stressed that it would be detrimental to both the national economy and the labour market to introduce a ban that would make impossible even the estimation of potential deposits. The authors suggested the need to conduct, at a national or European level, research on hydraulic fracturing techniques and their impacts on the environment. At the same time, the report indicated the need to closely monitor any undertakings in this area. Institutions competent in this matter could include a national research committee (to guarantee the quality and transparency of research) and local information committees. Until the completion of research, the report does not recommend carrying out hydraulic fracturing on the territory of France. It predicts that, based on two three-year studies there will be a basis for taking "rational decisions concerning feasible shale gas and shale oil production in France".[117]

The report was highly criticized by the opponents of shale gas as opening the possibility of future production in France. The industry assessed the report and found it to be balanced and emphasized the value of the recommendation to conduct potential exploitation under proper supervision and in an appropriate regulatory framework with all associated challenges and problems exposed and tackled.[118]

In early May 2011, the National Assembly Commission for Sustainable Development and Land Development developed a compromise version of the draft law on the exploration and production of shale gas in France. It was based on the principle of blocking hydraulic fracturing on French territory and the obligation by companies holding concessions to deliver within two months from the date the law was promulgated information concerning the exploration techniques used in the search for shale gas. Cancellation of the granted permits would take place if the industry either did not deliver the required documentation or it indicated hydraulic fracturing as a method to be used in exploration.[119] Despite initial political agreement on the text of the law, the Group of Socialists, Radicals and Citizens were against its adoption

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114 See *Commission du développement durable et de l'aménagement du territoire, Compre rendu no 43*, 13 Avril 2011, www.assemblee-nationale.fr.

115 *Proposition de loi de M. Christian Jacob et plusieurs de ses collčgues visant ŕ abroger les permis exclusifs de recherches d'hydrocarbures non conventionnels et ŕ interdire leur exploration et leur exploitation sur le territoire national, n° 3301, déposée le 31 mars 2011*, www.assemblee-nationale.fr.

116 *Proposition de loi visant ŕ interdire l'exploration et l'exploitation d'hydrocarbures non conventionnels et ŕ abroger les permis exclusifs de recherches de mines d'hydrocarbures liquides ou gazeux, et tendant ŕ assurer la transparence dans la délivrance des permis de recherches et des concessions, n° 3283, déposée le 30 mars 2011*, www.assemblee-nationale.fr.

117 *La synthčse du rapport provisoire du 21 avril 2011*, www.developpement durable.gouv.fr.

118 B. Héraud, *Gaz de schiste : le pré-rapport de la mission gouvernementale laisse la voie ouverte ŕ l'expérimentation*, 27 Avril 2011, www.novethic.fr.

119 *Rapport fait au nom de ka Commission du développement durable et de l'aménagement du territoire sur la proposition de loi visant ŕ interdire l'exploration et l'exploitation des mines d'hydrocarbures liquides ou gazeux par fracturation hydraulique et ŕ abroger les permis exclusifs de recherches comportant des projets ayant recours ŕ cette technique (no 3301)*, Enregistré ŕ la Présidence de l'Assemblée nationale le 4 May 2011, www.assemblee-nationale.fr.

during the voting on 10 May. In the end, the project was approved by the majority (mainly from the UMP and New Centre), 287-186.[120]

The split in the French political scene was finally proved by the text of the report by MPs Gonnot and Martin, which was published on 8 June 2011. This document contained two different conclusions.[121] The representative of the UMP advocated introducing only a temporary ban on the exploration and production of shale gas by hydraulic fracturing until a better understanding of the mining techniques is reached and the appropriate steps to protect the environment and public health are taken.[122] However, according to the representative of the Socialists, "France must give up the exploration of the hypothetical shale gas and shale oil deposits on its territory".[123] In reference to a declaration by President Nicolas Sarkozy that France will remain neutral towards the exploration and production of shale gas in Poland, Martin emphasized that "being neutral on [...] the shale gas issue means being in favour of climate *laissez-faire* at the global level".[124]

The debate in the Senate on the draft law approved on 11 May 2011 by the National Assembly testified to the discrepancy between the different political parties. The most controversial was an amendment proposed by the Senate Committee for Economy, Sustainable Development and Planning. It demanded that there be an exception to allow actions "in cases of projects for scientific purposes aimed at the evaluation of hydraulic fracturing techniques or alternative techniques".[125] However, this proposal was definitively rejected as a result of the fierce debate that took place in the Senate on the 1st and 9th of June 2011. The draft law was then transmitted to the mixed commission, consisting of representatives of the National Assembly and Senate and which has developed a compromise version of the document accepted by the two chambers. And last, the law was adopted on 21 June by the National Assembly and on 30 June by the Senate. Thus, France became the first country in the world to forbid the use of hydraulic fracturing on its territory. The adopted text of the law does not introduce the automatic cancellation of granted exploration licenses. However, the companies are obliged to make available within two months the relevant information about the exploration methods used. A lack of information or the indication of the use of hydraulic fracturing will result in the revocation of the shale-gas exploration permits. Moreover, the law provides for the establishment of a national committee whose aim will be to assess the risks that hydraulic fracturing or alternative techniques constitute for the environment. The committee will be compelled to provide public information about the conditions required to conduct experimentation, solely for the purposes of research. Moreover, the government was required to submit annually to the parliament a report on: (1) the development of exploration and production techniques and knowledge concerning French, European and global gas-and-liquid hydrocarbon deposits; (2) the conditions to conduct experiments under public control and for scientific purposes, and (3) the activities of the national committee.[126]

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120 *Analyse du scrutin No. 729*, 11 May 2011, www.assemblee-nationale.fr.

121 See *Rapport d'information déposé en application de l'article 145 de Réglement par la mission d'information sur les gaz et huile de schiste*, Enregistré ŕ la Présidence de l'Assemblée nationale le 8 juin 2011, www.assemblee-nationale.fr.

122 *Ibidem*, pp. 101–103.

123 *Ibidem*, p. 105.

124 *Ibidem*, p. 106.

125 *Proposition de loi adoptée par l'Assemblée Nationale aprčs engagement de la procédure accélérée visant ŕ* interdire *l'*exploration *et l'*exploitation *des* mines *d'*hydrocarbures liquides *ou* gazeux *par* fracturation hydraulique *et ŕ* abroger *les* permis exclusifs *de* recherches comportant *des* projets *ayant* recours *ŕ cette* technique. *Texte de la Commission de l'Economie du Devéloppement durable et de l'Aménagement du Territoire*, Enregistré ŕ la Présidence du Sénat, le 25 mai 2011, www.senat.fr.

126 *Loi n° 2011-835 du 13 juillet 2011 visant ŕ interdire l'exploration et l'exploitation des mines d'hydrocarbures liquides ou gazeux par fracturation hydraulique et ŕ abroger les permis exclusifs de recherches comportant des projets ayant recours ŕ cette technique,* JORF n°0162 du 14 juillet 2011, p. 12217.

