

Beyond the Fracking Wars:
The International Community’s Response

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***Water, water, everywhere,  
Nor any drop to drink.***

*~The Rime of the Ancient Mariner by Samuel Taylor Coleridge*

I. INTRODUCTION

An explosive debate is taking place internationally at the intersection of the human right to safe drinking water and fracking, the increased development of unconventional deposits of natural gas through hydraulic fracturing of shale reserves. The debate opens a new chapter in the history of sustainable water supply and the struggle to control water and manage potential environmental risks associated with fracking<sup>1</sup> but also implicates fundamental goals of energy independence, energy development and global security.

Shale gas exploitation and production have expanded during the past decade to account for over 30% of all natural gas production in the United States, with reliable estimates indicating that shale gas can comprise 40% to 50% of the United States’ total production over the next thirty years.<sup>2</sup> Shale gas will continue to play a significant role in international energy development and can potentially contribute to a significant level of energy security on a global scale. But at what price does the international community achieve diversification of energy supplies and reduced energy dependence in the context of an unstable global oil market?<sup>3</sup> Beyond the U.S.A., how should the international community respond – and how is it responding - to the concerns provoked by fracking over public health, the environment, adequate supplies of quality water, and pollution? There is no time for a leisurely response in light of the dramatic escalation of opposition to fracking that has erupted worldwide during the past year. Protests against the perceived environmental risks posed by fracking have spilled onto the international stage with a furor not seen since student protests of a generation ago, with such social media-led events as the “Global Frackdown,” dubbed by supporters of a global grassroots movement as “the first coordinated international day of action against fracking”<sup>4</sup> that took place on September 22, 2012, “unfolding from Johannesburg to Paris and in cities across the U.S.”<sup>5</sup> Fueled by an increasingly coordinated and organized opposition from such environmental organizations as Food & Water Europe, No Fracking Ireland, STOPHF of the Czech Republic, Friends of the Earth UK and The Greens—European Free Alliance, Ecologists en Accion from Spain, and 350.Org, Global Frackdown was credited with uniting activists who effectively spearheaded over 140 events and demonstrations in five continents calling for bans on fracking, complete with rallies on the steps of the European Parliament, protests in Capetown, South Africa and Cape Breton, Nova Scotia, and demonstrations in front of Parliament buildings from Bulgaria and the Czech Republic to South Africa.<sup>6</sup>

II. SCOPE OF THIS PRESENTATION

This presentation assesses complex issues that are being addressed throughout the world over political gridlock, hardening of positions between the energy industry, scientists, environmentalists and national

governments government, and the fundamental need to restore public confidence in governments to protect the public interest.

Whether it is No Fracking Ireland, No Fracking UK, “No” to “le Fracking”, or “Ja” to “Gegengasbohren,” this debate now has a clearly international component that is exacerbating the political gridlock over fracking. This political gridlock in some instances has been punctuated by hostile debate and sometimes skewed information over how to handle contaminated water and minimize the risk of depleting dwindling water supplies, how to provide meaningful and effective warnings and disclosures, and collateral harm from trucks, drilling equipment, workers and fracking waste water.<sup>7</sup> While the American Petroleum Institute launched its intensified “Vote 4 Energy” public relations campaign to promote fracking during the recently concluded 2012 presidential election<sup>8</sup>, a similar campaign was underway in the European Union to present natural gas, including unconventional gas extraction through hydraulic fracturing, as a “cheap ‘no regrets option’ and painting renewable energy sources as unaffordable.”<sup>9</sup>

The fracking debate has long since moved from its genesis in the USA and has escalated in several EU member states, nations on the African continent, Australia, Canada, and the Pacific Rim. As this chapter is being written, over 270 municipalities in the U.S.A. have imposed moratoria or taken other action against fracking, including Vermont, a state which has banned fracking altogether, despite the fact that no shale gas deposits exist in the Green Mountain State.<sup>10</sup> France, Romania, the Czech Republic, Bulgaria and the German Land (State) of North Rhine Westphalia have banned or declared moratoria on fracking, joining New York and New Jersey. As Jim Dean, chair of Democracy for America, put it during the kickoff of Global Frackdown, “The events taking place around the world as part of the Global Frackdown prove that people are tired of the lies from big oil and gas.”<sup>11</sup> According to Dean, “We’ve learned our lessons from Love Canal and the Horizon oil spill – when money is involved, corporations lie to the people to keep their profits up. It’s time to end the lies.”<sup>12</sup>

How have matters escalated to this point? And how can the various international stakeholders pull back from the precipice of such gridlock and have any hope of achieving the goal of a long-term sustainable energy economy on a global scale, with anything resembling principled management of risk through a regulatory regime that protects the public interest?

The need to navigate between these two extremes is paramount and will require consideration of several facets of the “fracking” debate:

◆Escalating controversy: This is an explosive controversy that has driven several nations to impose or consider imposing moratoria on shale gas development through fracking.

◆Growing environmental concerns: Serious evaluation and scrutiny must be undertaken with respect to claims of potential pollution and overuse of water supplies and other environmental risks associated with fracking that have spread internationally,<sup>13</sup> as nations have undertaken to evaluate and quantify what promises to be a potential solution to dependence on foreign natural gas.

