

Poland's Quest for Shale Gas: North American Experience, European Context

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by

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Structure

1. Shale gas—global phenomenon, local peculiarities
2. European dimension—between national approaches and EU ambitions
3. Poland as the European shale gas laboratory
4. How to get the North American experience right?
5. Shale gas as a common priority? Potential for Polish-Turkish cooperation

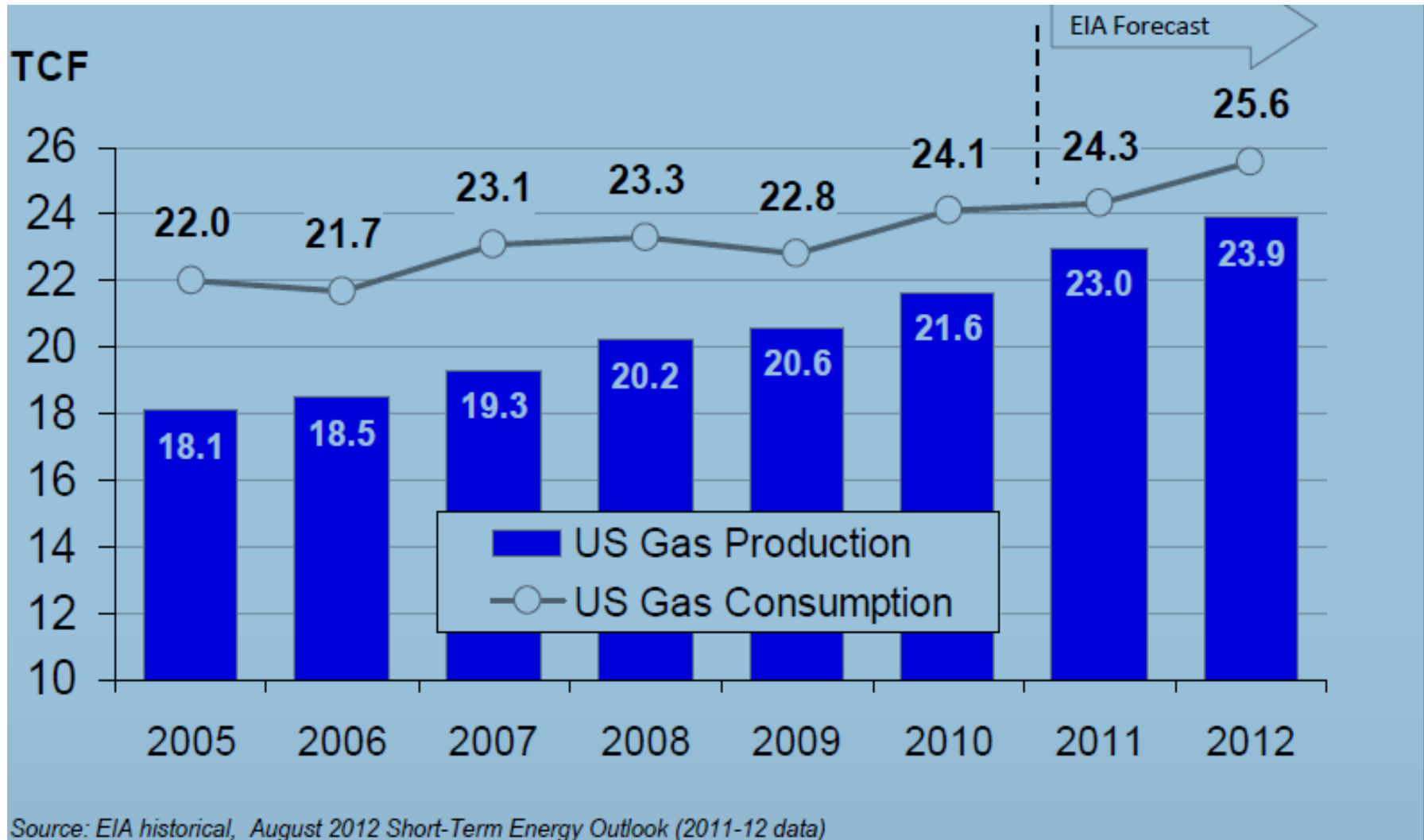
U.S. shale gas revolution: facts, figures, implications (1)

