RUSSIAN TITANIUM MARKET

SEPTEMBER 2016
RUSSIAN TITANIUM SPONGE PRODUCERS

SHARE OF PRODUCTION

AVISMA 95%
SMW 5%

AVISMA

MT
CAPACITY OUTPUT

SOLIKAMSK MAGNESIUM WORKS

MT
CAPACITY OUTPUT

SPONGE PRODUCERS

COMPANY | CAPACITY | OUTPUT
AVISMA | 44000 | 37839
SMW | 2500 | 2200
RUSSIAN TITANIUM INGOT PRODUCERS

SHARE OF CAPACITY

- VSMPO: 92%
- CMK: 3%
- VILS: 1%
- CMP: 4%
- ZMP: 1%

COMPANY CAPACITY OUTPUT

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>CAPACITY</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSMPO</td>
<td>72000</td>
<td>63732</td>
</tr>
<tr>
<td>CMK</td>
<td>2000</td>
<td>500</td>
</tr>
<tr>
<td>VILS</td>
<td>500</td>
<td>200</td>
</tr>
<tr>
<td>CMP</td>
<td>3000</td>
<td>450</td>
</tr>
<tr>
<td>ZMP</td>
<td>500</td>
<td>200</td>
</tr>
</tbody>
</table>

DYNAMICS OF CAPACITY AND OUTPUT

- 2008: 69
- 2009: 68
- 2010: 71
- 2011: 71
- 2012: 72
- 2013: 73
- 2014: 74
- 2015: 77.3
RUSSIAN MARKET TITANIUM DEMAND IN 2015

TOTAL TITANIUM DEMAND OF RUSSIAN MARKET IN 2015 – ABOUT 12,000 MT

- INDUSTRIAL: 31%
- ENGINE BUILDING: 29%
- AIRCRAFT BUILDING: 22%
- OTHER: 6%
- NON-FERROUS, EQUIPMENT, CHEMICAL: 7%
- POWER ENGINEERING: 4%
Unites Aircraft Corporation, JSC is the aircraft corporation uniting the largest Russian aviation companies and implementing the whole production cycle – from civil and military aircrafts development to their disposal.

United Engine Corporation, JSC is the integrated structure manufacturing engines for military and civil aviation, aerospace projects, power units of various capacities for electric and thermal energy generation, gas compressor plants and ship gas turbine units.

Russian Helicopters, JSC is one of the world’s leading producers in helicopter industry, the sole designer and manufacturer of helicopters in Russia, as well as one of a few companies in the world having the capacities for development, production, testing and maintenance of state-of-the-art civil and military helicopters.

State Corporation for Space Activities “Roscosmos” established with the objective to ensure long-term competitiveness of the Russian Federation in manufacture of aerospace products and rendering of services, with absolute achievement of goals and fulfillment of tasks in aerospace field as set forth by the Government.
MAIN RUSSIAN AIRCRAFT PROGRAMS AND TITANIUM DEMAND

CIVIL AIRCRAFTS
- SSJ – 100, MS – 21
- IL – 476, IL – 96
- Tu – 214, An – 148/158

RUSSIAN AEROSPACE MARKET IN 2015 CONSUMED OVER 6000 MT

MILITARY AIRCRAFTS
- SU – 27/35, MIG – 29
- YAK-130, T - 50

CARGO AND SPECIAL AIRCRAFTS
- BE – 200
- IL - 476
FORECASTED TITANIUM DEMAND OF AEROSPACE MARKET

RUSSIAN AEROSPACE MARKET IN 2015 CONSUMED OVER 6000 MT
RUSSIAN INDUSTRIAL MARKET

Shipbuilding: construction of ships of different types, submarines and oil platforms

Nuclear power industry: modernization of the existing nuclear power plants, completion of construction and new projects

Chemical industry: production of sulphates, terephthalic acid, chlorine and chlorine compounds, chemical fertilizers

Nonferrous industry: increasing demand for Cu, Au, Ni, Co – which require titanium for production

Oil-and-gas industry: fittings, flanges, piping, high-pressure vessels, heat exchangers, stop valves, liquefied natural gas
KEY DRIVERS ON RUSSIAN INDUSTRIAL MARKET AND TITANIUM DEMAND

UNITED SHIPBUILDING CORPORATION

USC IN 2015 CONSUMED OVER 3500 MT

ROSATOM

ROSATOM IN 2015 CONSUMED 450 MT

OTHER RUSSIAN INDUSTRIAL MARKET

NON-FERROUS METALLS, EQUIPMENT, CHEMICAL INDUSTRY, OIL&GAZ, MEDICINE
IN 2015 CONSUMED OVER 1600 MT
FACT AND FORECAST OF TITANIUM DEMAND

TONNS


INDUSTRIAL

AEROSPACE