◆Public confidence shaken: Public confidence in the energy industry is at an all-time low and must be restored. Even securities regulators like the S.E.C., the investor-and-markets watchdog for the U.S. Government, have stepped into the heated environmental debate over fracking.<sup>14</sup> The natural gas industry’s credibility has been assailed by an increasingly uneasy and distrustful environmental community, state governments and local governments. Concerns have been raised over the additional demand on water resources attributable to the use of millions of gallons of water at each well site, the potential release of fracking wastewater into the environment at a time when the industry has refused to disclose the chemical composition of hydraulic fracturing fluids used, lack of transparency concerning the industry’s operations, reports of methane leaks, and baseline water quality conditions before drilling starts. In short, the debate over unconventional natural gas development has reached a level of gridlock in the United States that demands greater governmental oversight at the federal and state

regulatory level and greater cooperation from the natural gas industry in identifying, quantifying and managing the scientifically ascertainable risks associated with this natural gas extraction process in a transparent, proper and safe manner.<sup>15</sup> That gridlock is magnified now on an international scale.

◆International developments: Serious, thorough and coordinated analysis must be undertaken with respect to the relevant legal and governmental developments relating to fracking in the European Union, Eastern Europe, Eurasia, the African continent, the Pacific Rim, South America and North America. Transparency must be the rule and not the exception, and full access must be provided in order to make publicly available all relevant scientific, technical and commercial information on shale gas operations and chief environmental concerns associated with fracking. Such an analysis must be proactive and include efforts to restore trust and credibility in response to the many concerns voiced over the fracking process, governmental oversight, identification of best practices, and genuine transparency by the natural gas industry.

◆Recommendations for International Protocols: The international community must be given the challenge to augment these efforts through coordinated efforts and comprehensive recommendations for international oversight, risk management, and international protocols that address:

1. Fracking waste fluid,
2. Identification of chemical ingredients used in fracking fluids injected at well sites,
3. Public input and participation in permitting processes,
4. Monitoring of contaminants,
5. Shared technology and understanding of impacts of fracking process on domestic and transboundary water resources and water quality, and
6. Remediation protocols by the industry.<sup>16</sup>

Successful development and implementation of these recommendations hinges on coordinated work and commitment at the international level leading to regulatory certainty, sound environmental oversight, and energy security. A balance must be struck between the two forces contributing to the current state of gridlock: (1) the demand for public safety through enhanced regulatory oversight, common sense disclosure and transparency measures, and meaningful efforts to minimize environmental risk, and (2) the need for development of shale gas as a predictable and growing energy resource for decades to come.

#### A. The Human Right to Clean Water

A debate is underway over the competing goals of sustainable energy resources and sustainable water resources, the underpinning of the basic human right to safe drinking water.

The nations of the world, acting through the 2000 Millennium Declaration by the U. N. General Assembly, adopted the goal of cutting in half by the year 2015 the proportion of the world's population unable to reach or afford safe drinking water, while stopping unsustainable exploitation of water resources.<sup>17</sup>

The 2002 World Summit on Sustainable Development in Johannesburg pledged to cut in half by 2015 the proportion of people without access to basic sanitation. The General Assembly's Declaration of 2003 as the International Year of Freshwater, and its "Water for Life" Declaration of 2005 to 2015 as the International Decade for Action kept the focus on water issues and global freshwater problems.<sup>18</sup>

In the summer of 2010, the United Nations General Assembly cited the fact that approximately 884 million people "lack access to safe drinking water" and more than 2.6 billion "do not have access to basic sanitation" services, leading to a landmark resolution that broadly declared: the right to safe and clean drinking water and sanitation is a human right essential for the full enjoyment of life and all human rights.<sup>19</sup>

This 2010 resolution urged member states and international organizations to help developing countries by providing “financial resources, capacity-building and technology transfer” to augment efforts to provide “ safe, clean, accessible and affordable drinking water and sanitation for all.”<sup>20</sup>

The United Nations’ action was barely noticed. While the resolution passed by a vote of 122 to zero, 41 nations abstained, including the United States, which nonetheless supported “the goal of universal access to safe drinking water.”<sup>21</sup>

Proponents for a sustainable energy policy and proponents for a sustainable water policy are on a collision course in the United States, Europe and other parts of the world are on a collision course. As late as 2007, before the impact of the shale gas revolution was as obvious as it is today, it was assumed that the United States would be importing large amounts of liquefied natural gas from the Middle East and other areas. Today, the United States is essentially self-sufficient in natural gas, with the only notable imports being from Canada, and is expected to remain so for many decades.