- Natural gas the second-most important part of the U.S. energy mix (26% of primary energy consumption), after oil (36%), ahead of coal (21%), renewables (9%), nuclear (8%)
- Biggest consumers: industry (33%), residential/commercial sector (32%), power generation (31%), transportation (3%)
- fairly limited use by the transportation sector (3%), but quite significant in electricity generation (20%)
- small imports dependency, not more than 10%
- between 2000 and 2006, production from shale reservoirs increased by 17% annually; between 2006 and 2010 – by 48%
- the U.S. Department of Energy expects shale gas to constitute 46% of total domestic production by 2035 (currently at app. 25%)

U.S. shale gas revolution: facts, figures, implications (2)

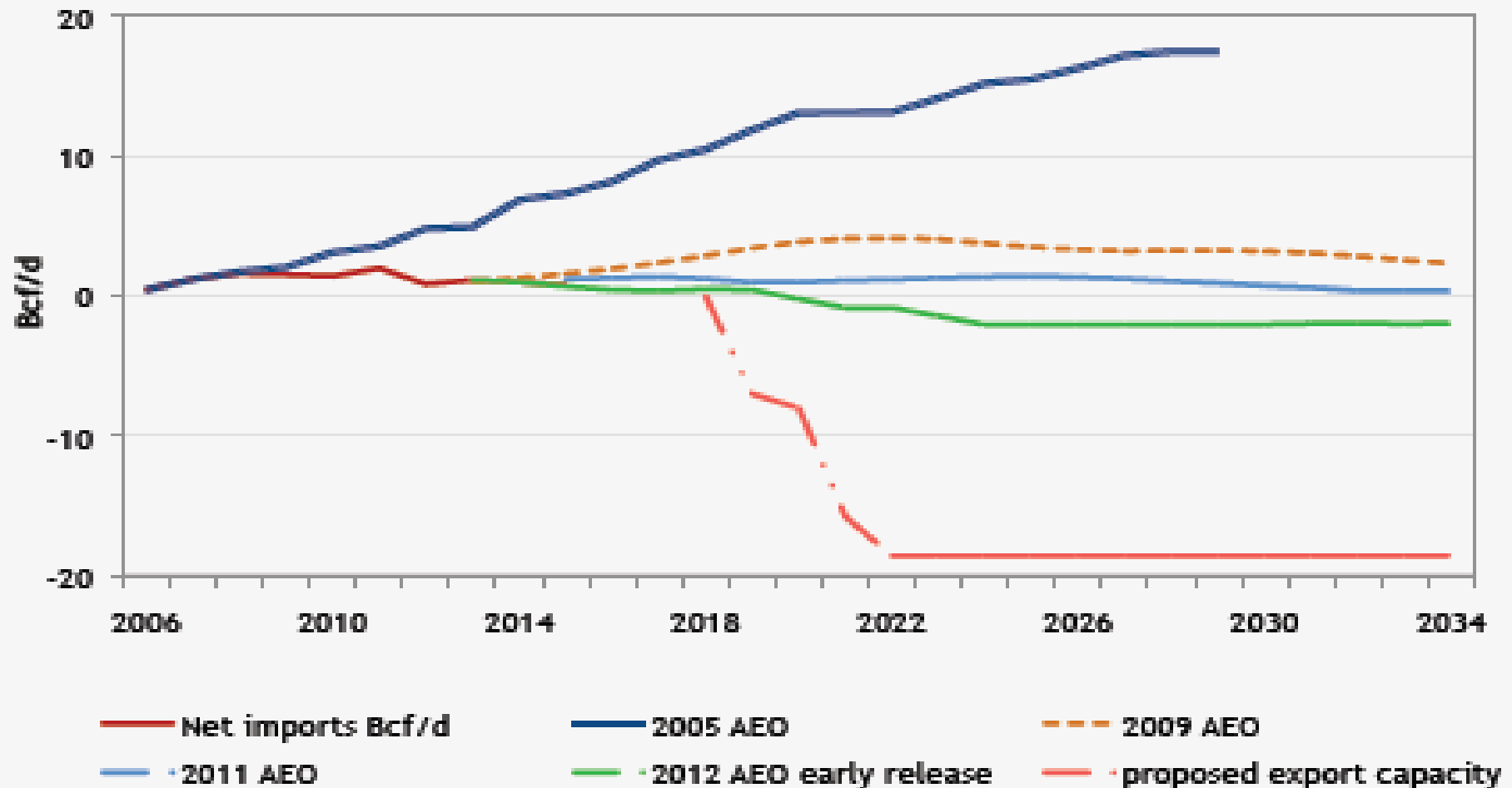
- the impact of the economic downturn of 2007/2008
- Cheap gas - new jobs, greater competitiveness of the U.S. industry
- 2015 – first shipments of American LNG from the so-called lower 48 states
- extent unclear, but the decision has been made
- the global energy landscape will be remade – pricing mechanisms, demand for natural gas
- the big unknowns – how much, for how long, at what price

