Is adaptive risk regulation possible in a contentious political environment?
Shale gas regulation in the EU

David M Reiner

Assistant Director, EPRG,
Lead, Public Engagement, ReFINE Project
Judge Business School, University of Cambridge

Conference on Planning Adaptive Risk Regulation
University College London
7 January, 2016
What is Fracking?

- Shales have low permeability, pore spaces not interconnected
- Rocks must be cracked to increase permeability
- Horizontal drilling is used to extend target area
- Water used to crack the shale, propant (often sand) holds cracks open
- Process is new to Europe, but well established in USA and attractive on grounds of energy security and competitiveness
U.S. dry natural gas production
trillion cubic feet

History | 2011 | Projections


Non-associated offshore
Tight gas
Coalbed methane
Associated with oil
Non-associated onshore
Shale gas
Alaska

Source: U.S. Energy Information Administration, Annual Energy Outlook 2013 Early Release
Energy Security: Poland

- Historical ‘relationship’ with Russia
- Recent events:
  - Crimea
  - Detention of Russian spies in Poland

Sources: US EIA, PGNiG, BBC
Energy Security: GB

Fossil Fuel imports as proportion of energy supply

Sources: House of Commons Library
Natural Gas Prices

Sources: PGNiG, Gazprom, New York Times

**Average NG import prices [$/Mbtu]**

- **UK LNG**
- **EU LNG**
- **UK pipe**
- **EU pipe**

**$/1000m^3**

- US: 85
- Netherlands: 355
- Poland*: 530

*purchase price from Russia

**$/Mmbtu**

- US: 3
- Europe: 10.4
**Risked, technically recoverable shale gas reserves (TcF)**

EIA 2013

- **Max:** 148
- **Min:** 26
- **National Estimates**
  - Max: 228
  - Min: 82

Sources: EIA, PIG, BGS
We cannot afford to miss out on shale gas
Safe fracking will cut energy bills and create wealth without ruining precious countryside, writes David Cameron

Britain has led the way in technological endeavour: fracking is part of this tradition   

By David Cameron
10:04PM BST 11 Aug 2013
You can’t run if you can’t walk: Stages of development

A few years

Weeks to Months

Years to decades

Drilling and Hydraulic Fracturing

Geology

Seismic Data

Exploration Well

Production

Abandonment

But situation in EU is so heated that cannot even begin to drill exploration wells – why?
Members of the Green European parliament group and representatives of Non-Governmental Organizations (NGOs) take part in public action in front of the European Union in Brussels, Belgium on 18 September 2012, as part of a campaign against shale gas and fracking. Photograph: Olivier Hoslet/EPA
Gas Import dependence and national shale gas exploration status

Public Support/Scrutiny in Poland v UK

Should fracking be allowed in the UK?
[percentage of respondents]

Support for shale gas in Poland [%]

Press coverage of protests in Poland
[number of articles]

Press coverage of protest in the UK
[number of articles]
Weak Support for Unconventionals in EU-26

Q21. Thinking about the next 30 years, which of the following energy options do you think should be prioritised now in (OUR COUNTRY)?

- Renewable energy sources: 70%
- Energy efficiency: 28%
- Nuclear energy: 18%
- Carbon dioxide capture and storage (CCS): 12%
- Unconventional fossil fuels, such as shale gas: 9%
- Conventional fossil fuels: 8%
- Other (DO NOT READ OUT): 1%
- None (DO NOT READ OUT): 1%
- Don't know: 5%

EU-26: 3-11%, PL: 32%

(MAX. 2 ANSWERS)

Source: Flash Eurobarometer 360 “Attitudes of Europeans towards air quality”, Jan 2013
Local opposition strong across Europe
Shale gas in Poland

Mad and messy regulation

Jul 10th 2013, 17:00 BY A.E. | WARSAW

POLISH dreams that shale gas would transform the country into a second Norway have been tempered in recent months. The geology is more difficult than anticipated and proposed regulation has been repeatedly delayed. After great initial enthusiasm companies such as ExxonMobil, Talisman and Marathon Oil threw in the towel and quit the country.

In a recent report investors complained that
Poland on road to EU Court over shale gas defiance
**SPECIAL REPORT:** There are 65 shale gas wells and drills in Poland, more than any other European country. The UK, the other EU member state with plans to develop the resource, has only a couple of wells.

Poland plans to build 50 new shale wells every 12 months over the next few years but currently, the focus is more on exploration than exploitation. It has granted 82 concessions to prospect for unconventional hydrocarbons, 72 of those are shale gas related.
Polish shale gas hits a dry well

The exit of the last major global energy firm this month could mean the death knell for the country’s industry.