Developed countries of the world need a sustainable energy policy, the linchpin of economic stability. At the same time, no one can deny that water is critical for sustainable development and is an essential component of environmental integrity and indispensable for human health.<sup>22</sup>

Given the international community’s recognition of the human right to safe drinking water, the escalating concerns over the fracking process expressed by a number of nations and subnational governments through moratoria discussed *infra*, and the willingness of the natural gas industry to join in a collaborative process with government regulatory agencies, how can we best define the problem with fracking? It is submitted that **the problem with fracking can most accurately be defined as the management of risk through a transparent regulatory regime that is international in scale.**

An international regulatory regime can be built on the cornerstones of safety and responsibility. It is time to address the creation of a regulatory regime through which the risks associated with the fracking process - including potential surface pollution from fracking fluids, excessive water use, and groundwater contamination - can be assessed on the basis of good science and quantified on the basis of reliable data. Through such a regulatory regime the E.U. and other nations currently embroiled in controversies pitting the natural gas industry against the environmental community can open and maintain a constructive dialogue leading to a safe and responsible way to free themselves from escalating fuel prices by increasing reliance on non-traditional energy sources.

#### 1. Natural Gas as Transitional Energy Source

Increasing pressures have come to bear on nations to identify and secure domestic energy sources. When world market oil prices skyrocketed in 2005, the development of shale gas extraction through fracking received a major boost as the United States, faced with high gas prices, began investing billions of dollars in what promised to be a means of bringing cheap energy to consumers.<sup>23</sup> Members of the EU also began looking at potential shale gas resources on the European continent as a potentially reliable transitional energy source. Such a source of energy, while ultimately non-renewable, could nonetheless serve as a critical bridge fuel on a path to energy independence, a common goal shared by the United States, the EU and other members of the international community.

#### 2. Dependence on Natural Gas from Russia

Another potential plus of shale is reducing many European countries’ reliance on Russia, which supplies most of Central and Eastern Europe with natural gas. Many are already saying that if shale deposits are found in Europe, Moscow will lose the benefit of selling resources to other countries. However, Gazprom is not losing any

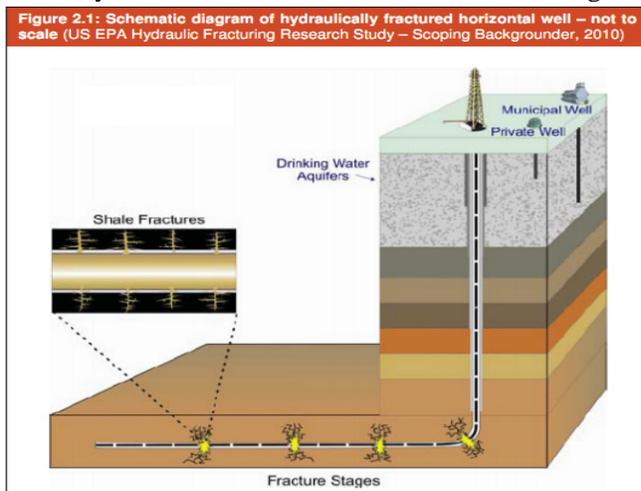
sleep over this supposedly miraculous fuel,<sup>24</sup> and others have challenged the optimistic hype and predictions about the tremendous size of shale gas reserves in Europe.<sup>25</sup>

One commentator has noted three key problems with the predicted fracking bonanza in Europe:

- a. Even as the United States is beginning to face bottlenecks in locating experienced drilling workforces and equipment, the European Union lacks both the experienced workforces and the pressure pumping; therefore, he queries, if the U.S. is already facing such restrictions, how will Europe fare, where shale gas developments are still in their infancy?
- b. Major energy companies are already expressing reservations in light of the highly uncertain economics of shale gas in the EU in the context of a current gas glut that has depressed prices.
- c. Compared to the U.S., local opposition is much more likely in the more densely populated Europe, where citizen-organized initiatives opposing shale gas development are mushrooming, particularly in Sweden, France and Germany's most populous state of North Rhine-Westphalia. Fourth, there are environmental challenges associated with the fracking process.<sup>26</sup> In this regard, U.S. companies are not presently required to disclose the identity of such chemicals to the E.P.A. due to the Halliburton Loophole. The extent to which these companies are beyond E.P.A.'s reach or other federal or state regulatory authority is open to debate.

### III. What is Fracking?

Hydraulic fracturing, or fracking, entails injecting large volumes of water, hydrofrac fluids, and propping agents, usually sand, into porous shale rock under high pressure, creating fissures – or fractures – that allow natural gas trapped inside the shale to flow out while the fracture is propped open after the pressure is released. Coupled with improvements in horizontal drilling, fracking gives natural gas companies the means to access unconventional sources of natural gas in an economical way.<sup>27</sup> The following schematic diagram depicts a typical hydraulically fractured horizontal well and various stages of the fracking process.