The United States on its way to become a net exporter by 2015



The industry in the United States seems to agree with this assumption

Proposed export capacity vs past and present EIA LNG import forecasts



From a global endowment...

- April 2011, the EIA releases the report: *World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States*
- importance: estimating technically recoverable shale gas for select countries/basins, and comparing it with existing reserves, consumption and imports/exports
- „the estimates are uncertain given the relatively sparse data that currently exist”
- Global Shale Gas Initiative (GSGI) as a tool for providing assistance to individual countries in developing more detailed shale gas resource assessments; Poland joined the GSGI in July 2010, along with countries such as China and Jordan
- Significant geopolitical angle of the initiative
 - „For energy-security reasons, we’re interested in having countries like China and India and Eurasian countries develop their own means so they don’t get it from countries of concern for the U.S.”—**David Goldwyn, former Coordinator for International Energy Affairs, U.S. Department of State**

This summary made real news

(World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States, pp. 4)

	2009 Natural Gas Market ⁽¹⁾ (trillion cubic feet, dry basis)			Proved Natural Gas Reserves ⁽²⁾ (trillion cubic feet)	Technically Recoverable Shale Gas Resources (trillion cubic feet)
	Production	Consumption	Imports (Exports)		
Europe					
France	0.03	1.73	98%	0.2	180
Germany	0.51	3.27	84%	6.2	8
Netherlands	2.79	1.72	(62%)	49.0	17
Norway	3.65	0.16	(2,156%)	72.0	83
U.K.	2.09	3.11	33%	9.0	20
Denmark	0.30	0.16	(91%)	2.1	23
Sweden	-	0.04	100%		41
Poland	0.21	0.58	64%	5.8	187
Turkey	0.03	1.24	98%	0.2	15
Ukraine	0.72	1.56	54%	39.0	42
Lithuania	-	0.10	100%		4
Others ⁽³⁾	0.48	0.95	50%	2.71	19

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North America					
United States ⁽⁴⁾	20.6	22.8	10%	272.5	862
Canada	5.63	3.01	(87%)	62.0	388
Mexico	1.77	2.15	18%	12.0	681
Asia					
China	2.93	3.08	5%	107.0	1,275
India	1.43	1.87	24%	37.9	63
Pakistan	1.36	1.36	-	29.7	51
Africa					
South Africa	0.07	0.19	63%	-	485
Libya	0.56	0.21	(165%)	54.7	290
Tunisia	0.13	0.17	26%	2.3	18
Algeria	2.88	1.02	(183%)	159.0	231
Morocco	0.00	0.02	90%	0.1	11
Western Sahara	-	-		-	7
Mauritania	-	-		1.0	0
South America					
Venezuela	0.65	0.71	9%	178.9	11
Colombia	0.37	0.31	(21%)	4.0	19
Argentina	1.46	1.52	4%	13.4	774
Brazil	0.36	0.66	45%	12.9	226
Chile	0.05	0.10	52%	3.5	64
Uruguay	-	0.00	100%		21
Paraguay	-	-			62
Bolivia	0.45	0.10	(346%)	26.5	48

...to worldwide interest

- China inviting investors, entering into first PSAs with major IOCs, acquiring assets in North America – ambitious goals
- Argentina is reported to have third-largest deposits, but investor climate shaky, deep doubts whether E&P can be profitable
- Algeria keen to attract foreign investors with tax breaks – the aim is to double the production by 2030
- Turkey—official statements about the interest of oil/gas majors in exploratory works (March 2012) – concerns similar as elsewhere (current account deficit, alternatives, economic feasibility, environment, etc.)

Shale gas in Europe: stairway to heaven or highway to hell?