The Socialists revealed their dissatisfaction with the adopted text of the law and that the final report prepared by the General Councils had not been made public and the proposals for changes in the mining code, announced in March, had not been presented by the government. As a result, the National Assembly deputies and socialist senators in early July 2011 submitted a proposal for legislation explicitly prohibiting the exploration and production of shale gas in France, regardless of the techniques used. These documents will be the subject of parliamentary debates this autumn.

The position of the companies that received concessions for shale-gas exploration in France evolved throughout the ongoing political debate. At first, high uncertainty about the potential for profitability contributed to investments that were extremely cautious and limited. However, in an internal document from January of this year, Total disclosed the existence of "potentially rich" deposits within the Montélimar concessions that could be from 10 to 20 times higher than the current annual gas consumption in France. This company also submitted an application in November 2010 for a new concession. During the meeting with representatives of the French government on 10 February this year, Total announced that the first drilling was planned for the beginning of 2012 and Schuepbach posted notice about the planned completion of two drill sites in October 2011. Companies also reported that they were interested in an extension of the concessions obtained in March 2010.[127] From April to July, when the issue of shale-gas exploration and production was debated and finally translated into law, the industry representatives generally did not participate in the discussions. However, commenting on the very nature of the debate, they stressed that it was premature and too emotional. The formal ban on the use of hydraulic fracturing in France was met with a dual response. On one hand, the industry hopes to calm the situation and is counts on initiating more substantive debate later in 2012 after the presidential and parliamentary elections in France, which are planned for April to June. On the other hand, some of the involved companies consider the possibility to take legal action to obtain compensation for losses incurred and for lost profit.[128]

United Kingdom

British energy policy is focused on achieving an energy-efficient and low-carbon economy. Natural gas is considered to be the most suitable transitional fuel to reach this goal and still meet emission reduction targets. With the declining domestic North Sea gas production past its 2000 peak, imports have grown and are likely to continue to do so. In 2010, domestic production met 61% of the total gas demand, while net imports totalled 38% (compared to 2% in 2000).[129] The UK government is seeking to enhance the security of gas supply through the development of import and storage capacity, facilitated access for companies to small and challenging offshore fields, expanding LNG infrastructure and maintaining close relations with the main suppliers (Norway and Qatar) as well as struggling for an EU-wide internal gas market.[130]

All existing estimates about British shale gas are based on analogy to comparable geological fields in the U.S. The first comprehensive British enquiry goes back to the mid-1980s and the work of a geologist, Professor Robert Selley (Imperial College London), who was inspired by similar research in the U.S. Selley concluded that the UK reserves could be significant but were not economically viable in the existing tax regime. The publication was

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127 *Nathalie Kosciusko-Morizet et Eric Besson on réuni les industriels…, op. cit.*

128 *Ibidem*.

129 Almost half of the gas imported in 2010 came from Norway and one third as LNG with Qatar as the main supplier (79% total LNG in 2010). The fuel was used in 36% of electricity generation compared to 29% in 2000; See: DECC, *Dukes*, May 2011, www.decc.gov.uk

130 DECC, *Annual Energy Statement*, 27 July 2010, www.decc.gov.uk.

presented to the Department of Energy in 1985 with no significant resonance. A 2005 update by Selley also did not attract attention.[131]

In Autumn 2010, David Cameron's government presented the report on shale gas's potential, commissioned the year before to the British Geological Survey (BGS) by the previous government. BGS stated that shale-gas resources could be "as large as 150 Bcm", but proper tests and drilling were required to confirm those numbers. In addition, it was underlined that a set of constraints such as geological peculiarities, high population density and land-ownership regulations could make the recoverable share much smaller.[132] According to April 2011, the U.S. Energy Information Agency reported that UK shale-gas reserves could amount to 566 Bcm.[133]

By August 2011, only two licences for shale-gas drilling had been granted by the Department of Energy and Climate Change (DECC). In comparison, 84 had been approved for coal-bed methane (CBM) projects. While multinationals such as BP or Shell have engaged in shale projects outside the UK, the licences in the country were obtained by small players: Cuadrilla Resources (Lancashire area) and EurEnergy Resources (Weald). The former obtained permissions in 2007 and was the first and so far the only company to proceed with shale-gas operations in the UK. Some CBM players have checked the potential for the fuel in their license acreage. One is IGas Group (a result of the acquisition of Nexen Exploration by IGas Energy in March 2011), which identified some shale gas in 2010. Another is Dart Energy (until June 2011, it operated as Composite Energy), which intends to test its CBM acreage near Falkirk, Scotland.[134]

Other firms with a recent interest are Eden Energy and Coastal Oil and Gas. The former published a report in May 2011 on shale gas potential in its seven licences in south Wales and Kent (southeast England). The estimated quantity had been 962 Bcm, of which 362 Bcm had been marked as recoverable. In April and May 2011, certain difficulties emerged with getting planning permission from local authorities for exploration by Coastal Oil and Gas as well as by Europa Oil and Gas (which mainly holds concessions for underground coal gasification).[135] During 2011, the 14th round of the Production and Exploration Development License (PEDL) is planned. A considerable interest in permits for shale-gas projects is expected.

The U.S. shale-gas revolution initially met with very limited resonance in the UK. Shale gas has been occasionally mentioned by a few MPs (in the House of Lords, mainly), and generally during broader discussions on energy issues. No official interest was expressed by the government apart from some random remarks on the U.S. shale-gas phenomenon and its consequences for world gas markets. It was the first shale-gas drilling operation close to Blackpool (northwest England) in August 2010 by Cuadrilla Resources that brought public attention to the issue. Local media in particular began to follow closely the progress of the domestic operations and discussion about the potential of shale gas.

In mid-2010, the first analyses of European shale gas were published in the UK. Katinka Barysch from the Centre for European Reform saw the U.S. shale revolution as beneficial to Europe's energy security, but doubted if similar success could be achieved on the continent. Peter Stevens, energy researcher at Chatham House, argued in a report from September 2010 that investment in an uncertain shale potential may contribute to underinvestment in conventional gas exploration. Overestimation of the size of reserves and productivity could

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131 See: R. Selley, "Shale Gas - blessing or curse?", *Geoscientist*, No. 21, 4 May 2011, www.geolsoc.org.uk; and Energy and Climate Change Committee, *Shale Gas. Fifth Report of Session 2010–12*, Vol. I, HC 795, 23 May 2011, Ev 74-75, www.parliament.uk.

132 DECC, *The Unconventional Hydrocarbon Resources of Britain's Onshore Basins - Shale Gas*, UK Promote 2011, 2010, www.og.decc.gov.uk.

133 *World Shale Gas Resources, op. cit.*

134 See: Energy and Climate Change Committee, *op.cit.*, Ev 76; Natural Gas for Europe, *Shale Stirs Debate in Scotland*, 29 May 2011, naturalgasforeurope.com.