The fracking process has generated controversy in part because of concerns that it may contaminate groundwater and cause gas to leak from household taps.<sup>28</sup> Along with the various proprietary additives and chemicals in fracking fluids, hydrofrac water is in close contact with the rock during the course of the stimulation

treatment, and when it is recovered may contain various formation materials, brines, heavy metals, radionuclides, and organic chemicals that can make wastewater treatment difficult and expensive, not to mention the fact that a substantial amount of wastewater is generated at each well site during the fracking process. The formation brines can also contain high concentrations of sodium, chloride, bromide, and other inorganic constituents such as arsenic, barium, other heavy metals and radionuclides that far exceed safe drinking water standards.<sup>29</sup>

Sand as a proppant is probably a harmless additive, but other parts of hydrofrack fluids may include chemical constituents of potential concern to human health and the environment. Many communities, states in areas where significant fracking operations are underway, environmental organizations, and elected officials at the state and federal level in the U.S. are now raising concerns about the potential impact the fracking process has on drinking water, including contamination of wells, aquifers and groundwater resources.<sup>30</sup>

#### IV. Fracking Comes to Europe

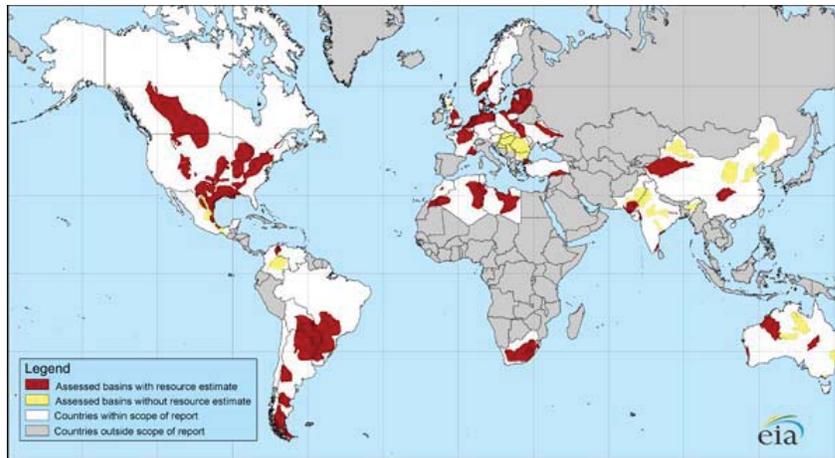
Shale gas resource potential in Europe has been the subject of studies by Advanced Resources International and the Energy Information Administration, and preliminary estimates are being assessed in Austria, Sweden, Poland, Romania, Germany, Croatia, Denmark, France, Hungary, the Netherlands, Ukraine, and the United Kingdom, among others. A technically recoverable assessment of approximately 220 TCF (6.22970 trillion cubic meters or TCM) between Poland, Sweden, Austria and Germany has been estimated, with 55% of that amount being in Poland.<sup>31</sup> Shale gas drilling practices that began in the United States have spread to Canada,<sup>32</sup> the Czech Republic<sup>33</sup>, and elsewhere on an international scale,<sup>34</sup> and a number of these other nations are having second thoughts about the controversial method of natural gas extraction known as “fracking.”

The U.S. Department of Energy has noted that the phenomenal increase in the domestic supply of natural gas through shale gas production may have significant, long-lasting effects on energy independence and national security, and may lead to “a lessening of both supply and leverage from countries such as Russia and Iran, in part through the strengthening of European consumer markets.”<sup>35</sup>

The direct economic benefits and production potentials predicted for nations and subnational units of government are huge. One London-based research firm recently reported that Europe’s recoverable reserves of shale gas, sometimes referred to as unconventional gas, would be enough to meet its gas demand “for at least another 60 years.”<sup>36</sup> While others have challenged such growth projections as overly optimistic,<sup>37</sup> environmental resistance and the level of governmental concerns over some of the consequences of shale gas fracking continue to escalate.

##### A. Europe’s Shale Gas Reserves

The International Energy Agency estimates Europe may hold 35 trillion cubic meters (1236.013 TCF)<sup>38</sup> of natural gas dispersed in shale formations, more than enough to meet its foreseeable needs based on current annual demand of about .58 trillion cubic meters. This is significant in light of Europe’s relative position with the rest of the world in Global Shale Gas Reserves, as shown below.<sup>39</sup>



The EU is one of the world's largest importers of natural gas and a major player in the international gas market, with Norway being one of the world's largest suppliers of natural gas as part of the extended European Economic Area, followed by the number two supplier, the Russian Federation. One of the key objectives of the EU is a single European energy market, which should level the prices of gas in all EU member states. According to *Energy 2020, A Strategy for Competitive, Sustainable and Secure Energy*, a common EU energy policy

has evolved around the common objective to ensure the uninterrupted physical availability of energy products and services on the market, at a price which is affordable for all consumers (private and industrial), while contributing to the EU's wider social and climate goals. The central goals for energy policy (security of supply, competitiveness, and sustainability) are now laid down in the Lisbon Treaty.<sup>40</sup>

The technological availability of fracking in the United States for many decades stands in stark contrast to Europe, where the process is still relatively unknown. As in the U.S., its proponents in the EU say that the risks involved with the fracking process are low, and that the benefits of extracting this natural gas make it necessary to continue supplying Europe's energy needs. Its opponents have raised red flags about potential contamination of water supplies, attributable in part to unknown chemical additives used in the process.<sup>41</sup>

One commentator recently observed that a host of energy companies are engaging in exploratory drilling for shale gas deposits across Europe in an effort that is comparable to

the great natural gas rushes of the past. Exxon Mobil has bought up concessions in Germany and Poland. Shell is active in Sweden and Ukraine. Chevron is in Poland. Total is in Denmark and France. And Cuadrilla is also exploring in the Netherlands and the Czech Republic.<sup>42</sup>