- the EU not principally opposed to shale gas, but different institutions pursue different goals
- the European Commission (EC) – do not entice, do not discourage
- the EC certainly can impact the general conditions of mining activity in the EU (concessions granting oversight)
- the focus of the EC is expanding, and includes not just DG Energy, but also DG Environment, DG Climate Action – it reflects the dilemma that the EC is facing/is likely to face...
 - subsidiarity and giving the member states a free hand vs. more actively supporting renewables and decarbonisation, thus handicapping new sources of fossil fuels
- official position – current regulations adequate for this scale of exploration activities

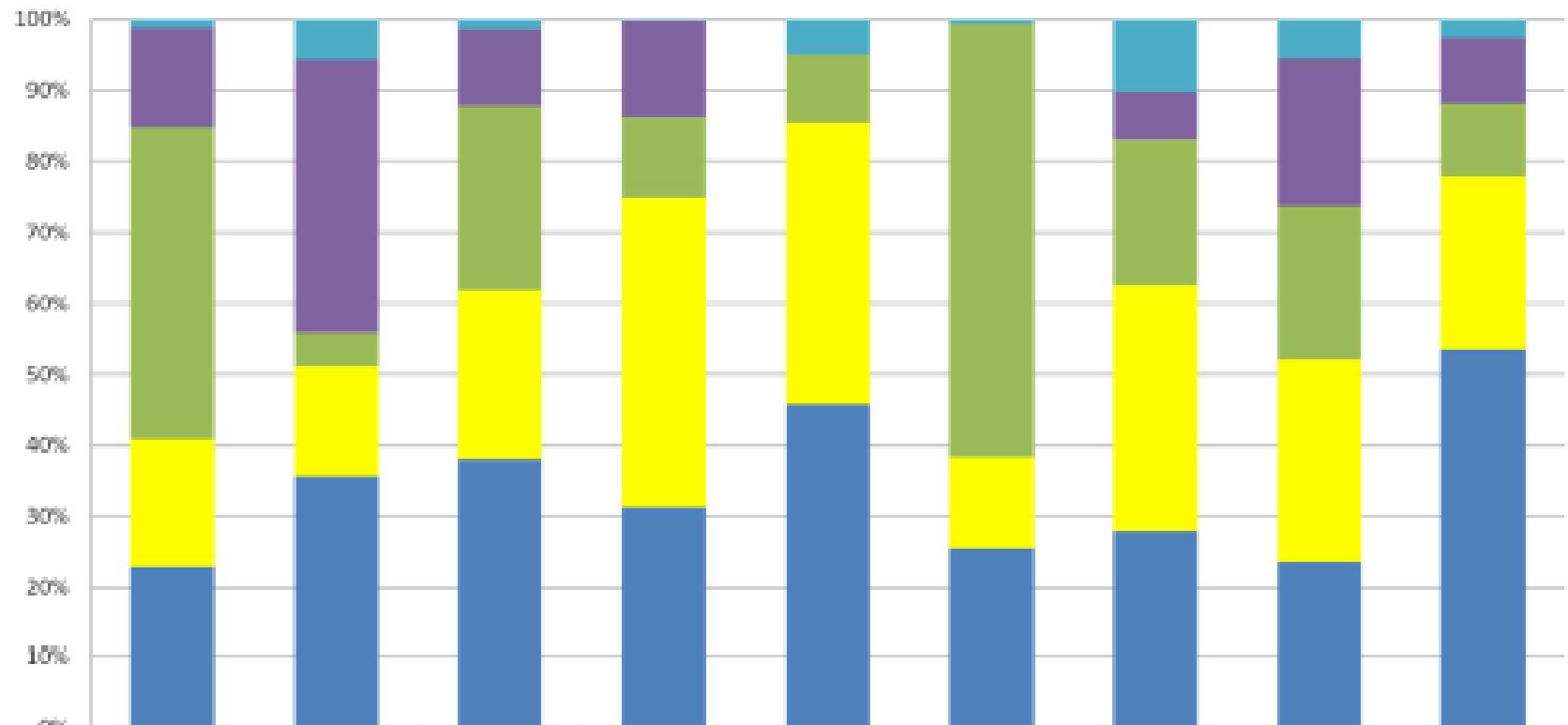
EU-level institutional tug-of-war

- ...and it reflects a reaction to the activities of other institutions, most notably the European Parliament
- no stand-alone law –making authority
- looking for „a place under the sun” in the post-Lisbon institutional environment
- outcome—a lot of interest: working groups, briefings, reports, draft resolutions → more harm than good?