135 See: Natural Gas for Europe, *Europa, Partners Suffers Setback for Weald Basin Drilling*, 26 May 2011, www.naturalgasforeurope.com.

then lead to an unstable gas supply in the future. In December, the Oxford Institute for Energy Studies published a paper considering the possibility of the replication of the U.S. scenario on European soil.[136]

Political debate was actually triggered in October 2010 when the House of Commons' Energy and Climate Change Committee (ECCC) announced the an inquiry on shale gas. The investigation lasted a few months and embraced written contributions and public hearings as well as visits of some of the Committee's members to the U.S. and to Cuadrilla sites near Blackpool. Some concerns about environmental risks quickly emerged. In January 2011, the first calls for a moratorium on exploration were reiterated, echoing the decisions in some U.S. states and France. In a report commissioned by the Co-operative (a major British multi-branch association), the Tyndall Centre for Climate Change Research (based at the University of Manchester) called for a moratorium on shale development in the UK. The report argued that exploration could cause environmental damage and negatively impact the UK's long-term climate policy targets.[137] The debate was heated up by Cuadrilla's plans to begin hydraulic fracturing in March. After two earthquakes registered on 27 May and 1 April near Cuadrilla's drilling sites, the company decided to suspend work until the source of the seismic activity could be confirmed.[138]

On 26 May 2011, the ECCC published its findings on shale gas in a report that included a detailed assessment of possible technological, regulatory and safety challenges and the impact on UK energy policy. The committee took note of the positive implications of the shale-gas boom in the U.S. for the British gas market, but doubted this could be replicated in the UK because of the rather small potential and significant constraints. It concluded that given the existing regulatory and safety framework there was no reason to ban shale-gas operations but that the continuous monitoring of developments (in Britain and abroad) was required. The ECCC claimed that new domestic production could only moderately contribute to security of supply, slightly reducing import dependence. The committee was concerned that shale gas might discourage companies from investing in expensive low-carbon energy if special governmental incentives were not provided. The report named Poland as a "shale barometer of Europe", whose progress in the development of an exploration and regulatory framework needed to be closely monitored by the UK government. The ECCC remained concerned about some adverse competitive results to the UK if Poland were to care more about energy security benefits (a lower dependence on gas imports) than for environmental protection when exploring shale gas.[139]

Until the ECCC investigation, the government was reluctant to publicly comment on shale gas, and referred mainly to the direct effects of U.S. production (higher LNG availability and a lower price for gas). Even after the publication of the BGS report on shale potential, officials had been consistently downplaying the domestic prospects on the ground, saying it was premature to assess the actual reserves since there was insufficient data. Nevertheless, a few comments by government representatives suggested an unofficial interest in the subject.

The official stance on shale gas was finally revealed during the ECCC research. But it was reported in March 2011 that the DECC had carried out secret consultations in Autumn 2010 on unconventional-gas prospects. Surprisingly, the department did not contact Cuadrilla about its

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136 See: K. Barysch, *Shale gas and EU energy security*, Centre for European Reform, 11 June 2010 www.centreforeuropeanreform.blogspot.com; P. Stevens, *The 'Shale Gas Revolution': Hype and Reality*, A Chatham House Report, September 2010, www.chathamhouse.org.uk; F. Geny, *Can Unconventional Gas Be a Game Changer in European Gas Markets?*, NG 46, Oxford Institute for Energy Studies, December 2010, www.oxfordenergy.org.

137 Tyndall Centre for Climate Change Research, *Shale gas: a provisional assessment of climate change and environmental impacts*, January 2011, www.tyndall.ac.uk.

138 "Drilling halted by earthquake", *The Gazette*, 2 April 2011, www.blackpoolgazette.co.uk.

139 Energy and Climate Change Committee, *op.cit., passim*.

projects and only some of the contributions have been disclosed to the public.[140] More important, the government has been constantly refusing moratorium demands on the grounds that an adequate regulatory framework was in place (and much better than in the U.S.). Since February 2011, the DECC has been periodically in contact with other key regulatory bodies (the Environmental Agency, Health and Safety Executive and the Scottish Environment Agency) to exchange relevant information.[141]

In its contribution to the ECCC inquiry the government's representatives claimed that economically viable shale-gas production might improve British energy security to some extent but on a far-smaller scale than in the U.S. and only for a short period. The main reasons indicated were stricter regulations, higher population density and land ownership laws. Furthermore, they claimed that it was unlikely there would be significant activity on British shale gas in the coming years. However, the potential abundance of unconventional gas could lead to underinvestment in the development of conventional gas or other energy sources. The adequate response to the potential long-term importance of gas should be prioritizing carbon capture and storage (CCS) development and implementation in gas-fired electricity plants.[142] On 14 June, Foreign Office Minister Lord Howell claimed that CCS would be a suitable means by which to keep natural gas as not only a bridge to a low-carbon economy but also a part of the future energy mix.[143]

No plans to facilitate shale development have been mentioned. Rather, easier access to less-attractive offshore conventional fields and accelerating the development of low-carbon technologies have been announced. For the latter aim, funds will come from the Green Investment Bank (still in the process of being established), and such instruments as a legally-binding carbon floor price. When asked by the ECCC about possible discussion about EU common environmental standards for shale development, DECC Minister Charles Hendry expressed concern that then the lowest common denominator would be sought. The best role for the EU, he added, should be that of sharing information and best practices so the member states could take an individual approach. The UK, thus, should aspire to be a model for shale exploration and the regulatory framework.[144]

On 27 July, the government's response to the ECCC shale gas report was published. The document addressed in detail the concerns regarding safety and environmental standards. The government reiterated its past declarations that a robust regulatory framework was in place in the UK. Still, it repeated the statement that while the potential for shale-gas exploration was uncertain, all operations would be under constant scrutiny. It claimed it might consider incentives for industry to invest in exploration and development of shale gas but only if the full potential of commercial production had been proven. The government underlined it was closely watching shale development in other countries, including the U.S. and Poland. Shale gas is seen as a part of a diverse energy supply in which gas plays a transitional role on the path to a low-carbon economy. In the response, more openness was shown to a discussion about an EU common exploratory standard for shale development.[145]

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140 *Ibidem*, Ev 66.

141 House of Commons, Written Questions, Col. 347W, 8 June 2011, www.parliament.uk

142 Energy and Climate Change Committee, *op.cit.*, Ev 57.

143 Lord Howell, *European Union's External Energy Policy*, 14 June 2011, www.fco.gov.uk.

144 See: Energy and Climate Change Committee, *op.cit.*, *passim*, See also: House of Commons, Written Answers, 20 January 2011, Vol. 521, Part 102, Energy and Climate Change, http://services.parliament.uk; House of Lords, Main Chamber Debate, Energy: Shale Gas, Volume No. 726, Part No. 132, 28 March 2011, www.services.parliament.uk.