Against this backdrop of potential shale gas reserves that underlie most of the EU's 27 states, environmental organizations and other critics of fracking are raising the alarm about potential groundwater contamination and other environmental ramifications of large-scale shale gas development.<sup>43</sup>

#### B. Reactions Within the E.U. and in Other Nations

Concerns over possible groundwater contamination from fracking along with other environmental issues have been raised by citizen groups and environmental organizations in France<sup>44</sup>, where the French government recently imposed a moratorium halting shale gas exploration because of environmental concerns. Most recently this issue has arisen in Poland<sup>45</sup>, South Africa<sup>46</sup>, and Nova Scotia.<sup>47</sup> We will examine how this debate is unfolding in other nations.

## 1. Poland

Shale gas fracking enjoyed a relatively quiet arrival in Poland during the last few months. The new type of natural gas and oil extraction known as hydraulic fracturing was already producing increasing amounts of natural gas — and controversy — in the USA, and is now starting to generate opposition elsewhere as it spreads around the world. So far in Poland, though, the opposition is coming mostly from neighbors of drilling wells, while environmental groups like Greenpeace Poland are reserving judgment. To complicate matters, the Polish government is understandably eager to develop domestic gas supplies that could help free the country from reliance on Russian gas.

### a. The Push for Shale Gas in Poland

Millions of Poles already use gas for cooking and heating, but until now virtually all of it came from Russia. And after centuries of domination by their giant neighbor to the east, it is a big problem for many Poles. That is part of the reason why Polish government is pushing shale gas drilling and is “determined to make shale gas in Poland become a reality.”<sup>48</sup> Tapping Poland’s large shale gas reserves, moreover, could change the regional balance of power.

### b. Environmental Impact Assessments

While there may be no concerted environmental campaign against shale gas in Poland at the present time, there are legal obstacles. According to the Polish Environment ministry, there is no special environmental law concerning shale gas, and that the country does not need one. Poland already requires every big new project to have an environmental impact assessment, and the government will consider fracking proposals on a case by case basis.<sup>49</sup>

### c. San Leon Energy’s Response

Echoing shale gas drillers in the U.S.A. who reject concerns about ground water contamination, the response of one of the major energy companies in Poland is that there is no risk of water pollution from fracking: “You’ve got shallow water and deep gas,... [and][i]f the groundwater aquifer’s at 200 meters or even 1000 meters, the shale gas here in Poland is between 2500 and over 4000 meters.”<sup>50</sup>

### d. Poland’s 21st Century Rush

A major impetus from shale gas fracking is Poland’s dependence on Russian gas supplies, which currently account for two-thirds of its demand. According to Poland’s Ministry of the Environment, Polish shale gas is “the gold rush of the 21st century,” and Poland is a future “energy super-power” with estimated reserves of 1.4 trillion to 3 trillion cubic meters.<sup>51</sup> On the negative side, while shale gas could help reduce Poland’s need for coal-derived electricity (currently 92 % of production) and serve as a “transition” energy source on the way to a more renewable future, critics have noted that shale gas drilling could spoil the landscape and exacerbate water shortages in some areas.<sup>52</sup>

As energy-poor Poland begins to move forward with its plans to use hydraulic fracturing, or fracking, to develop the country’s natural gas reserves, little controversy has emerged regarding the controversial nature of the fracking process. The Polish experience to date does not appear to address some of the most problematic environmental concerns associated with massive amounts of water required during the fracking process and the potential for surface water contamination.

A more cautious official stance may be in the works. As Poland's Deputy Environment Minister Jacek Jezierski recently observed, "We will be able to say whether amendments to provisions regulating shale gas extraction are needed once we perform a professional assessment of its environmental impact, not an emotional one. Poland intends to control this process, not to ban it." According to Marek Kryda of the Institute of Civil Affairs, "It is necessary to look after issues related to property expropriation and lease. We can already see irregularities at the stage of test drilling."<sup>53</sup>

A number of Polish geologists and experts as recently as July 2011, have rejected as unfounded the arguments of scientists in neighboring Germany that fracking poses environmental dangers. In mid-July 2011, European Union officials received a critical report on the consequences of shale gas exploration and extraction, prepared by a German think tank, Ludwig-Bölkow Systemtechnik, and commissioned by the Environmental Committee of the European Parliament. In the report, scientists demand that the European Commission should not only strictly control the process of exploration, but also that it should prepare regulations to govern the extraction of shale gas. The report's authors argue that existing laws are too loose and that the fracking process is dangerous for the environment because it requires the use of toxic substances that are pumped into the ground in a solution with water, and the fracking fluids which eventually rises to the surface are contaminated with heavy metals and radioactive material.<sup>54</sup>

