RUSSIAN-CHINESE ENERGY COOPERATION OUTLOOK

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Energy is a Key Driver of Russian-Chinese Economic Cooperation

- In 2016 energy goods (petroleum and petroleum products, coal and electricity) provide about 60% of total export from Russia to China.

- More than 80% of the Chinese FDI flows in Russia directed to Russian Energy Sector.

**Export from Russia to China**

**Major energy deals and loans between Russian and Chinese companies**

<table>
<thead>
<tr>
<th>Year</th>
<th>Agreement</th>
<th>USD*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>China National Petroleum Company (CNPC) loan to Rosneft</td>
<td>6 bn</td>
</tr>
<tr>
<td>2006</td>
<td>CNPC (49%) and Rosneft establish Vostok Energy Ltd</td>
<td>–</td>
</tr>
<tr>
<td>2006</td>
<td>Sinopec buys 49% of Rosneft's Udmurtneft</td>
<td>3.5 bn</td>
</tr>
<tr>
<td>2007</td>
<td>Sinopec buys 25% of Rosneft's Sakhalin-3 project</td>
<td>–</td>
</tr>
<tr>
<td>2009</td>
<td>China Development Bank loan to Rosneft and Transneft, enabling the Russia-China oil pipeline (ESPO spur)</td>
<td>25 bn</td>
</tr>
<tr>
<td>2013</td>
<td>CNPC-Rosneft 25-year oil supply deal, doubles oil exports</td>
<td>270 bn</td>
</tr>
<tr>
<td>2013</td>
<td>Sinopec-Rosneft 10-year supply deal</td>
<td>85 bn</td>
</tr>
<tr>
<td>2013</td>
<td>CNPC buys 20% of Novatek’s Yamal LNG Project</td>
<td>5.4 bn</td>
</tr>
<tr>
<td>2014</td>
<td>CNPC-Gazprom gas deal “Power of Siberia” 38 bcm/y</td>
<td>400 bn</td>
</tr>
<tr>
<td>2015</td>
<td>China’s Silk Road Fund buys 9.9% of Yamal LNG Project and provides USD 790 million loan for the project</td>
<td>1.2 bn</td>
</tr>
<tr>
<td>2016</td>
<td>Chinese banks provide 15-year loan to Yamal LNG Project</td>
<td>12 bn</td>
</tr>
</tbody>
</table>

*Estimated at time of agreement (in billions), based on company sources, Vedomosti.ru and Platts.com.

Source: UN Comtrade
In 2016, Russian crude oil export for China equals 52.5 mmt (+24% y/y), Russian petroleum product export for China equals 2.2 mmt (-41% y/y).

The reduction in the Russian petroleum products import is due to the fact that China is becoming a net exporter of petroleum products.
Russia is a Key Crude Oil Exporter for China

In 2016, Russia became the biggest crude oil exporter to China, exceeding Saudi Arabia.

In the 2Q 2017, Russia's share in the China oil imports was 14.6%.

The growth of Russian oil supply to China started in 2013, when the major long-term contracts were signed between Rosneft and CNPC.

Source: General Administration of Customs of People’s Republic of China
Rosneft and CNPC agreed in May 2013 to more than double oil exports to China and increase the capacity of ESPO’s Line 1 to 58 mt by 2015 and 80 mt by 2020.

Planned expansion of ESPO’s Line 2 to Kozmino to 50 mt and a doubling of the Daqing spur to 30 mt by 2020 were also agreed.

Rosneft will have to develop new oil projects to be able to supply the expanded pipeline and fulfill its obligations to its Chinese partners.
Forecast of the structure of natural gas supplies to the Chinese market by 2030

- By 2030, the Russian pipeline gas supply to China, after the launch of the Siberian and Altai gas pipelines, is about 68 bcm.
- The IEA (2016) forecasts a similar growth of the Russian pipeline gas supply to China, estimating that it will reach 80 bcm by 2040, thereby accounting for 30% of total Russian gas exports.
- Current contracted LNG shipments from Russia in China are 3 mtpa from 2018 (Yamal LNG).

Source: JPMorgan, Bloomberg, IEA
Russian Gas Pipeline’s Projects to China

- Russia signed its first contract to ship gas to China (38 bcm a year) from untapped East Siberian fields under a $400 billion deal in 2014
Yamal LNG will be producing 16.5 MTPA of LNG and up to 1.2 MTPA of gas condensate.

The LNG Plant will be built in three phases which are scheduled for start-up in 2017, 2018, and 2019, respectively.