By ANDREW KURETH | 6/16/15, 5:30 AM CET | Updated 7/8/15, 3:21 PM CET

WARSAW — Hopes kindled just four years ago that Poland would become a gas exporter — a “second Norway,” in the words of then-foreign minster Radek Sikorski — have been doused by the decision of U.S. energy giant ConocoPhilips’ Polish subsidiary to halt exploration.

The exit this month of the last global player from Poland’s shale gas market, leaving just a few domestic and smaller foreign firms among whom drilling has come to a near halt, further undermines the case for fracking in the European Union, where Poland and the UK have been its strongest backers.

The appetite for drilling has dried up.

“The appetite for drilling has dried up,” said Tomasz Chmal, an expert on shale gas with law firm White & Case in Warsaw.

The industry’s fall is hard to swallow for those who had hoped for 300 years worth of energy independence from Russia, where Poland gets just over half of its gas imports. Such predictions were being made in 2011, after the U.S. Energy Information Administration estimated Poland’s shale gas reserves at 5.3 trillion cubic meters, albeit based on historical data rather than new exploration.
Polish shale industry collapsing as number of licenses nearly halves

Prospects for fracking boom in Poland look remote as companies including state-owned gas firm ditch shale gas concessions in face of challenging geology

Poland's shale gas industry appears to be collapsing, just four years after the US government predicted that its reserves were abundant enough to fuel the country for the next three centuries.

Concessions for exploratory shale drilling have nearly halved in the last year from 58 to just 32, according to a new Polish government manifest published to little fanfare on the environment ministry's website this week.

With rockbottom oil prices continuing to erode global fracking hopes, Chevron and ConocoPhillips this year joined Exxon, Talisman and Marathon in pulling out of the east European country.
UK shales

- Carboniferous
  N. England

- Jurassic
  SE England
Conclusions of Major UK Reviews

• Royal Society review of Hydraulic fracturing led by Prof Robert Mair: “overall effect of UK shale gas production on national emissions is likely, with the right safeguards, to be relatively small. Indeed emissions from the production and transport of UK shale gas would likely be lower than from the imported Liquefied Natural Gas that it could replace.”

• Public Health England: “the risks to public health from exposure to emissions from shale gas extraction are low if operations are properly run and regulated.”
MacKay/Stone Report on Carbon Footprint of Shale Gas Extraction

- Emissions intensity of shale gas extraction ~ 200 – 253 g CO2e per kWh comparable to gas extracted from conventional sources (199 – 207 g CO2e/kWh(th)), and lower than carbon footprint of LNG (233 - 270g CO2e/kWh(th)).
It is unlawful for fracking companies to drill under your home without your permission. Search your postcode and join the legal block today to protect your home and community from fracking.

Could your home be fracked?

Enter your postcode and find out if your home could be put up For Shale

56,881 people are already part of the Not For Shale legal block.

Find out more at www.wrongmove.org.
Bad news! Your area could be fracked.
Join the 56,880 people who have joined our legal block.

Your home is in one of the areas the government is considering for drilling and possible fracking.

Greenpeace lawyers have revealed it is unlawful for companies to drill under your home without your permission or a statutory right. Doing so would be trespassing.

Residents around the country are refusing permission for drilling and creating a legal block to fracking across the country. Add your name and say no to drilling under your home.

Find out more

☑️ “I hereby declare that I do not permit fracking companies to drill under my home.”

Email

Join

We’ll keep you updated about Greenpeace campaigns.

Map Key:

- Government is considering for oil and gas drilling and fracking
- Land government isn’t currently considering

“My husband and I are joining the legal block because we feel worried about what’s going on. We’re within our legal rights to refuse permission. Together we can stand up to these big companies. For me, it’s not just about my life, it’s my children’s lives. More effort should be put into safer and longer-term energy sources.”

Karen Ditchfield
Singleton, Lancashire
Framing Fracking

• Strong opposition from much of the UK public despite general support for fracking from UK government.

• 6-focus group study by Durham in UK and 4 country study by Cambridge both identified 4 key areas of concern:
  • Lack of understanding
  • Lack of trust/credibility
  • Lack of consultation
  • Lack of scope in assessing impacts

Key Point - Public concern is not limited to risk and feasibility. Trust and confidence in policy makers and other key stakeholders is a key concern.
UK Compensation

- After several iterations, UK government, communities living near fracking sites have been offered £100,000 during exploratory drilling plus a 1% share of revenues from gas found (~£5-10m over 25 years) plus full retention of business rates (~£2m)
- In 2014, DECC offers additional payment of £20,000 for each lateral well at fracking sites (assuming 10 wells per site, each with four lateral wells, makes average total £800,000)
- So inadequate that one of leading firms, Ineos immediately increases minimum offer to 6%
- Cameron has suggested offering homeowners direct compensation but no follow up. Osborne has offered the potential for a sovereign wealth fund for shale regions.
- Infrastructure and Competitiveness Bill proposes changing trespass law to allow shale gas exploration firms to drill beneath private property without needing owners’ permission and new proposals to drill under national parks
Versus US ownership of mineral rights and the lure of royalties to individuals

