ERECC Factsheet

Shale Gas and its impact on Renewable Energy Sources

Last update – June 2013

Key Conclusions:

- **Scepticism around the economics of shale gas**: Shale gas in the US is often presented as a “game-changer”. However, there is scepticism around the economics of shale gas, notably due to the unprofitability of its business model in the US.

- **Shale gas may divert investment away from renewable energy**: Analyses emphasise the threat that shale gas development may pose to the development of renewable energy sources (RES) by diverting private and public investments away from RES.

- **70% of Europeans see renewables as an energy priority for the next 30 years**: According to a 2013 Eurobarometer survey, less than one in ten EU citizens thought that unconventional fossil fuels, such as shale gas, should be an energy priority for the next 30 years while 70% see renewables as a priority.

- The EU should make sure that all environmental and health costs of shale gas are reflected in its price according to the ‘polluter-pays’ principle.
The downward impact of shale gas on gas prices in the US

The surge in shale gas production in the US has led to a massive supply increase, from approx 4bn cubic feet per day in January 2007 to 27bn cubic feet per day in November 2012.

This increased supply has led to a large decline in the US gas price from nearly $7/MMBtu in 2007 to below $3/MMBtu by the end of 2012\(^1\).

Figure 1 shows the evolution of gas prices in the US from 2005 to 2012.

![Gas Price $/MMBtu](image)

While this decline is dramatic (71% from 2005 to 2012), it does in fact mimic the decline we have seen in some renewable energy technologies in recent years\(^2\).

However, this decrease in the US shale gas price has been driven by the lack of environmental regulation for shale gas production in the US. These prices do not reflect environmental and system costs, as well as other externalities.

---

\(^1\) MMBtu = Million British thermal units

\(^2\) PV system prices decreased from €6.5/W in 2007 to €1.5/W in 2012 (76%). Roughly 40% cost reduction was achieved by concentrated solar power since 2007. Onshore wind investment costs fell by 10% from 2008 to 2012.
The wobbly economics of shale gas

Breakeven costs vary from source to source:

- World Energy Council: $4/MMBtu to $8/MMBtu
- Joint Research Center (JRC): $3/MMBtu to $7/MMBtu
- International Energy Agency (IEA): $5/MMBtu - $7/MMBtu for dry wells (wells containing gas only)

According to Navigant Consulting, US gas electricity prices in 2012 are between $3 and $4 per MMBtu. The breakeven figures above show a clear mismatch between production costs and the present prices i.e. shale gas production is yielding heavy losses.

As a result, many shale gas producers in the US are in financial difficulty: A detailed analysis of the financial data accounts of 18 of the top shale gas producers by Bernstein Research shows that capital expenditure on land acquisitions and now drilling exceeds cash flow (by as much as 511% in the worst example, Carrizo Oil & Gas) and they are still heavily laden with debt. If shale gas was profitable, the cost of expanding production would be financed through cash flow; this is clearly not the case.

Testimonies from shale gas producers in the US have not been encouraging:

Exxon Mobil CEO, Rex Tillerson, said in a talk before the Council on Foreign Relations: “What I can tell you is the cost to supply is not $2.50. We are all losing our shirts today. We’re making no money. It’s all in the red”.

In October 2012, Statoil announced that they were selling 180 US shale gas wells, only one year after it bought Brigham Exploration Co. in October 2011.

British Group has just made a $1.3m write-off on its US shale gas acquisitions.

Shale gas producers are taking heavy losses now and hoping prices increase dramatically in the coming years. The US EIA forecasts that the 2012 gas price will have more than doubled by 2030.

This paints less a picture of a 'shale gas revolution' and more one of loss making companies inflating unsustainable debt bubbles which will fail to keep energy prices low in the medium term and cause fossil fuel lock-in in the long term.
Limited prospects for shale gas in the EU

It is difficult to predict what impact shale gas exploitation would have on the European energy market. However, viewing research and analysis in the context of the US experience with shale gas does infer some knowledge:

- The first studies from Wood MacKenzie\(^\text{11}\), Bloomberg\(^\text{12}\) and KPMG\(^\text{13}\) have shown that even with public subsidies, shale gas production in Europe will not have any real impacts on energy security or lower gas prices.

- According to the JRC: “The best case scenario for shale gas development in Europe is one in which declining conventional production can be replaced and import dependence maintained at a level around 60%.”\(^\text{14}\).