## 2. Germany: Gegen-Gasbohren

The controversy over fracking came to Germany when ExxonMobile Germany proposed to begin test drilling in northern Germany in October 2010, shortly after which several hundred people organized an anti-fracking organization, Gegen-Gasbohren, and through their website at [www.gegen-gasbohren.de](http://www.gegen-gasbohren.de) and through an effective outreach facilitated by the media, newspapers and television, provided information about fracking on shaleshock.org, including scenes from the indie movie "Gasland."<sup>55</sup> Gegen Gasbohren was founded in September 2010, with groups in several German towns where shale gas fracking was planned, each drawing up to 300 people. As media coverage increased, after only three months every major party in the state of North Rhine-Westphalia is calling for a moratorium on fracking. Some are even calling for a moratorium on test drillings, until it is clear that the drilling technology is safe.<sup>56</sup>

## 3. France: No to "le Fracking"

As the fracking fight has gone international, citizen groups and environmental organizations raised the alarm in France, the first country to enact a moratorium. The site of what was to be a mad rush to conduct exploration for shale gas in France is the Paris Basin, which is under France's most fertile farmland. The geology of the Paris Basin shale formation, a saucer-shaped rock formation that extends over 140,000 kilometers, is similar to the Bakken Shale formation in North America, where oil production has surged with the increased use of fracking. It is unclear how much of the Paris Basin's estimated 100 to 300 billion barrels will be recoverable using the hydraulic fracturing techniques, but industry executives have noted that "[i]f the geological potential is there, it would be a shame for France to pass up this source of energy."

Opponents to "le Fracking" cited public shock over learning that the French government had pushed through drilling permits without any debate, showing disdain for the population and elected representatives. Fracking opponents have also pushed for modifications of rules that will allow public consultation when awarding permits for natural gas exploration. Opponents expressed fear that harmful chemicals could seep into groundwater through a process that entails shooting water, sand, and chemicals into the ground to extract oil or natural gas.

The French government became increasingly aware of and concerned over the potential impact of fracking on the local environment. Its concerns were threefold: (1) excessive use of existing water supply, insofar the average amount of water used for each hydraulic fracturing well was as much as the amount 100,000 French

people use in one day; (2) potential contamination of both the soil and groundwater; and (3) the large number of wells needed to extract shale gas is 10 to 20 times as many as are used in conventional drilling.

As concerns mounted in the United States and Europe over the environmental impact of shale gas fracking, José Bové, a French environmentalist, farmer, former Presidential candidate, and Green party deputy with the European Parliament, brought the search for shale gas to a halt in France. As energy companies began to ready their rigs outside Paris and started to plan for drilling in southern France, local environmental groups began raising concerns about damage to water tables from the hunt for hydrocarbons locked in shale rock. On Jan. 22, 2011, Bové started a petition drive that led to the French government ordering an exploration moratorium. On Mar. 11, 2011, French Prime Minister François Fillon extended the ban until June 2011, when parliamentary and ministry reports on the environmental and economic effects were due.<sup>57</sup>

The National Assembly, France's lower chamber, passed the moratorium bill on June 21, 2011, after which the French Parliament voted on June 30, 2011 to impose a moratorium on fracking. Critics had argued that fracking raised environmental concerns and could contaminate groundwater. Ironically, just as France was making headlines as the first country to enact such a ban, New York State was preparing to lift its moratorium on fracking.

In the meantime, Bové took his anti-fracking battle to the European Parliament and will seek an EU-side ban on exploration by the producer who have already snapped up drilling permits and are now riding out the political storm and waiting until the French government studies are completed.<sup>58</sup>

In a study requested by The European Parliament's Committee on Environment, Public Health and Food Safety, scientists concluded that "at a time when sustainability is key to future operations it can be questioned whether the injection of toxic chemicals in the underground should be allowed, or whether it should be banned as such a practice would restrict or exclude any later use of the contaminated layer... And as long-term effects are not investigated."<sup>59</sup>

Environmental groups complain that in addition to toxic chemical input from fracking, many other problems of natural gas exploration and production are being minimized by the industry, including such problems as "leaks or failures of steel and cement drill casings, deep-well injection of toxic waste which may also increase seismic activity, the storage of explosives on farms and in communities during seismic surveying, increased green house gas emissions, offshore and onshore oil spills that damage fisheries, and waste product contamination of air, water and soils."<sup>60</sup> According to French environment minister Nathalie Kosciusko-Morizet, an outspoken opponent of fracking, permits given to gas exploration companies the year before should never have been granted: "We have seen the results in the U.S. There are risks for the water tables and these are risks we don't want to take. It was an error. ... An environmental evaluation should have been done before giving out the permits and not after. ... There is only one technology that can be used today to produce shale gas and that's hydraulic fracturing and we don't want it."<sup>61</sup>

In France, the shale gas industries ambitious plans have met stiff resistance among environmentalists and ordinary citizens who do not want to see their countryside transformed into fields of oil derricks. In light of a water shortage in this region, moreover, these same opponents of fracking fear the water shortage may become even worse if shale gas fracking proceeds unabated. One can anticipate that the French government will likely condition relaxation of this moratorium, if ever, on an industry-wide commitment to reduce the amount of water needed for the fracking process, placing strict limits on the number and spacing of wells, and other verifiable measures that will reliably protect the environment.