Capping energy resources: nation-states in control

- decisions by various member states to encourage/ban/ignore shale gas E&P reflect the divergences of economic/political priorities, and varying degrees of social sensitivity
- modalities of the debates on national levels
 - overall approach to the energy vs. climate policy dilemma – what will we need natural gas (and fossil fuels) for?
 - role of natural gas in the overall energy mix and „vested interests”
 - producer? exporter? how dependent on imports? degree of diversification?
 - security of supply (contractual arrangements, infrastructure)
 - lessons from France, the Czech Republic, Bulgaria

Energy mix



	Czech Republic	France	Germany	Hungary	Italy	Poland	Romania	Slovakia	Spain
Hydro electric	1,24%	5,56%	1,43%	0,19%	5,00%	0,66%	10,29%	5,45%	2,62%
Nuclear Energy	13,84%	38,64%	10,82%	13,55%	0,00%	0,00%	6,72%	20,83%	9,28%
Coal	44,02%	4,63%	26,00%	11,30%	9,60%	60,96%	20,41%	21,68%	10,14%
Natural Gas	18,03%	15,43%	23,73%	43,69%	39,59%	12,84%	34,63%	28,45%	24,38%
Oil	21,86%	35,74%	38,02%	31,27%	45,80%	25,54%	28,02%	23,59%	53,58%

Source:

Ministry of Economy of Poland, Department of Oil and Gas

The fossil fuel import dependency

Country	Natural gas [%]	Total fossil fuel import dependency [%]
Poland	73,0	31,9
Czech Republic	98,6	27,4
Germany	84,1	63,2
Italy	93,2	90,0
Spain	101	89,3
France	97,9	52,7
United Kingdom	26,1	27,4
Slovakia	96,3	65,9
Denmark	-120,6	-26,6
Portugal	100	87,9

Source:

Ministry of Economy of Poland, Department of Oil and Gas

Poland—the European shale gas frontrunner...

- first concession granted already in 2006, but the interest did not surface until late 2009 → first oil & gas majors (Conoco-Phillips, Marathon, Talisman, ExxonMobil) declare interest/acquire licenses
 - National Energy Strategy of 2009 silent on shale
 - little/no indication of political interest
- fast-forward to Dec. 2012 → over 100 concessions; over 30 are „active”; over 10 reached the horizontal drilling stage; BUT only three have been fracked; \$ 1 billion spent on exploration
- political consensus; fairly high public acceptance

...but not quite a Central European emirate (yet)

- size of the resource base—still largely speculative
 - the 2011 EIA report puts the estimate at 5,3 trillion cubic meters; the documented conventional deposits at ca. 100 billion cubic meters; annual production at 4 billion
 - early 2012 estimate of the (Polish) National Geological Institute – anywhere between 350 and 750 billion cubic meters
 - the Ministry of Environment intends to publish a new estimate after 100 test wells have been fracked
- competitiveness of the tax/regulatory regime—unknown/untested → economic viability up in the air
- administrative/regulatory capacity, environmental enforcement
- the „ExxonMobil factor”
- further spectacular resignations, public opposition, the time factor (production not expected until 2020-2025!) → do we have a plan B?

Lessons from North America (or what shouldn't we be looking for)

- impossible to duplicate the U.S. and (to a lesser extent) Canadian experience in Europe
 - forget self-sufficiency, imports likely to continue
 - more difficult access to land/water resources
 - will there be sufficient hardware?
 - the „shale constituencies” → different requirements for the industry to obtain a social license to operate
- this creates an obvious dilemma → how to invoke the North American experience if Europe will follow a different path (qualitatively/quantitatively)?