- Shale extraction in Europe will not be as cheap as in North America. Studies put the breakeven point for European shale gas at approximately twice that of US shale gas.

<table>
<thead>
<tr>
<th>Study</th>
<th>US break even estimate</th>
<th>Europe break even estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>JRC(^\text{15})</td>
<td>$3/MMBtu to $7/MMBtu</td>
<td>$5/MMBtu - $12/MMBtu</td>
</tr>
<tr>
<td>IEA(^\text{16})</td>
<td>$3/MMBtu - $7/MMBtu for dry wells (wells containing gas only)</td>
<td>$5/MMBtu - $10/MMBtu</td>
</tr>
</tbody>
</table>

- European citizens do not want shale gas, they want renewables. A Eurobarometer survey from January, 2013 found that 74% of EU citizens would be concerned if there was a shale gas project located in their neighbourhood, with 40% being very concerned. Less than one in ten EU citizens thought that unconventional fossil fuels, such as shale gas, should be an energy priority for the next 30 years while 70% see renewables as a priority\(^\text{17}\).

- The European Commission has environmental concerns with regard shale gas and stated that: “Extracting shale gas generally imposes a larger environmental footprint than conventional gas development. Risks of surface and ground water contamination, water resource depletion, air and noise emissions, land take, disturbance to biodiversity and impacts related to traffic are deemed to be high in the case of cumulative projects.”\(^\text{18}\). The Commission has also noted that: “Shale gas

---

\(^{12}\) Bloomberg New Energy Finance: UK shale gas has no ‘get out of jail free card’. February 2013.
\(^{13}\) KPMG: Central and Eastern European Shale Gas Outlook. May 2012
\(^{18}\) European Commission: Support to the identification of potential risks to the environment and human health arising from hydrocarbon operations involving hydraulic fracturing in Europe. August 2012.
produced in the EU causes more GHG emissions than conventional natural gas produced in the EU\textsuperscript{19}.

- Europe’s geology and population density differs greatly to the US, which will have implications for shale gas production, considering the high density of drilling required\textsuperscript{20}.

This goes some way to explaining the highly skeptical attitude of Europeans towards unconventional fossil fuels.

\textbf{The impact of shale gas developments on the EU energy market}

US shale gas production since 2007 has impacted several power generation technologies, notably coal. Burning more gas instead of coal leaves a surplus of coal in the US that is being exported to Europe. As a result, US coal exports to the EU have increased by 187\% from 2005 to 2011.

In Europe, cheap coal imported from the US displaces gas from the grid, as renewables have priority dispatch and nuclear is expensive to ramp up and down. Consequently, cheap US coal imports favour the most CO\textsubscript{2} intensive power technology in Europe and could be creating an increase in emissions.

\textbf{The impact of shale gas development on RES}

\textbf{Private investment:}

Most analyses emphasise the threat that shale gas poses to the deployment of renewable energy sources, as cheap natural gas provides an alternative source of energy at a lower price, and as such potentially diverts investment away from renewables. This is the line followed by the International Energy Agency (IEA) in its report on the ‘Golden Age of Gas’.

A report by the Citibank however states that additional gas-fired power – including from shale gas – may, in the case of variable renewable energy technologies, be beneficial from an overall system perspective\textsuperscript{21}.

A Bloomberg New Energy Finance report observes the effects of shale gas on the US renewable energy market leading to decreased RES investments in the US in 2012 compared to the year before\textsuperscript{22}. Similarly, report by MIT looking at US energy scenarios found that shale gas development suppresses the development of the renewables sector\textsuperscript{23}.

\textbf{Public investment:}

Some initiatives have already shown a possible diversion from European public funds towards shale gas at the expense of RES. The Council of Ministers of the EU has added gas to the list of “low carbon

\textsuperscript{19} European Commission: Climate impact of potential shale gas production in the EU, July 2012
\textsuperscript{21} Citi Research: Shale gas and renewables: a symbiotic relationship, September 2012
\textsuperscript{22} Le Monde: Baisse des investissements dans les énergies renouvelables en 2012, January 2013
\textsuperscript{23} MIT: Shale gas revolution report, 2012
technologies” which could benefit from Horizon 2020 R&D funding. This reduces the overall amount of research money dedicated to renewable energy\textsuperscript{24}.