145 *Shale Gas: Government Response to the Committee's Fifth Report of Session 2010-2012*, HC 1449, 26 July 2011, www.parliament.uk. One of the examples of the growing interest of the UK government in the Polish shale debate was a closed seminar organized in Warsaw by the Polish Institute of International Affairs and the British Embassy to Poland: *Shale Gas in Poland: Challenges and Opportunities*, 16 March 2011, www.pism.pl.

Although, in the first quarter of 2011 a visible indifference towards shale gas turned into active engagement, the official policy apparently has remained a "wait-and-see" approach. On one hand, this could be explained by the will of the government to avoid sending premature or unnecessary signals to investors in the energy sector. On the other hand, such a reserved position could mean it would like to leave the door open to exploit the potential of shale gas if it proves to be significant and commercially viable.

Labour, the main opposition party, stepped into the debate at the end of 2010 with its first questions to the government about shale gas. In January, Shadow Energy Minister Huw Irranca-Davies called for a moratorium on drilling,[146] and during the subsequent months he repeatedly expressed his concerns about the human and environmental impacts of shale exploration.[147] In June, a group of Labour MPs proposed an amendment to the Energy Bill (currently in the legislative process) obligating the head of the DECC to conduct a comprehensive impact review on the shale industry in the UK.[148]

After the ECCC report, active engagement also came from Caroline Lucas—the only Green Party MP in the current parliament. She has repeatedly demanded an immediate moratorium on shale gas and for it to be maintained until the environmental effects are fully understood along with prioritising the development of renewables and promoting energy efficiency.[149]

The progress in shale operations activated local party groups and MPs who represent the constituencies where the drilling had taken place or were planned. This was particularly true in Cuadrilla's case. In January 2011, the Blackpool Green Party demanded an immediate ban on drilling by the company. After the earthquakes in the spring, Gordon Marsden, the Labour MP for Blackpool South, called for a review of all the evidence on seismic activity in his district. Eric Ollerenshaw, the Conservative MP for Lancaster and Fleetwood, requested more detailed and transparent information as well as broader public consultations on shale development.[150]

The energy industry in the UK showed much interest in the shale gas debate from the very beginning and criticised the government for its apparent indifference. Cuadrilla engaged in the debate by addressing growing environmental concerns, disclosing the chemicals used in fracking and allowing the DECC, the ECCC and local authorities to visit the drilling sites. During the ECCC enquiry, representatives of Cuadrilla and IGas stressed that they were not expecting tax incentives from the government and were prepared to cover the costs of their operations.

In a memorandum to the ECCC, National Grid, which operates the country's electricity and gas transmission system, claimed that if shale gas could be developed economically in the UK then it would make a useful contribution to the country's energy mix and would provide diversity and security of gas supply. However, there are likely to emerge technical challenges, in particular those associated with the need to comply with requirements for gas quality and entry capacity. Similar views have been expressed by Scotia Gas Network, which stated that the coverage of transport infrastructure may favour a further expansion of the number of shale

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146 "The Labour Party calls for shale-gas drilling halt", BBC News, 26 January 2011, www.bbc.co.uk.

147 There appeared, however, opinions that shale production could benefit local communities. Irranca-Davies reportedly claimed that the job-creating potential could be significant, and shale-gas production could reduce the UK's dependency on gas imports: See. P. Wall (Western Mail), "Campaigners raise alarm over proposed gas drilling in Vale of Glamorgan", *Wales Online*, 28 February 2011, www.walesonline.co.uk.

148 Notices of Amendments given on Thursday 16 June 2011; Review of shale gas in the UK, www.publications.parliament.uk.

149 See: *Lucas: Moratorium on new shale gas exploration needed*, 24 May 2011, www.greenparty.org.uk.

150 A. Johnson, "UK joins 'gas rush' despite pollution fears", *The Independent*, 2 January 2011, www.independent.co.uk; N. Morris, "MPs call for inquiry into shale gas drilling after earthquakes", *The Independent*, 8 June 2011, www.independent.co.uk.

wells.[151] An example of strong opposition was the negative opinion of the Co-operative, which argued that the expansion of the shale gas industry, at best, was not in the spirit of UK climate change policy and, at worst, would hamper investment in low-carbon energy sources.

Major environmental NGOs such as Friends of the Earth, WWF and Greenpeace have been consistently questioning the reasons for shale-gas exploration. They had been pointing to the potential risks, such as water contamination caused by hydraulic fracturing as well as possibly higher emission levels of methane. However, they agreed with the important role of gas as a transitional fuel to a low-carbon economy.[152] The NGO's manifestations were complemented by the initiatives of the residents of the areas of possible shale operations. A significant one was the initiative "Vale says no!", which demanded a ban on shale development and successfully strived for the refusal of planning permission for Coastal Oil and Gas. The movement gained support from Conservative MP for Vale de Glamorgan, Alun Cairns.[153] Another example is the Campaign to Protect Rural England, which focused on the challenges from shale exploration to the ecology and character of the countryside in England.

A valuable source of knowledge about shale gas development in the UK (and worldwide) has been the blog *No Hot Air*. Its founder, Nick Grealy, is experienced at different posts in the gas industry and quickly became one of the most vocal campaigners for shale-gas development in the UK. He claimed that the government had been downplaying the shale-gas potential in order to not undermine energy policy foundations. In his view, the officials (backed by various energy consultants and the advice of such institutions as OFGEM – a national regulator of the electricity and gas markets) deliberately have been talking about the threat of shrinking domestic gas resources and an increasing dependence on imports, particularly from such uncertain suppliers as Russia. The reason they did that, in Grealy's opinion, was the need to justify the growing financial cost to consumers of reducing emissions (CCS development, predominantly). Grealy contributed to the ECCC inquiry and underlined that full decarbonisation technologies are either expensive or unproven. In March 2011, he inaugurated a multi-lingual (English, French, Polish) informative service (available at: shalegasinfo.eu) on shale gas as part of debate on the new fuel.[154]

The Netherlands

Netherlands is one of the major EU gas producers, consumers and exporters, suffering from continuous depletion of its reservoirs, including the giant Groningen field that initiated the Western European adventure with natural gas in the late 1950s. The current level of production is sustained thanks to the development of smaller offshore gas fields and ever-increasing exploration-related activities. The ambition is to maintain the present annual production from small fields of about 30 Bcm up to 2030.[155] A willingness to at least maintain its prominence as a gas hub and to ensure stable supplies for its domestic market for the long run turned Dutch attention to LNG (import facilities are planned) and Russian supplies (the participation of Gasunie in Nord Stream). Such a move inevitably would produce a growing import dependence and security concerns. Therefore, the Dutch government turned to unconventional gas soon after the news about the U.S. revolution together with information about potentially