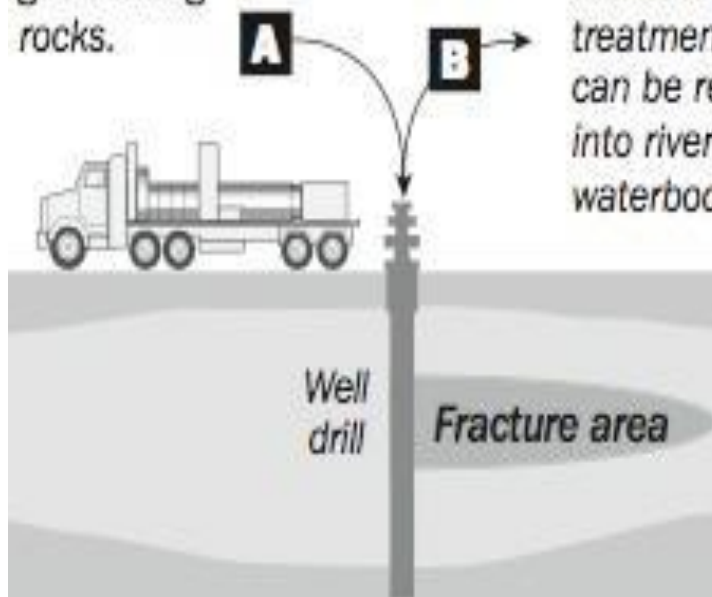
How is this useful?

- a better understanding of the environmental impact
- more accurate assessment of the resource base
- sustainability of production from unconventional deposits
- ways to exploit economies of scale
- perhaps crucially → how to stay ahead of the game technologically, in regulatory/fiscal domain, etc.
- in the U.S., the industry was steering the developments, hence a lot of popular backlash
 - in Europe, national governments are already at the helm

Conventional fracking

A A high-pressure blend of millions of gallons of water, along with drilling chemicals and sand, is injected deep underground to break up natural gas-bearing rocks.

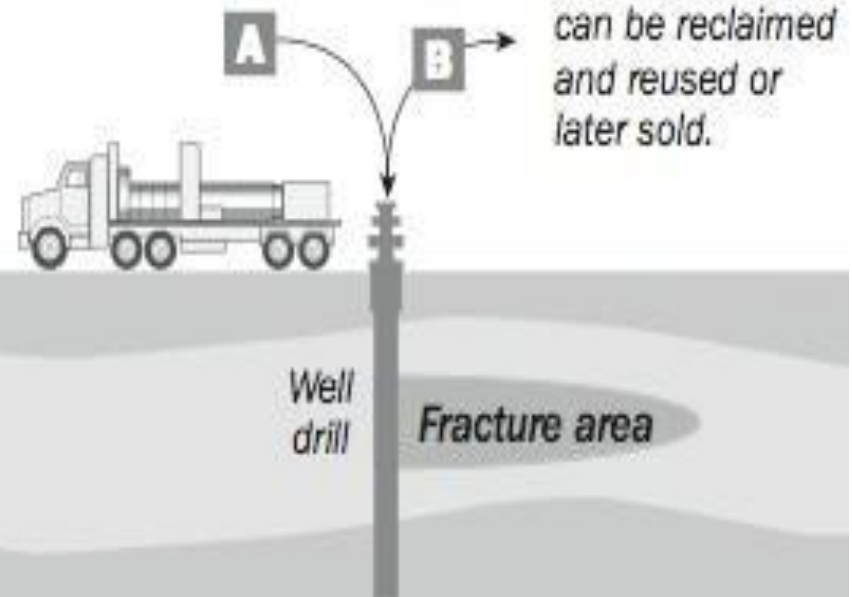
B Some of that water, now polluted, returns to the surface under pressure with the rising natural gas. Polluted with chemicals, as well as naturally-occurring salts and mild radioactivity, the water requires treatment before it can be released into rivers or other waterbodies.



Liquid propane fracking

A A gel made from liquefied propane gas, along with sand, is injected underground.

B Under pressure and heat, the gel reverts to vapor, fracturing rock, then returning to the surface with the freed natural gas. The vapor does not carry salts or mild radioactivity, and it can be reclaimed and reused or later sold.



Natural gas, and shale gas in particular: a Polish-Turkish opportunity

- differences when it comes to natural gas' role in the energy mix (electricity generation!) and import dependency...
- ...and some similarities in dependence on a dominant supplier, and her preferred contractual arrangements
- neither country is currently a major producer, or has sufficient possibilities to replace existing suppliers → price takers
- but Turkey far more advanced in liberalizing gas trade/market
- differences vis-a-vis their respective roles as transit countries...
- ...and similarities when it comes to the need to (further) increase the role of natural gas in the energy mix
- liquified natural gas (LNG) – Poland as a newcomer, Turkey as an established customer
- no giant leaps forward should be expected (neither are they necessary), but definitely room for:
 - mid-level cooperation (technical, legal, procedural)
 - joint pilot projects, exchange of information
 - expert discussions—not just geologists!



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