Chinese companies have 30% of the project: CNPC (20%) and Silk Road Fund (9.9%).
Russian Eastern Petrochemical Clusters Are Focused on China

**Angarsk Polymer Plant**
- Capacity: 0.7 mtpa
- Investment: 52 bln RUR
- Upgrading date: after 2020

**Angarsk Petrochemical**
- Capacity: 10.4 mtpa
- Investment: 84 bln RUR
- Upgrading date: 2017

**Achinsk refinery**
- Capacity: 6.9 mtpa
- Investment: 98 bln RUR
- Upgrading date: 2017

**FEPCO**
- Capacity: 12 mtpa
- Investment: 660 bln RUR
- Completion date: 1st line - 2020, 2nd line – 2022
- Processing depth: over 95%
- Petrochemicals (on raw): 3.4 mtpa

**Komsomolsk refinery**
- Capacity: 8.0 mtpa
- Investment: 78 bln RUR
- Upgrading date: 2018

**Khabarovsk**
- Sakhalin LNG
High-tech Cooperation: Services and Equipment

• Nantong COSCO Heavy Industry Co., Ltd – Shipping crane equipment for shipbuilding company “Zvezda”

• Asian Lift PTE LTD - Technical supervision services for the construction of cranes

• China Shipbuilding & Offshore International Co., Ltd and Qingdao Beihai Shipbuilding Heavy Industry Co., Ltd. – Design and construction of a transport-transfer dock with a carrying capacity of 40 thousand tons

• Suzhou Dafang Special Vehicle Co., Ltd - Purchase of equipment (conveyors)

• China Oilfield Services Limited – Drilling in the Sea of Okhotsk

• Sichuan Honghua Petroleum Equipment Co., SJ Petroleum Machinery Co (Sinopec) – Drilling rigs

• Yantai Jereh Oilfield Services, Shandong Kerui Petroleum Equipment – Equipment and services of hydraulic fracturing, coiled tubing
## Key Chinese-Russian Joint Oil & Gas Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prime distillation complex in Tianjin</strong></td>
<td><strong>Partner is CNPC</strong> 16 mmtpa capacity, over 95% conversion depth The project also provides for establishing a retail network comprising 300 retail sites</td>
</tr>
<tr>
<td><strong>Udmurtneft</strong></td>
<td>2006 - <strong>Sinopec</strong> has a 47.6% of shares in the company oil production (around 6.5 mtpa)</td>
</tr>
<tr>
<td><strong>Verkhnechonsk field</strong></td>
<td>In June 2017 Rosneft and <strong>Beijing Gas</strong> closed the deal for sale of 20% shares in Verkhnechonskneftegaz ($1,1 bln)</td>
</tr>
<tr>
<td><strong>ChemChina</strong></td>
<td>Joint venture to build a plant and produce polymer coatings and paints with annual capacity 50,000 tons</td>
</tr>
<tr>
<td><strong>China CEFC Energy Company</strong></td>
<td>In September 2017, <strong>CEFC</strong> and Rosneft signed an agreement for the long-term supply of Russian crude oil to China.</td>
</tr>
</tbody>
</table>
• In 2016, Russian coal import for China amounted to about 18.6 mmt per year or 10.2% of the total volume Chinese coal imports.

• In the past two years, Chinese coal consumption has slowed, since it carries out the transfer of Chinese coal-fired power plants to gas generation.

• The electricity import in China is a small fraction of total electricity consumption in China. However, Russia currently occupies a key place in the market of imported electricity.
Russian-Chinese Cooperation in Nuclear Energy Sector

• The key project is Tianwan NPP. Power plant was constructed under the Chinese-Russian Agreement of 1992.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Reactor type</th>
<th>Net capacity</th>
<th>Gross capacity</th>
<th>Construction started</th>
<th>Commercial operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tianwan-1</td>
<td>VVER-1000/428 (AES-91)</td>
<td>990 MW</td>
<td>1,060 MW</td>
<td>October 1999</td>
<td>May 2007</td>
</tr>
<tr>
<td>Tianwan-2</td>
<td>VVER-1000/428 (AES-91)</td>
<td>990 MW</td>
<td>1,060 MW</td>
<td>October 2000</td>
<td>August 2007</td>
</tr>
<tr>
<td>Tianwan-3</td>
<td>VVER-1000/428M (AES-91)</td>
<td>1,050 MW</td>
<td>1,126 MW</td>
<td>December 2012</td>
<td>2018</td>
</tr>
<tr>
<td>Tianwan-4</td>
<td>VVER-1000/428M (AES-91)</td>
<td>1,050 MW</td>
<td>1,126 MW</td>
<td>September 2013</td>
<td>2018</td>
</tr>
</tbody>
</table>

• The experimental fast neutron reactor with sodium coolant (CEFR) constructed with the participation of Russian experts was commissioned in 2011. That year the fourth, which is the last stage of the gas centrifuge enrichment plant was commissioned ahead of schedule.

• At the end of July, 2014, CNNC New Energy and Rusatom Overseas signed a memorandum on construction of floating nuclear power plants (FNPP), which China will use to supply power to islands and offshore hydrocarbon deposits.
May 2016, the leaders of Russia and China signed a joint declaration “on cooperation in coordinating the development of the Eurasian Economic Union (EEU) project and the (SREB)”

Moscow and Beijing’s declared goal in combining the two projects was to build a “common economic space” in Eurasia, including a Free Trade Agreement between the EEU and China.