151 Energy and Climate Change Committee, *op.cit.*, Ev 7 and Ev w11.

152 *Ibidem, passim*; See also Andrew Johnson, *op.cit.*

153 *Vale Says No*, www.thevalesaysno.co.uk

154 See: *No Hot Air*, www.nohotair.co.uk .

155 *Focus on Dutch Gas 2011*, EBN, www.ebn.nl.

promising structures in the Netherlands. In 2009, TNO and EBN[156] confirmed the unconventional-gas potential (shale and tight gas and coal-bed methane, or CBM). The Netherlands even claims that "unconventional resources must contribute to the hydrocarbon mix as soon as possible."[157] The most promising sources right now are shallow gas and tight gas reservoirs. The former were discovered offshore of the Netherlands in the early '70s, but only recently, in 2008 and 2009, did the first fields came online. Tight gas fields also were discovered many years ago, but only a few fields produce even a relatively small volume of gas. Hydraulic fracturing has been in use, so it is by no means a novelty for either business or local communities. Shale gas and CBM are more difficult to reach because of the depth of the reservoirs and technological challenges. That is why the transition from the ongoing exploration phase to the production of shale gas is expected in the 2020s. EBN is investigating the national potential of unconventional reservoirs by its own research and in cooperation with academic institutions. Moreover, it looked into the possible impact of these resources on the Dutch security of supply and natural environment. EBN emphasized the need to improve knowledge using expertise from North America, improve technology to reduce costs and the environmental footprint, and stimulate production through proper incentives (e.g., lower taxes) Because of its long tradition of gas exploration, however, the Netherlands possesses an excellent database, which is now helping in the ongoing and in-depth research about the Dutch deposits. It is characteristic of Dutch official stances that opportunities rank higher than risks.

In an advisory letter by Dutch Energy Council published in February 2010, it was recommended the government take the necessary steps to facilitate unconventional-gas development in the Netherlands. However, it should not detract from the development of LNG landing capacity, which is indispensable in order to benefit from anticipated market conditions and maintain and enhance the position of the Netherlands as a gas hub. The council pointed out the benefits stemming from unconventional-gas development: increased gas reserves, security of supply through geographical diversification, more contractual flexibility and new modes of commercial risk-spreading, and a facilitated transition to a sustainable energy supply. It also recommended the encouragement of the use of gas in Europe and the Netherlands as a part of a transition to a sustainable energy mix, and it even suggested a call for the European Commission to clarify its view on the role of gas in the EU's future energy mix. It seems that the Netherlands are playing the unconventional-gas card not only to reach its own potential but also to protect the role of gas in the European energy mix, e.g., to protect its markets.

The council devoted much attention to the public acceptance of onshore activities, which is not surprising given the high population density in the country. Therefore, it suggested establishing a proper system of benefits for landowners and local communities for making their land available to exploration and production. The council recognized the existing regulatory framework as satisfactory.

Several exploratory concessions have been granted to different companies, including Cuadrilla Resources and the Queensland Gas Company. In partnership with EBN, Cuadrilla is planning to drill the first well late in 2011. The company did public consultations to address the environmental concerns of local communities. The opposition is not as significant as in France but NIMBY syndrome is as present as elsewhere. In Brabant, a province in the southern Netherlands where Cuadrilla planned a test drilling this summer, a large majority of the local council took a sceptical approach. At first, the permit was granted without any public controversy, but the protests in France and Germany produced growing opposition. The company launched consultations with local representatives to convince them that the

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156 The government is interested in assessing the potential with the help of TNO Geological Survey of Netherlands and state-owned entity EBN, which participates in oil and gas exploration and production and related activities (transport and storage), provides the government with expertise, and is often instructed by the government to perform other tasks, such as the implementation of energy policy.

157 B. Scheffers, R. Godderij, H. de Haan, F. van Hulten, *Unconventional gas in the Netherlands*, February 2010, EBN, www.ebn.nl/files/2010_spe_nl_unconventional_gas_scheffers.pdf .

side-effects of hydraulic fracturing are negligible. Despite a rise in local opposition, the government openly expressed its support for exploiting the unconventional-gas potential. The spokesperson for the Ministry of Economic Affairs was quite blunt when commenting on the emerging difference between the local and central authorities, saying "[t]he national interest prevails. The licenses for gas exploration and production are at a national-level issue, although a municipality can delay but not stop [it]."[158]

Denmark

Denmark currently holds about 60 Bcm of conventional-gas reserves and produces annually 8.6 Bcm, almost half of which (4 Bcm) is exported to other EU countries. According to an EIA study, Denmark may possess shale-gas deposits of 650 Bcm. To fulfil its commitments as a supplier, Denmark is planning to develop fields in the North Sea.[159] The government foresees a gradual decrease in indigenous production. It aims at achieving the goal of a carbon-free energy market by 2050, which would lead to the elimination of fossil fuels from its energy mix. This policy was indicated in a report by the Danish Commission on Climate Policy in September 2010[160] and was repeated by Minister of Energy and Gas Lykke Friis in April 2011.[161] In this light, it seems rather unlikely that Denmark would draw significant attention to unconventional reserves.

With reference to shale gas, in August 2010 the GFZ German Research Centre for Geosciences together with the Geological Survey of Denmark and Greenland conducted shallow drilling in Alum shale at Bornholm in August 2010 as part of the GASH project. The concessions for the exploration of hydrocarbons were granted to Schuepbach Energy LLC in 2009 and to Total in June 2010.[162] Nonetheless, political debate about shale gas is almost absent and probably will not appear in the upcoming election campaigns. Thus, a question by Member of European Parliament Morten Messerschmidt to Minister Friis in July 2010 via the newspaper *Business.dk* on the lessons learned from Polish-American investments for the exploitation of shale gas in Denmark, should be considered to be incidental.[163] Moreover, the debate on shale gas appears only sporadically in mass media. It was partially covered by the professional press most often in the contexts of developments in the U.S. and Poland and the environmental challenges.

To sum up, it is unlikely that the Danish stance on its energy priorities will change in the near future. The government will focus on improving energy efficiency, reducing CO2 emissions, developing renewable energy sources and increasing the competitiveness of the internal market. In this context, apart from developing the North Sea, it is hard to expect that the government turns to new fossils fuels anytime soon. Massive scale drillings for shale gas seem doubtful in the present-day context of energy policy. So, there are few reasons for Denmark to introduce a moratorium on hydraulic fracturing. However, it is an open question what kind of policy Denmark would take at a European level in the ongoing discussions about the need for a special regulatory framework for shale-gas development.

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158 *Cuadrilla Drilling Sparks Controversy in Holland*, May 2010, www.naturalgaseurope.com.

159 *Environmental Impact Assessment From Additional Oil And Gas Activities in the North Sea*, Non-technical summary, August 2010, www.ens.dk.