### Natural Gas Royalty Estimate

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>Your royalty rate.</td>
</tr>
<tr>
<td>$4.00</td>
<td>Average wellhead gas price.</td>
</tr>
<tr>
<td>1.5</td>
<td>Average well production rate in millions of cubic feet per day.</td>
</tr>
<tr>
<td>1</td>
<td>Acres you own within the well's production unit.</td>
</tr>
<tr>
<td>1</td>
<td>Number of acres in the well's production unit.</td>
</tr>
<tr>
<td>$22,500.00</td>
<td>Your expected royalty payment per MONTH (before expenses).</td>
</tr>
</tbody>
</table>

**Calculate another royalty**

Don't assume that you are rich yet. Learn about [natural gas well decline rates](https://www.geology.com)

This information is provided by Geology.com for entertainment purposes. The amount of your actual royalty can differ significantly from what is shown above. The royalty payment above is based upon the information that you provided. It includes assumptions which might not fully represent the conditions of your lease/royalty agreement and market conditions at the time your gas goes to sale.
Lancashire Mini Case Study

• ‘Bad luck’: Cuadrilla Resources drills first exploratory well near Blackpool 2.3 M event (April 2011)
• ‘Temporary pause’: Moratorium on all exploration until HMG review completed (led by BGS) even as PM reaffirms support
• Take 2? First post-moratorium projects considered by Lancashire County Council which rejects two proposed exploration wells in June 2015 under intensive pressure and international scrutiny
• Removing all pretense: Hearings planned for Feb 2016, but decision taken away from independent planning inspector and ‘called in’ by Secretary of State
The case against fracking in Europe is overdetermined

1. **Geology is different:** deeper and smaller plays in Europe, data is scarce, most potential shale plays are quite poorly characterised

2. **Stricter Regulation:** US had ‘‘Cheney-Halliburton Loophole’’ in CWA, whereas European countries imposed moratoria and would have stricter regulatory regimes (in part b/c of US experience)

3. **Incentives:** Tax credits in US plus mineral rights are owned by landowners

4. **Industry structure:** Shale revolution in the US driven by small firms, plentiful rigs, close proximity, strong services industry

5. **Market structure:** Many fewer actors in EU market, TPA instead of common carriage pipelines

6. **Public opposition:** Well-organised opposition builds on climate camps, local activist groups, and has become focal or proxy issue for NGOs (comparable to Keystone XL in US?)

---

Additional nails in shale’s coffin

• Add to these serious impediments:
  • Voiced suspicions of the role of Russia in supporting NGOs opposed to fracking in Bulgaria and elsewhere (Rasmussen)
  • One of first exploration wells in UK produced a tremor
  • Poor initial results in Poland the strongest supporter of fracking with the greatest number of exploration wells (65)
  • The low current gas price environment

• In some ways, it is actually surprising that fracking is not completely dead. Stakeholders have found it difficult to worry about the niceties of adaptive regulation when faced with perennial existential crises
What could have been done differently?

• The zeal of high-level government support initially reassured investors but this (a) may have been misleading and (b) undermined gov’t credibility (including the potential for adaptive regulation)

• Social license to operate cannot simply be granted by government and the absence of any serious dialogue on compensation has been striking and exploration has been treated as a beach head (camel’s nose effect)

• Consultation v ‘consultation’: Genuine public engagement, though undoubtedly difficult, has been remarkably poor and has merely heightened suspicions

• Only EC-level consultation exercises have been purely technical, which has frustrated many key stakeholders
Thanks!

David Reiner
Judge Business School
University of Cambridge
dmr40@cam.ac.uk
+44-1223-339616
Fracking debate increasingly polarised

![Bar chart showing public opinion on fracking in 2013 and 2014. The chart indicates a polarisation in support and opposition over the years.]
Knowledge does not translate into support: Relation between familiarity and support for fracking

- Never heard of this
- Heard before, but not at all familiar
- Neither familiar nor unfamiliar
- Not very familiar
- Somewhat familiar
- Very familiar

- Strongly oppose
- Somewhat oppose
- Oppose neither support nor oppose
- Somewhat support
- Strongly support
- Don't know
Familiarity with Hydraulic Fracturing (or ‘Fracking’)
Public Support for Fracking

Survey respondents who say they are familiar with the term hydraulic fracturing (42% of total base or 889 individuals).
There has also been concern in U.S. about global and local impacts of fracking.