#### 4. United Kingdom

In Great Britain, the Energy and Climate Change Secretary gave fracking a clean bill of health and insisted it was subject to robust controls, and the House of Commons Energy Select Committee also supported the fracking procedure, arguing that Great Britain could have considerable reserves of shale gas that should be exploited in order to reduce the country's reliance on imported energy. That all seemed to take a turn for the worse in June 2011, when two earthquakes were recorded in Lancashire, England, leading members of Parliament to call for an investigation into the safety and environmental impacts of drilling for shale gas, based on concerns that fracking could have triggered the seismic activity, in addition to contaminating local water supplies.<sup>62</sup> Cuadrilla Resources, the British company that was exploring for gas in shale formations deep underground, promptly announced that was temporarily halting fracking operations near Blackpool in Lancashire after indications that it might have set off the two earthquakes.<sup>63</sup> Similar earthquake activity was reported in the state of Arkansas in February 2011, where the Center for Earthquake Research and Information recorded about 100 earthquakes over a seven day period before two injection wells were shut down at the request of the Arkansas Natural Gas Commission. One of the earthquakes measured 4.7 on the Richter scale, the largest to hit the state in 35 years.<sup>64</sup>

#### 5. South Africa

In mid-April 2011, South Africa's cabinet placed a moratorium on natural gas exploration licenses in the semi-arid Karoo region, a vast and ecologically sensitive region where the controversial shale extraction technique of "fracking" was about to be deployed. This region had been high on the radar screen of conservationists and Karoo farmers. A statement issued by the South African government noted that the "Cabinet has endorsed the decision by the department of minerals to invoke a moratorium on licenses in the Karoo, where fracking is proposed."<sup>65</sup>

#### 6. Quebec, Canada

As of March 2011, Quebec will no longer authorize fracking for natural gas, according to Nathalie Normandeau, Quebec's natural resources minister, who announced that the Quebec government would no longer authorize any hydraulic fracturing operations in the province. Gas leaks at wells that have already been fracking in Quebec led government officials to question whether the industry was in control of the situation.<sup>66</sup>

#### 7. Bulgaria, Romania and other Eastern European Nations

Grassroots opposition to fracking has arisen in Eastern Europe. Chevron was anticipating the "next fossil fuel extraction boom in the region" as it moved ahead with "quietly acquiring rights to drill for natural gas using fracking technology," but the growing opposition has thwarted its plans thus far.<sup>67</sup> According to Guy Chazan, "For years, it has been snapping up exploration acreage along a geological faultline that stretches from the Baltic to the Black Sea. A crucial piece of its jigsaw fell into place in May [2012] when it won the right to negotiate a big shale gas contract in Ukraine. That left it with an almost continuous arc of concessions stretching from Bulgaria in the south-east to Poland in the north. The blocks in Romania alone cover 2,700sq km."<sup>68</sup> Faced with a major protest against Chevron's plans to drill in the most fertile farm region in the country, Bulgaria banned fracking.<sup>69</sup> In Romania, Chevron encountered fierce opposition as well, after it had already acquired licenses in the northeast and southeast Dobrogea region near its southern border with Bulgaria and in the northeastern part of the country near the border with Moldova. According to Nicolae Rotaru of Civic Platform in Romania, "We examined the Chevron contract and... encountered suspicious secrecy at all levels. We want a law to be worked out to regulate the drilling for shale gas in Romania ... It is dangerous for human life."<sup>70</sup>

## 8. Arrival of Shale Gas in the Mainstream

Natural gas multinationals are “now scouring the EU for shale-gas structures. Poland, Hungary, Germany, Austria and other countries in—coincidentally—the region of Europe most exposed to Russian gas, show promise,” with projections by the IEA indicating up to 35 trillion cubic meters (1236.013 TCF) of natural gas reserves, six times the size of conventional existing reserves, but that

[t]here are obstacles. Some environmentalists—and Gazprom—say the drilling process threatens water sources. For that reason, New York has prevented shale-gas exploitation in its share of the Marcellus shale (while Pennsylvania, which shares the field, has allowed it). Inhabitants of densely populated Europe, unaccustomed to disruption by the oil industry, might not like the rapid rate at which multiple shale wells must be drilled to sustain output.<sup>71</sup>

The arrival of shale gas in the mainstream may be problematic for Gazprom’s business model, which is based on the development of huge, expensive conventional gas fields in inhospitable regions of Russia. Some of these projects are already being mothballed. Gazprom’s fierce opposition to fracking is understandable and a global pocketbook issue for the Russian firm.

### A. International Treaties and Protocols

There are tools for crafting an effective, principled methodology to address the political gridlock and international tempest over fracking. Those tools include existing treaties, protocols and international conventions that can serve as the foundation for a coordinated, multinational, fair and totally transparent process for international oversight and monitoring that can and should be implemented without further delay. Let us take a look at the existing international landscape first and then consider a feasible solution.

