Russian Gas Issues

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## The Russian Gas Matrix: major building blocks 2011 (2012)

<table>
<thead>
<tr>
<th>SUPPLY (major variables)</th>
<th>DEMAND (major variables)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAZPROM PRODUCTION:</strong></td>
<td>RUSSIAN DEMAND: GDP, price reform, capital stock turnover</td>
</tr>
<tr>
<td>(Yamal production, other NPT)</td>
<td>473 (465) Bcm</td>
</tr>
<tr>
<td>513 (488) Bcm</td>
<td></td>
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<tr>
<td><strong>NON-GAZPROM PRODUCTION:</strong></td>
<td>EXPORTS TO CIS: volume, price relationships with Ukraine and Belarus</td>
</tr>
<tr>
<td>Gazprom relationships, tax, terms of network use</td>
<td>82 (66) Bcm</td>
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<tr>
<td>157 (169) Bcm</td>
<td></td>
</tr>
<tr>
<td><strong>CENTRAL ASIAN IMPORTS:</strong></td>
<td>EXPORTS TO EUROPE: long term contracts, new transit pipelines</td>
</tr>
<tr>
<td>individual relationships, competition from China</td>
<td>150 (138) Bcm</td>
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<tr>
<td>35 (32) Bcm</td>
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</tbody>
</table>

Complex issues for all elements!
The balance of market relevance for Russia is changing slowly

Historic pricing trends have always favoured exports to Europe

Europe continues to dominate Gazprom’s revenues in 2012, but the share of FSU sales has increased sharply

Domestic sales only account for 24% of the Gazprom total, despite an 8-fold increase in prices over the past decade
Russia’s export volumes declined sharply during the 2008/09 economic crisis and have not recovered since.

Prices for Russian gas, that remain linked to oil prices, have compensated for this loss of volumes, but have reduced Gazprom’s competitiveness.

Gazprom’s position is also being challenged by a number of arbitration cases and by the EU Competition Directorate.
Gazprom’s strategy may be validated in the short term but carries longer term risks

Prices for Russian gas versus spot price

European gas demand trends

- Gazprom is maintaining its strategy of oil-linked pricing, preferring a high price over high volumes

- This is a perfectly valid strategy, and may pay dividends in a tight market, but is somewhat risky in a stagnant longer term demand scenario

- Gazprom has shown retro-active pricing flexibility, but the ongoing impact of renewables/coal and/or the arrival of new competing gas from North America could undermine its position
FSU markets are responding to price signals and are demonstrating how Russia can lose “captive” markets.

- Average prices from Russia to FSU countries have moved towards, or even above, European netback levels.

- Sales of Russian gas have declined as a result, as countries look to reduce demand and/or diversify supply.

- Ukraine is the best example of this; demand is down and the search is on for increased indigenous supply and alternative sources of imports.
  - Lithuania is another example of potential destruction of demand for Russian gas.
Why so many export pipes? You need to be very confident about the outlook for European gas demand to need this much capacity.

Total existing capacity – 250bcm
Plus:
Nord Stream 3 - 27.5bcm
South Stream - 63bcm
Nord Stream 4 - 27.5bcm
Yamal Europe 2 - 33bcm
Total planned - 151bcm

A high price to pay for geo-political influence and security of supply?
Russia’s domestic market is demonstrating similar trends with demand growth stalling as prices rise

- Russian gas demand fell by 1.6% in 2012 and is set to rise by only 0.75% p.a. to 2020, in reaction to a quadrupling of prices in 10 years

- Gazprom’s market share has been falling consistently over the past decade and could be below 50% by 2020

- Novatek and Rosneft both aim to produce and sell 100bcma + by 2020, while total Independent production could reach 300bcma by then

- The balance of the market is adjusting to a new more competitive landscape
Rising prices have encouraged competition from new suppliers

Meanwhile demand for Russian gas in all its markets has stagnated

It would therefore appear that Russia has an excess of potential gas supply

Independent producers have been signing long-term contracts with consumers to secure market share
Non-Gazprom Russian Supply is set to expand rapidly

Potential NGP gas production in 2020

- Novatek has been at the forefront of 3rd party gas supply in Russia and has plans to double output by 2020
- Rosneft has become the major new entrant through organic and inorganic growth, and has aggressively gained new customers
- Total 3rd party production can double by 2020, and existing contracts underpin much of that growth potential
Gazprom’s natural dominance is starting to be eroded