Some European governments are promising to provide a “generous new tax regime”\textsuperscript{25} or to allocate public funding to facilitate the development of the shale gas industry\textsuperscript{26}. The European Investment Bank is also considering funding shale gas projects for its revised energy lending policy\textsuperscript{27}. Such measures, in times of scarcity, compete with the RES sector for public support.

\section*{Limited interest of Member States in shale gas}

To date, there has not been any commercial production of shale gas in Europe.

\textbf{If the EU wishes to address the issue of shale gas, it should make sure that all environmental and health costs of shale gas are reflected in its price according to the ‘polluter-pays’ principle.}

\section*{France}

Despite promising estimates, on 30 June 2011, France became the first country in Europe to impose a ban on hydraulic fracturing. On Monday 29\textsuperscript{th} of August 2012 Industry Minister Arnaud Montebourg said: France isn’t prepared to tap its shale energy resources until “clean technologies” are invented to replace hydraulic fracturing\textsuperscript{28}.

\section*{Poland}

Poland’s resources are according to the Polish Geological Institute around 500 bcm (billion cubic metres), one tenth the initial US Energy Information Administration’s estimate\textsuperscript{29}. In the past 12 months, ExxonMobil, Talisman Energy and Marathon oil have all pulled out of shale exploration in Poland after unimpressive test results\textsuperscript{30}.

Citibank have also raised concerns over Polish shale, saying “Since 2007, (Poland) has rushed to develop its shale resources, producers have so far failed to establish a viable shale gas industry, despite 112 exploration licenses having been issued”\textsuperscript{31}.

Despite all this the Polish Minister of Budget declared that his Government would spend €12.5 billion until 2020 to facilitate the development of the shale gas industry in Poland\textsuperscript{32}.

\section*{Bulgaria}

Bulgaria became in January 2012 the second European country after France to ban exploratory drilling for shale gas via hydraulic fracturing.

\begin{itemize}
  \item \textsuperscript{24} Guardian: Gas rebranded as green energy by EU. May 2012
  \item \textsuperscript{25} Financial Times: Budget 2013: Support for shale gas sector. March 2013
  \item \textsuperscript{26} http://www.liberation.fr/terre/2012/10/13/la-pologne-mise-sur-le-gaz-de-schiste_853047
  \item \textsuperscript{27} http://www.eib.europa.eu/about/partners/cso/consultations/item/public-consultation-on-eibs-energy-lending-policy.htm
  \item \textsuperscript{28} Bloomberg: France to keep shale ban until fracking alternative emerges. August 2012.
  \item \textsuperscript{29} UPI: Lower Poland shale gas reserves estimated. March 2013.
  \item \textsuperscript{30} Platts: Bleak mood for Polish shale after Marathon, Talisman exits. May 2013.
  \item \textsuperscript{31} https://ir.citi.com/586mD+JRvPXd2COZC6Jt02hIqcsXfPTw4HaBO9dAJW0gfNfCIUTTA==
  \item \textsuperscript{32} http://www.liberation.fr/terre/2012/10/13/la-pologne-mise-sur-le-gaz-de-schiste_853047
\end{itemize}
Ireland

Ireland has had a moratorium on fracking since 2011, until the results of a Government commissioned impact assessment are published\(^{33}\). These results will probably not be available until 2015.

**Austria, Hungary and the Czech Republic**

Shale exploration is on hold in the Czech Republic due to environmental concerns\(^{34}\).

The introduction of a law in Austria obliges companies to have a detailed environmental inspection before each planned project but this raises the costs. Austrian energy group OMV (Österreichische Mineralölverwaltung) has abandoned plans to produce shale gas in Austria because addressing all environmental concerns related to fracking makes the projects economically unviable\(^{35}\).

**United Kingdom**

The UK Finance minister has said that generous tax breaks would be introduced for shale gas\(^{36}\). However a recent government report concluded that the Government should not rely on shale gas contributing to the UK’s energy system, that it is unclear whether domestic production of shale gas could result in price decreases and that unchecked development of shale gas may be incompatible with the UK’s climate change objectives\(^{37}\).

---

33 Irish Times: No ‘fracking’ until further study says Rabbitte. May 2012.
35 Reuters: OMV abandons Austrian shale gas plans. September 2012
36 http://www.reuters.com/article/2013/03/20/britain-budget-shale-idUSBRE8N0CCDFC20130320