160 Danish Commission of Climate Change Policy, www.klimakommissionen.dk. Opposite opinions, based on the economic feasibility, could be heard from the governmental expert J. Henningsen, "Vi kan roligt oege vores afhaengighed af naturgas", 21 November 2009, www.ing.dk.

161 L. Friis, *The Danish road to fossil fuel independence*, speech at Yale University, 9 April 2011, www.kemin.dk.

162 In both cases, the Danish state company Dansk Nordsřfonden has preserved the right of 20% of concessions granted. "List of concessions", DNSF, 20 June 2011, www.nordsoeen.dk; "Shale gas international deployment in Europe", www.total.com.

163 M. Messerschmidt, *Sats pĺ naturgas pĺ land*, 16 July 2010, www.business.dk.

Sweden

The share of gas in Sweden's energy mix is negligible (1.8%), and the government promotes a policy of moving away from hydrocarbons to renewable and nuclear energy sources. Nevertheless, as this goal is not attainable in the short-term perspective, Sweden seeks to enhance energy security through the diversification of supply routes. In May 2011, the Swedish energy company Aga inaugurated the first small LNG terminal in the Baltic Sea in Nynähamn.[164]

The shale-gas exploration market is liberalized and open. Additional incentives for investors come in the form of preferential tax conditions and publicly available information on shale formations.[165] Between 2008 and 2011, Royal Dutch Shell conducted shale-gas exploration in Skíne, in the south of Sweden. The company resigned from the areas because of the unsatisfactory results of three drillings.

However, the interest in shale gas exploration has not decreased. National licensing authority Bergsstaten granted exploration licenses to Gripen Gas AS (September 2010) and Energigas (January 2011) in the central region, Östergötland, and on the northern part of the island of Gotland (May 2011).[166] Although shale gas has not been explicitly mentioned in any of the governmental documents on energy, it has become an issue of heated political debate. After the parliamentary elections of September 2010, the "red-green" opposition (Social Democratic Party, Green Party and the Left Party) moved the debate on the negative consequences of the extraction of shale gas from the regional to the national level.[167]

The opposition has been calling since the elections for introducing amendments into the Minerals Act in order to strengthen environmental protection[168] and the granting to Municipal Authorities and/or landowners the right to veto the extraction of fossil-energy sources.[169] Moreover, it insisted that the government should not approve large-scale projects of extraction in Sweden[170]

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164 "Sweden's first LNG terminal is now opened", aga.se, 6 June 2011, www.aga.se.

165 Extensive geological data were gathered in the 20th century. The database "Exploration Reports", in which it is possible to search for and download some 6,000 documents, most of them produced for mineral exploration purposes, is available at Swedish Geological Survey upon request, see www.sgu.se.

166 "Map of exploration permits and exploitation concessions in Sweden", Swedish Geological Survey, www.vvv.sgu.se. In March 2009, however, the government rejected an application for test drilling for oil west of Gotland.

167 During the election campaign in April 2010, the opposition promised to put a halt to Shell activities in case of victory. However, the elections resulted in the formation of a minority government of the Alliance of the Moderate Party, the Liberal Party, the Centre Party and the Christian Democrats.

168 The group of the Green Party Members put forward a motion on 27 October 2011 on appointing a commission on the modernization of the Minerals Act in order to strengthen environmental considerations. G. Fridolin, Ĺ. Romson, J. Lindholm, L. Nordin, "Modernisering av minerallagen och förbud mot utvinning av kol, fossilgas och olja", Motion 2010/11:N439, Sveriges Riksdag, www.riksdagen.se, 27 October 2011

169 Currently the most interested are the Municipalities in Österlen : Tomelilla and Sjöbo. See: H. Larsson, (Social Democratic Party), "Kommunal vetorätt mot utvinning av fossil energi", Motion til riksdagen 2010/11:N414, Sveriges Riksdag, 27 October 2010, www.riksdagen.se, and G. Fridolin, (Green Party), "Stopp för utvinning av fossila bränslen", Interpellation 2010/11:93 till miljöminister Andreas Carlgren, Sveriges Riksdag, www.riksdagen.se.

170 The group of the Left Party Members put a motion on 20 October 2010 that the government should not approve a large-scale extraction of fossil fuels in Sweden, including by Shell. J. Holm, K. Persson, J. Sjöstedt, S. Holma, T. Björlund, H. Linde, "Fossilutvinning i Sverige", Motion till riksdagen 2010/11:N279, Förslag till riksdagsbeslut, Sveriges Riksdag, www.riksdagen.se.

and even should ban exploration and extraction of fossil fuels.[171] Of these suggestions, only the first one was partially accepted and only in a modified form—the Cabinet Office is currently preparing a revision of certain provisions of the Minerals Act. The revision will increase land owner and municipalities' access to information on study permits, but they would not have veto power. The review does not include the prohibition of the extraction of fossil fuels in any form,[172] and the chances of putting a moratorium on exploration and/or production activities is very remote. The government suggests that moving away from a fossil fuels economy will be achieved by market mechanisms, such as a carbon tax.[173]

Before the elections, the debate on shale gas went on mainly at a local level in the Skíne region, where authorities tried to make invalid the administrative decision to grant concessions to Shell. At the same time, the campaign against shale-gas activities was carried by the local press, green business organizations and environmental NGOs (Heaven or sHell, LRF Skíne, WWF and Greenpeace).

On the EU level, Sweden will preserve its favourable position towards renewable sources of energy. With respect to shale gas, however, it may wish to remain neutral. Open support could raise public opposition, while rejection would hit undertakings currently held in Sweden. Thus, the "wait-and-see" position remains the safest one for the government. This stance was represented by Prime Minister Frederick Reinfeldt in his comment on the passage devoted to shale gas which was added to the conclusions of EU Council on Energy in February 2011.[174]

Norway

From the EU perspective, Norway could actually be treated as an internal producer because of its EEA membership. Almost all the gas produced is being sold to the EU. On the one hand, the priorities of Norway's energy policy focus on the most efficient exploitation of the existing conventional fields, and the development of production in the Arctic region. On the other hand, the country is very much interested in increasing energy efficiency and investing in renewable energy sources. The change in the post of the Minister of Petroleum and Energy in March 2011 brought no changes to these objectives, which were additionally emphasized in the Notification of the Department of Petroleum and Energy to the Parliament as of 24 June 2011.[175]

With reference to shale gas resources, in an interview from November 2010, a representative of the Norwegian Petroleum Department stated that there were shale-gas resources on the Norwegian continental shelf but their production was considered to be not economically viable.[176] The other representatives of the government highlighted the challenges that could accompany European exploration and production. In September 2009, a Norwegian State Secretary for The Ministry of Defence indicated that shale gas production may adversely

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171 On 27 October 2010, 25 November 2010 and 27 May 2011 by the Green Party Members. G. Fridolin, (et. al.), "Modernisering....", *op.cit.*, and G. Fridolin, "Stopp för utvinning..." *op.cit.*, and G. Fridolin, "Oljeutvinning pĺ Gotland", Skriftlig frĺga till närings- och energiminister Maud Olofsson 2010/11:562, 27 May 2011

172 M. Olofsson, "Oljeutvinning pĺ Gotland", Svar av Närings- och energiminister pĺ skriftlig frĺga 2010/11:562, Sveriges Riksdag, www.riksdagen.se, 14 June 2010.

