There is provided a project on launching high-purity quartz (HPQ) production. This is a high-opportunity project due to the following prerequisites:

- World HPQ market totals about 60 thou t (app. USD 500 mn). The market is characterized of stable growth and annually increases by 3-5%.
- Developed mining industry in Belarus, research and raw materials (the volume of identified quartz sand deposits is 175 mn t) base.
- Skilled labor and experience in implementation of projects in quartz industry.
- Capital expenditures for the launching high-purity quartz production are estimated at USD 30-70 mn, payback period is 5-6 years.

MARKETS

Customs Union market:
- By 2020 Russia is planning to commission 152 GW of solar power stations. Annual average capacity growth is expected to amount to 14%.
- Russian microelectronics market is growing on average by 21% a year. It is projected to reach USD 2,84 bn by 2015, thus having increased by 3 times since 2009.

Internal market of Belarus:
- Integrated circuit output in Belarus increased by 1,5 times since 2005 and totals 1734 mn pieces. Annual average growth rate is 6%.
- There are 22 solar power stations in Belarus of total capacity of 1,89 MW. National development program of local and renewable energy sources implies installing 172 facilities by 2015. By 2020 aggregate capacities are expected to get raised to 85 MW.

European and South-East Asia markets:
- Since 2009 world volume of solar battery installations is actively growing. In 2010 it increased by 172%, in 2011 – by 40% (CAGR 22%). Leading countries: Germany, China, Japan, India, USA.
- The bulk of the electronic components market is accounted for by APEC countries (around 55%), followed far behind by the USA and European markets.
MARKET OPPORTUNITIES

Global opportunities:

- World HPQ market totals about 60 thousand (app. USD 500 mn).
- The market is characterized by stable growth and annually increases by 3-5%.
- 60% of global HPQ consumption is accounted for by microelectronics and solar energetics.
- World electronics industry is stably growing and reached 10.5 million sq in (USD 338 mn). With current growth rates, the market may double by 2017.
- Growth driver of HPQ market is quartz crucibles market. In 2013 it was estimated at USD 434 mn with annual average growth rate of 12%. The bulk of the market is accounted for by quartz crucibles for semiconductor industry.
- Market of silicon for semiconductor industry is expected to grow at the level of 7% a year.
- 35% of all crucibles for microelectronics is of 300 mm technology process, 40% - of 200 mm one. Demand for quality products will grow by means of gradual replacement of 200 mm technology process by 300mm and 450 mm ones.
- Global capacity of solar power stations exceeds 100GW. Annual average growth rate of solar battery installations is projected to reach 22%.
- Solar energetics market growth will trig the increase in share of crucibles for solar energetics up to 34% in 2015 (compared with 21% in 2008).
- HPQ market is monopolistic and characterized of constant price growth, quality issues, spot prices (customers’ concern).

Local opportunities:

- Share of imported silicon on the Russian market is estimated at about 30%. Necessity of importing high-purity quartz is conditioned by lower quality of silicon produced in Russia and inability of applying it in electronics industry.

Global HPQ consumption structure

<table>
<thead>
<tr>
<th>Consumption Area</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microelectronics</td>
<td>35%</td>
</tr>
<tr>
<td>Solar energetics</td>
<td>25%</td>
</tr>
<tr>
<td>Lighting engineering</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
<td>10%</td>
</tr>
<tr>
<td>Optics</td>
<td>5%</td>
</tr>
</tbody>
</table>

Quartz crucibles market, mn USD

- 2009: 78
- 2010: 88
- 2011: 105
- 2012: 119
- 2013: 135
- 2014: 162
- 2015: 182

World solar energetics installed power, GW

- Optimistic forecast: 600 GW
- Baseline forecast: 264 GW

Russian microelectronics market, USD mn

- 2009: 0.92
- 2010: 1.2
- 2011: 1.46
- 2012: 1.73
- 2013: 2
- 2014: 2.36
- 2015: 2.84

High-purity quartz market

- Unimin, USA: 80%
- Quartz Corp, Norway-USA: 8%
- China: 7%
- Other: 5%
INVESTMENT OPPORTUNITIES

- Capex for the project implementation might total **USD 30-70 mn**.
- Payback period is about **5-6 years**.
- IRR varies within **5-18%**.

POTENTIAL INVESTORS

- **Strategic investors** – companies with appropriate technologies and experience in quartz production.
- **Forward integration** – world major players on microelectronics and solar energetics markets.