Shale Gas in USA, Europe and Russia: without illusions

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7 December 2012, Warsaw
**Global shale gas resources**

**Table 6** Estimates of unconventional natural gas in place by type, in Gtoe

<table>
<thead>
<tr>
<th>Region</th>
<th>Coalbed methane</th>
<th>Gas from fractured shales</th>
<th>Tight formation</th>
<th>Methane hydrates</th>
<th>Remaining in-situ</th>
<th>Total non-conventional occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAM</td>
<td>77</td>
<td>98</td>
<td>35</td>
<td>6,089</td>
<td>20</td>
<td>6,319</td>
</tr>
<tr>
<td>LAM</td>
<td>1</td>
<td>54</td>
<td>33</td>
<td>4,567</td>
<td>8</td>
<td>4,662</td>
</tr>
<tr>
<td>WEU</td>
<td>4</td>
<td>13</td>
<td>9</td>
<td>761</td>
<td>7</td>
<td>794</td>
</tr>
<tr>
<td>EEU</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>FSU</td>
<td>101</td>
<td>16</td>
<td>23</td>
<td>4,186</td>
<td>42</td>
<td>4,367</td>
</tr>
<tr>
<td>MEA</td>
<td>0</td>
<td>65</td>
<td>21</td>
<td>190</td>
<td>25</td>
<td>302</td>
</tr>
<tr>
<td>AFR</td>
<td>1</td>
<td>7</td>
<td>20</td>
<td>381</td>
<td>4</td>
<td>413</td>
</tr>
<tr>
<td>CPA</td>
<td>31</td>
<td>90</td>
<td>9</td>
<td>381</td>
<td>3</td>
<td>514</td>
</tr>
<tr>
<td>PAO</td>
<td>12</td>
<td>59</td>
<td>18</td>
<td>1,522</td>
<td>1</td>
<td>1,612</td>
</tr>
<tr>
<td>PAS</td>
<td>0</td>
<td>8</td>
<td>14</td>
<td>190</td>
<td>4</td>
<td>217</td>
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<tr>
<td>SAS</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>381</td>
<td>2</td>
<td>389</td>
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<tr>
<td>World</td>
<td>232</td>
<td>411</td>
<td>189</td>
<td>18,647</td>
<td>117</td>
<td>19,595</td>
</tr>
</tbody>
</table>

`¹Gas remaining in-situ after commercial production of conventional natural gas has ceased (own estimates).`  
`¹Data adapted or modified from these references.`

**H-H. Rogner:** «The data in the following tables are speculative and should be read as such, particularly the regional distribution estimates, which in many cases are highly speculative.»

Russian shale gas resources (D1 category and above) count 48.8 tcm which are generally concentrated in Western and Eastern Siberia.
# Proved gas reserves and TRR for shale gas in USA, Europe and Russia

The difference between proved reserves and TRR shale gas in US is 1.5 times and 10 times for Europe. Evaluation for shale gas in Europe is very generous but far less responsible, without taking into consideration specific geologic conditions of shale gas layers.

<table>
<thead>
<tr>
<th></th>
<th>Proved reserves</th>
<th>TRR shale gas</th>
<th>Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>8.79</td>
<td>13.56</td>
<td>1.54</td>
</tr>
<tr>
<td>Europe</td>
<td>1.7</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Russia</td>
<td>44.6</td>
<td>48.8</td>
<td>1.1</td>
</tr>
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</table>
Breakeven price for natural gas in US

Breakeven gas price can be zero

Average Henry Hub price for 2012

Episode 2: economics
Nearly 70% of the shale gas sector production is hedged by US companies.
From 2006 Chesapeake earned 8.7 billion dollars on such operations, nearly 50 USD per 1000 cm. Another financial instrument is Volumetric Production Payment (VPP) in the last 5 years it has given Chesapeake 6.4 billion dollars of extra income.
Potential and not very significant export of LNG from North America is likely to be directed to Latin America and Asia. We do not expect a lot of supplies to Europe till 2020.
Indigenous production in Europe

Episode 4: forecasts
Conclusions for shale gas part in terms of European-Russian gas relationships

• Evaluation for shale gas in Europe is very generous but far less responsible, without taking into consideration specific geologic conditions of shale gas layers.

• The economic of shale gas production in US is very specific. Wellhead prices for shale gas are quite expensive, and a positive side is cheap logistics and the production of gas, Liquids and oil simultaneously. European shale gas production conditions are much differ than in the USA and its production economy will also be different.

• Potential and not very significant export of LNG from North America is likely to be directed to Latin America and Asia. We do not expect a lot of supplies to Europe till 2020.

• Small European shale gas volume in medium-term can not fully compensate a sharp gas production decrease in EU and can not affect the market situation and import flows into the region.

• Shale gas in middle term isn't a real challenge for the Russian gas itself, it is more likely to be a challenge for Gazprom which should take into account this aspect in world gas markets development.
Main directions of the European gas market transformation do not favor Russian export

- Growing supplies of LNG
- Diversification of pipeline supply sources

- Spot volumes are increasing very fast (30-40% p.a.)
- Majority of the European stakeholders support transition to the spot pricing

- Lower than contracted volumes
- Recovers very slowly
- In the power sector gas is strongly competing with coal

- Third package and Unbundling
- Gas Target Model requires all gas to be supplied at the virtual hubs
European supply outlook till 2020, %

- Indigenous production
- Russia
- Norway
- LNG
- Algeria
- Libya
- Azeri

Only two sectors – LNG and Russian export – show the same growth up to 2020.