173 M. Olofsson, Kammarens protokoll, Riksdagens protokoll 2010/11:51, "8 § Svar pĺ interpellation 2010/11:93 om stopp för utvinning av fossila bränslen", Par. 4, Sveriges Riksdag, 1 February 2011, www.riksdagen.se.

174 F. Reinfeldt, Kammarens protokoll, Riksdagens protokoll 2010/11:55, "1 § Information frĺn regeringen om Europeiska rĺdets möte den 4 februari", Pars. 49 and 51, Sveriges Riksdag, 8 February 2011, www.riksdagen.se.

175 En nćring for framtida – om petroleumsvirksomheten, Tilrĺding fra Olje- og energidepartementet av 24. juni 2011, godkjent i statsrĺd samme dag, Melding til Stortinget 28 (2010–2011), Table 3.1 "Ukonvensjonell gass", 24 June 2011, www.regjeringen.no.

176 P.L. Tonstad, "Norsk skifergass blir liggende i bakken", 3 November 2010, www.tu.no.

affect profitability in the Arctic region.[177] In April 2011, in response to a query from a Conservative Party member, the Minister of Finance highlighted "very significant uncertainties" for the development of shale gas in Europe that stem from political and economic challenges.[178]

The documents and information from the government on shale gas refer to the IEA information. While mentioning the international implications of production in the U.S., they underline the obstacles to European production, the preliminary stage of exploration, and a lack of certain data.[179] A recent report by the Ministry of Petroleum of Oil and Energy, "Norway as a gas supplier to Europe", states that although significant shale-gas reserves in Europe have been detected, it is still too early to say when, if at all, these reserves can be exploited. In all cases this is not expected to happen until 2020.[180]

Statoil, the Norwegian state-controlled major energy player, has the technology and financial resources needed for shale-gas exploration. Nevertheless, shale-gas activities are primarily conducted outside Europe. Statoil is exploiting fields in the U.S. (Marcellus Field and Eagle Ford in Texas) as a partner of the Chesapeake Energy Corporation. In June 2011, Statoil announced plans to increase the exploration and production of shale gas in the U.S. Its aspirations have not been reduced despite the legal steps undertaken by the Attorney General of Maryland in May 2011 with the intention to bring a case of poisoning the environment against Chesapeake Energy Corporation and its affiliates.[181]

Yet, Statoil's plans to enter the markets of China, South Africa, India and Australia have come to a halt. In China, negotiations on the exploration and production of shale gas with state-owned Chinese CNPC have been postponed. In South Africa, the government announced a moratorium on hydraulic fracturing. Also, initial plans to identify shale-gas deposits with Chesapeake outside the U.S. have not yet developed.

Potential shale-gas production in the EU would affect the structure of the largest Norwegian export market, so Statoil has been following the development of shale-gas exploration in Europe through its participation in the GASH project. At first, Norway showed no interest in shale-gas production in Europe, a point that was stressed by the Norwegian Minister for Petroleum and Energy[182] and Statoil CEO Helge Lund.[183] However, this position may be modified as conditions change in the global markets. Naftohaz of Ukraine already has announced that it "discussed with Statoil the points of [...] the development of shale gas deposits in the west of Ukraine".

In the media, the debate on shale gas has been ongoing since 2010. It is focused primarily on the reactions to external events, such as the withdrawal of Shell from Sweden, the earthquake in Blackpool that put a halt to drilling there, or the lawsuit against Chesapeake and its affiliates. Moreover, environmental concerns are raised in discussions about the social-corporate responsibility of Statoil. The NGOs Bellona and Framtiden i vaare hender

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177 R. Ingebrigtsenr, "Satsing pĺ nordomrĺdene", speech at Luftmilitćrt samfunn, 22 September 2010, www.regjeringen.no.

178 S. Johnsen, Finansdepartementet, "Svar pĺ spm. 891 fra stortingsrepresentant Gunnar Gundersen", 6 April 2011, www.regjeringen.no.

179 "Nasjonalbudsjettet 2011", Melding til Stortinget 1 (2010–2011), par. 2.7 "Utviklingstrekk i gassmarkedet", *in fine,* 1 October 2010 www.regjeringen.no, and "En nćring for framtida – om petroleumsvirksomheten", Report of Norwegian Government to the Storting (the Norwegian Parliament), (Meld. St. 28 (2010-2011), Par. 3.1 "Ukonvensjonell gass", 24 June 2011, www.regjeringen.no.

180 "Norge som leverandřr av gass til Europa", Ministry of Petroleum and Energy, 24 June 2011, www.regjeringen.no.

181 D.F. Gansler, "Attorney General Gansler Notifies Chesapeake Energy of the State's Intent to Sue for Endangering the Health of Citizens and the Environment", 5 February 2011, www.oag.state.md.us.

182 As an answer of the Minister of Petroleum and Energy to the interpelation of 05.2010.

183 A. Lindeberg "Skifergass er stort", interview with Helge Lund, 15 June 2010, www.dn.no.

raised environmental concerns related to shale-gas development. The visit of Taniet Colon from the Pennsylvania-based NGO "Mothers' Group" in June 2011 gained significant media coverage. She was on a mission to spread information about the negative implications for the environment that accompany the extraction of shale gas.

Nevertheless, the chances that in the foreseeable future environmental concerns could cause a shift in the politics of Statoil are miniscule. In May 2011, before the General Assembly of Statoil, environmental organizations protested against the company's activity in the production of oil from tar sands in Canada. But, the government has not changed its stance. Commenting on the issue, the current Minister of Petroleum and Energy, Ola Borten Moe, refrained from criticism of Statoil, even though before taking the ministerial post she had shared the environmentalists' views.[184]

Instead of a Conclusion—Poland as a Shale Gas Lab

If anywhere in Europe one might speak about shale-gas euphoria it would definitely be Poland. And it is not just the possible inflow of petrodollars that matters but foremost the political implications for Polish energy security, which has been playing a prominent role in public debate for many years. The import dependence on Russian gas deliveries has produced particular security concerns. Unsurprisingly, then, the first releases about the potential of shale gas generated a huge wave of interest among the society as a whole. It surged in 2010 after optimistic estimates of Polish shale-gas reserves of about 1.4 Tcm were provided by WoodMackenzie Consultants. The promising geological structures stretch from northern Poland (Pomerania region), through the central part and to the southeast region that borders Ukraine. In April 2011, the U.S. Energy Information Administration gave an even more optimistic account, suggesting that Poland holds the largest reserves of technically recoverable gas in Europe (5.3 Tcm).[185] However, one must be careful when reading these estimates since they are not based upon hard geological data but on comparisons of Polish structures with similar ones in the U.S. and assessments of potential reserves by analogy. It is known that each gas play has its own characteristics, which makes any generalisations risky. But if these estimates turn out to be correct and production is economically viable, then Poland could become a significant European gas producer in the long-term, although not comparable to Russia or Norway, but important enough to bring changes to the regional gas supply system.