- Gazprom has historically dominated via ownership of UGSS, involvement in Gas Balance and lack of transparency in transport arrangements
- Low regulated prices have also discouraged customers from switching unless absolutely necessary
- However, NGPs are now selling at discounted prices while continuing to make money
- Better contractual terms are also being offered (take-or-pay levels)
Gazprom is becoming the swing producer using controlled growth of Yamal output

Peak output pushed back

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Old Peak</th>
<th>New Peak</th>
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</thead>
<tbody>
<tr>
<td>Bovanenkovo</td>
<td>2018</td>
<td>2021</td>
</tr>
<tr>
<td>Kharasavey</td>
<td>2022</td>
<td>2023</td>
</tr>
<tr>
<td>Severo-Kamennomysskoye</td>
<td>2022</td>
<td>2024</td>
</tr>
<tr>
<td>Kamennomysskoye-more</td>
<td>2025</td>
<td>2027</td>
</tr>
<tr>
<td>Yuzhno-kirinskoye</td>
<td>2020</td>
<td>2023</td>
</tr>
<tr>
<td>Kirinskoye</td>
<td>2015</td>
<td>2018</td>
</tr>
<tr>
<td>Pestsovoye</td>
<td>2019</td>
<td>2020</td>
</tr>
</tbody>
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Yamal becoming the source of future production growth and flexibility

- Gazprom has significantly downgraded its production forecast from 650bcm to 540bcm in 2020
- Peak output at major field developments, including Bovanenko, have been pushed back by 2-3 years
- Yamal is becoming the engine of production growth but will also increasingly turn Gazprom into a relatively high cost swing producer in Russia
Domestic gas prices have reached a quasi-equilibrium, within a regulated context

3 steps towards market-based pricing system

- The theoretical oversupply of gas in Russia has raised questions about why regulated gas prices need to rise, particularly towards netback parity
- Initial reaction was to slow growth to 5% per annum, but this may become 0% in 2014
- The introduction of a Gas Exchange could help to establish a true market price, but may take time to evolve
Russia sees eastern gas sales as key to Gazprom’s strategy to 2030

- Russia regards gasification of its eastern provinces as a key strategic priority
- Increased export sales will be vital to underpin the economics of supply developments
- Gazprom’s production growth will rely on growing eastern output, as it faces more competition west of the Urals
- It would therefore appear to be in Russia’s interest to conclude an agreement with China
- Competitive tension is also being created via discussions on piped gas exports to Korea, LNG from Vladivostok and potential Sakhalin expansion
Gazprom’s domination of the Eastern Gas Programme can be a key source of growth

- Gazprom controls more than 4tcm of eastern gas reserves
- The Russian Administration is keen to encourage economic development in the region
- The geo-political importance of exports into China and Asia means that it will monopolise export sales and drive the timing of investment
However, lots of the same issues as in Europe/FSU/Domestic markets

- Uncertain demand outlook
- Price formation mechanism and price level
- Geo-political versus commercial priority – gasification of Eastern Russia, relations with China/Japan
- Competition from international sources of supply
- Changing levels of Russian corporate influence reflected in questions over Gazprom export monopoly
- Division of exports between pipeline and LNG
- Russian budget requirements – export tax from pipeline sales
Russia is facing a competition for supply into the growing Asian gas market. Russia’s potential eastern gas exports include W. Canada shale, US shale, Argentina shale, Brazil pre-salt, E. Siberia, Sakhalin, Queensland CBM, N. / N.W. Australia, W. Siberia, Yamal, Caspian, N. Sea, Barents Sea, Europe, N. Sea, Gas export / import province name, Gas import province.

Legend:
- Established gas export province / flows
- Emerging gas export province / flows

Impact of North American markets on price formation:
- Will Russia’s firm stance on oil-linked pricing undermine its potential for sales into Asia?
- Can the an offer of upstream equity offset differences over price?
Within Russia there appears to be some debate about how that competition should be addressed.

- Rosneft and Novatek are already signing contracts with Asian buyers.
- Novatek’s Yamal LNG project will inevitably compete in the Atlantic Basin.
- Can Gazprom find an adequate response that optimises the outcome for Russia?
Russia is facing multiple challenges in the gas sector

- The Russian gas sector, and Gazprom in particular, is experiencing increasing competition in all its markets
- In Europe, Gazprom’s position is being challenged by the EU authorities, by slack demand and by alternative supplies
- In the FSU, high prices are encouraging increased efficiency and diversification
- Progress is starting to be made towards Asia, but Gazprom’s export monopoly may soon be broken in this new region for Russian gas exports
- The question of Gazprom’s future as the dominant player across the Russian gas sector is at least a subject now worthy of debate
- Radical change may become a necessity if Russia is to retain its competitive position in the global energy economy