#### 1. The Bellagio Draft Treaty

Professor Albert Utton, a leading international groundwater scholar, has proposed a draft international groundwater treaty<sup>72</sup> that would establish transboundary commissions with power to establish conservation areas and adopt comprehensive management plans based on equitable apportionment. The Bellagio Draft Treaty on Transboundary Groundwaters provides an international mechanism to deal with transboundary groundwater pollution.<sup>73</sup>

#### 2. Berlin Rules

The 2004 International Law Association’s Berlin Rules apply to all aquifers, confined and connected to surface waters, regardless of whether they receive surface recharge. The Berlin Rules adopt the principle of equitable apportionment augmented by the precautionary principle and call for the adoption of sustainable management regimes that are integrated into surface water allocation and management systems.<sup>74</sup>

#### 3. NAFTA

Greater conservation of border groundwater resources shared by the United States and Mexico may be hastened by the North American Free Trade Agreement. For example, the Integrated Environmental Plan for the Mexico-United States Border Area makes potential groundwater contamination a more visible issue, and the Plan’s groundwater quality monitoring proposals should promote the greater exchange of groundwater

information. Such international collaborative efforts can lead to a more coherent, mutually beneficial and enforceable regime for addressing pollution of internationally shared aquifers and transboundary groundwaters.<sup>75</sup>

#### 4. Montreal Rules and Helsinki Rules

An important objective of international water law is pollution prevention, and that objective has been the focal point of several international treaties and standards. Under the 1982 Montreal Rules on Water Pollution in an International Drainage Basin declare that the right to equitable utilization includes the correlative duty to prevent new or increased water pollution that causes substantial injury to the territory of another state and to take all reasonable measures to abate the pollution. Under the Montreal Rules, basin states are required to cooperate to ensure an effective system of pollution prevention and abatement. The Helsinki Rules and the 1991 ILC Draft Rules integrate water quantity and quality considerations. This is done by the Helsinki Rules by making states liable for transboundary pollution, while the 1991 Draft ILC Rules extend state liability, making them liable for activities that caused appreciable harm to other states.<sup>76</sup>

### IX. CONCLUSION: The Case for International Oversight

Stepping back from the emotional frenzy and hyperbole that has characterized much of the debate and controversy over fracking and its impact on the environment, human health and safety, particularly with respect to water resources, we must consider two issues.

One is the fundamental issue of how best to achieve energy independence and to secure alternative sources of energy on a sustainable basis to power the nations and economies of our world. In achieving that independence, natural gas must be considered an important economic driver and a critical bridge fuel.

The other is the fundamental issue of how best to achieve sustainability of water resources and protect the fundamental human right to safe drinking water.

A strong argument can be made for federal oversight in this field within the U.S.A., particularly since waterways and water supplies do cross state boundaries. It is unacceptable, moreover, to trade human health for fuel.<sup>77</sup> A more compelling argument can and should be made for international oversight in a collaborative role with member states under applicable provisions of existing U.N. treaties and protocols.

On an international scale, creation of an international mechanism similar to the FRAC Act of 2011 may provide the communication and information network that is an essential element of ensuring that our global water resources are protected, public health is not compromised, and states and communities are not exposed to unknown environmental risks. Such an international mechanism is within reach and could develop international protocols for

- (1) treatment, disposal or recycling of fracking waste fluid, which cannot be treated like oil field brines and reinjected into the ground, since the water did not come from that source to begin with;
- (2) a transparent and effective process for disclosing the identity of all chemical ingredients, components and additives using in cracking fluids and propping material;
- (3) expanded public input and participation in the permitting process when dealing with transboundary aquifers and water resources;
- (4) coordinated monitoring of monitoring for contaminants such as radium, barium, strontium and other heavy metals, radioactivity, and other environmental risks associated with hydrofracking fluid waste; and
- (5) increased public-private collaboration and sharing of technology to increase level of understanding of the impacts of drilling and extraction processes on the management and protection of transboundary water resources and water supplies.

- (6) remediation protocols by the industry – provisions to authorize and facilitate payment of monetary damages to landowners and others determined to have suffered injuries or losses as a result of failures during the fracking process, accidental spills or contamination attributable to spillage, leakage or other contamination above or below the surface at or near hydraulic fracturing sites.

A monitoring and management mechanism could be crafted by using the framework of existing international water law, treaties and protocols designed to address transboundary groundwater pollution, water quality monitoring and comprehensive management of internationally shared groundwater and surface water resources, including fundamental tenets of the Bellagio Draft Treaty, the Berlin, Montreal and Helsinki Rules, and NAFTA. Creation of such a monitoring and management mechanism would provide states and the international community as a whole with the means to share critical risk-related information and develop as well as implement environmental safeguards while preserving the rights of sovereign states to control their own resources.

We challenge the international community to augment the recommendations and proactive efforts that have been identified in the recent report from the Department of Energy's SEAB subcommittee, with a coordinated, comprehensive mechanism for oversight and risk management. Such a mechanism based upon the above treaties and protocols can include components that parallel the key recommendations enumerated in the SEAB report. Coordinated work on the national and international levels can help strike a balance between public safety and the development of shale gas as a growing energy resource for the future. This requires commitment at every level, national, international, subnational and private sector, and will not be a panacea. It can nonetheless lead us away from the political gridlock and acrimonious debate over natural gas development and provide a pathway for states and communities to realize the economic benefits of natural gas as a reliable, transitional energy source, a critical bridge fuel on a path to energy independence for our nation and for the world.

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