Optimistic expectations concerning Polish reserves also created a considerable wave of interest among international oil and gas companies. For the last couple of years, more than a hundred concessions have been granted by the Ministry of Environment for shale-gas exploration.[186] Practically all promising areas have already been covered. The long list of companies includes various entities from a number of countries, but mainly the U.S., Canada and Poland (including the "energy majors" such as Chevron, Marathon Oil, Exxon Mobil, ConocoPhillips and ENI as well as smaller firms such as Talisman Energy, BNK Petroleum, Cuadrilla Resources, 3Legs Resources, San Leon Energy, RealmEnergy International, Emfesz and also Polish companies Orlen, Petrolinvest, Lotos and PGNiG). There are 125 obligatory and 50 optional test drillings under existing agreements planned for years 2011–2014.[187] Up to July 2011, eight test wells were drilled, and in one case hydraulic fracturing was applied. Cautious

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184 A. Lindeberg, *Statoil fortsetter med oljesand Men store aktřrer som Storebrand stemte mot pĺ generalforsamlingen*, 19 May 2011, www.dn.no.

185 *World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States*, U.S. Energy Information Administration, April 2011.

186 Data as of 1 September 2011, Ministry of Environment of the Republic of Poland, www.mos.gov.pl.

187 P. Poprawa, *Zasoby i potencjał gazu niekonwencjonalnego w Polsce* [in:] *Gaz niekonwencjonalny. Szansa dla Polski i Europy. Analiza i rekomendacje*, Instytut Kościuszki, August 2011, www.ik.org.pl, p. 117.

optimism has been leaked out of some of the results. Of course, uncertainty remains high since no one can say anything about the future profitability of exploitation, which is going to depend on numerous factors: actual potential and properties of shale plays, economic factors (market access, infrastructure in place, operational costs), environmental challenges, public opinion, and external developments (future shape of gas markets and prices). Yet, despite the existing uncertainty, the surge of interest in the industry suggests that Poland is really emerging as the most-promising location in the EU. Indeed, several analytical and government reports about shale gas quote Poland as a barometer and testing field for the future of shale gas in Europe. The success or failure of the Polish efforts might significantly influence the course of events and determine the future of the shale-gas sector in the EU. The challenges of the industry's environmental footprint, water management, high-population density and market unpreparedness are more or less the same as in other EU states. What makes the Polish case specific is the very broad political consensus and general public support. The main concern is not whether shale gas should be produced or not but rather how not to waste such an opportunity to radically change the energy landscape of Poland. To be precise, although it seems like a distant picture with the contours blurred, indeed the search for an open, critical opinion among policy-makers and mass-media would be a challenging task. One of the reasons is that shale gas is first and foremost a part of the energy security debate, and so it is closely related to national sovereignty and independence. It was even magnified due to the coincidence that word of optimistic information about Poland's shale-gas potential happened during difficult negotiations with Gazprom about an annex to an inter-governmental agreement and long-term gas contract (which was finally concluded in late 2010).

Naturally, the more active gas companies are in exploratory drillings, the more problematic this issue becomes for local communities, which are afraid of the potential costs of shale-gas exploration and development. In March 2011, in the Polish region of Pomerania, representatives of some local communities protested the drillings. They found the companies' information about the potential consequences of the drillings to be insufficient and were disappointed by the central government's actions, alleging it was ignoring local concerns.[188] This region lives specifically off tourism, and any activities that might affect the landscape and environment are treated as a direct threat to its economic standing. Despite some consultations held by the companies, distrust is still present. It resembles a bit the situation in the Netherlands, where the central government is openly in favour while local authorities are anxious. The Polish Green movement so far has been relatively silent, sceptical and emphasises the potential risks to the environment, but has not done so with any special determination. However, rising opposition from at least some local communities with support from environmentalists probably will emerge. At the same time a moratorium or ban on shale-gas exploration is out of the question under the current circumstances.

Polish Prime Minister Donald Tusk said he was going to engage personally in the process of the optimization of conditions for developing the shale-gas business. In a poll organized in June 2011, a majority of Poles (82%) was in favour of shale gas, but at the same time they called for more state presence in shale-gas development so that Poland could be the real beneficiary. These results illustrated a new tendency in the public debate about shale-gas potential, namely an emerging discussion about the way the government has dealt with the companies so far, the shaping of future policy about natural resources management and about the division of revenues. For some observers, concessions were sold too fast and practically for free. In August 2011, the major opposition party, Law and Justice, announced that it would submit a draft of a new law when parliament is formed after the October 2011 elections to regulate the shale-gas business in such a way that the state really benefits.[189] The new regulations would protect Poland from a total loss of control over the production and utilization

188 *Gaz łupkowy. Na Pomorzu protesty przeciwko odwiertom*, 22 March 2011, www.gazeta.pl.

189 "Ustawa PiS o wydobyciu gazu łupkowego", *Polish Press Agency (PAP)*, 13 August 2011.

of shale gas. However, it was emphasized that the new law also is supposed to ensure transparent rules of the game for all actors while ensuring satisfactory profits for the investing companies. A special state-owned company would be established to take part in exploratory and production activities (as in Norway). Finally a special "future generations fund" would be created to ensure that the revenues would not be squandered but invested.

The government is openly in favour of shale-gas development in Poland with the Ministry of Environment (the concession provider), the Ministry of Economy and the Ministry of Foreign Affairs (as coordinator of diplomatic activities with respect to shale gas) the most active actors. Poland joined the Global Shale Gas Initiatives in 2010 to be involved in international undertakings regarding the assessment and utilization of shale-gas potential.

Poland may either give birth to the shale-gas industry in the EU or prove its incompatibility under European conditions. The level of public acceptance appears to be the highest among the EU members. It means also that the public probably will be more willing to accept the inevitable external costs of shale-gas exploitation. The debate would not be so dynamic if Poland were not dependent on Russian gas imports, which produce serious security concerns that were magnified after a couple of supply crises in recent years. Therefore, given such a friendly political, social and business environment, any failure would simply be interpreted as proof that shale gas is just an experiment with no broader consequences in Europe. To sum up, the shale-gas debate in Poland was at first mainly about security and independence, but gradually it also has started to be about profits and economic opportunities. At all times, however, shale gas is perceived in Poland as an opportunity rather than a risk, as it is seen by many in Western Europe.

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