Aluminium Alloys and their Applications
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Aluminizing RUSSIA/CIS?

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1. Is the Aluminum industry going down stream?

- Why are downstream issues becoming more significant to primary producers?
- Is vertical integration in the downstream markets becoming back into fashion?
- How have producers begun to position themselves to respond to these changes?
2. Let's look at history

<table>
<thead>
<tr>
<th>Build the industry</th>
<th>Consolidation</th>
<th>Industry Renewal</th>
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</thead>
<tbody>
<tr>
<td>Hydro/VAW (2002)</td>
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</table>

|---------------------|-------------|-----------|-----------------------|-------------|

~1980

**Automotive Application Development**

- Alcoa Automotive Structures
- Alcoa Automotive Castings
- Alcan Engineered Products
- Hydro Automotive Structures
- Hydro Automotive Castings

- Ford P2000 AIV
- Engine block
- Rolls-Royce (BMW) Phantom

1900 ~1995 ~2000
3. What’s happening today

- Centers from supply and demand are shifting from traditional regions

- Des-integration:
  - Alcoa Automotive Structures (2010 - sold) – BDW – Magna Cosma
  - Alcoa Automotive Castings (2007 - sold) – Private equity
  - Alcoa soft alloy extrusions (2009 - SAPA)
  - Alcan Engineered Products (Constellium)
  - Rio Tinto/Alcan FRP (Novelis/Constellium)
  - Hydro Automotive Structures (2009 - sold) - Benteler
  - Hydro Automotive Castings (2006 - sold) - Nemak
  - Hydro Extrusions (2013 – SAPA)

- “New” players:
Centers of supply and demand are shifting from traditional regions

Mexico, US
Development of automotive production hub (expansion of Japanese and Korean automakers mainly and shifting production from domestic facilities to the low cost markets)

Turkey and Eastern Europe:
Automotive production hub, Development of down-stream industry

Russia

ME and India

China

ASEAN-5:
Automotive production hub, Development of down-stream industry

Indonesia will be World's 6th Largest Construction Market by 2020

Middle East:
Sizable increase of VAP production and down-stream industry

S.Africa

Brazil

Australia

Development of production facilities in low energy-cost regions (Persian Gulf, India, Russia) together with curtailment in High cost regions (Europe, Australia, NA)

Development of down-stream industries in low labor cost regions close to primary aluminum producers (Persian Gulf, India, ASEAN-5, Turkey)

International trade increases, longer and more expensive supply chains

Source: UC Rusal, news-stream
4. Reasons for going downstream

1. Awareness that China is self-sufficient

2. Value creation (stop exporting energy)

3. Import substitution

4. Building an industry, infrastructure, creating jobs, tax generation
5. What’s the situation in RUSSIA/CIS

- Aluminum consumption per capita lower than world average
- Consumption of primary aluminum on level of 1993
- Aluminum can consumption lags behind most of the developed countries
- Growth of aluminum application in car industry depends on localization of car components
- Large potential for new aluminum processing projects in East and West part of Russia
The consumption of primary aluminum per capita in Russia is lower than the worldwide average

Annual consumption of primary Al per capita in Russia was estimated as 5.8 kg per capita in 2012 (826,000 tonnes)

In the case of organic growth, the consumption would reach 9.6 kg per capita by 2022 (1,350,000 tonnes)

If the demand growth is promoted, the consumption per capita may reach 14.3 kg (2,000,000 tonnes) by 2022

Sources: Brook Hunt, UC RUSAL
The consumption of primary aluminum in Russia is still on the level which existed 10 years ago

• The consumption of aluminum decreased in Russia by 33% vs. 1993 (collapse of Soviet Union), while the production increased by 33%. The share of exports exceeds 82%.
• The structure of final consumption of aluminum (primary and secondary) substantially changed, due to the industrial output production collapse in the transport engineering sector, electric engineering sector, and military industrial sector at early 90-s.
• Today the key consuming segments in Russia are Packaging (rolling industry), Transport (casting), Construction (extrusion), and Energy (cables). The demand from the Engineering / Machine building Industry is practically absent.

Sources: Ministry of Industry and Trade of the Russian Federation, National Metallurgy, UC RUSAL’s estimates
Aluminum cans is a key segment in Russia, but the consumption lags behind the developed countries

4.4 billion cans (~57,000 MT of aluminum) were produced in Russia in 2012

The main beverage (beer – 70%) consumed in Russia is bottled in different types of packaging (glass, plastic, aluminum can)

The consumption of aluminum cans in Russia has the potential of a twofold increase within 5 years (> 130,000 MT of aluminium)
The growth of aluminum application in the car industry depends on localisation of car components

The automobile manufacture in Russia decreased by 1.8% in 2013.

The share of foreign models operating in the industrial assembly mode (SKD, CKD) reached 70%.

The degree of localisation of the major foreign car manufacturers is under 50%, while the production of aluminium components, except for heat radiators and wheels, is not localised at all.

The actual supplies of primary aluminum to the car industry is less than 50,000 tonnes, and secondary aluminum - about 100,000 tonnes.

Missed opportunity of aluminum consumption due to the imports of car components are estimated at 50,000 tonnes of aluminum.

<table>
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<tr>
<th>ПРЕДПРИЯТИЕ</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>AutoTOR</td>
<td>15%</td>
<td>15%</td>
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<tr>
<td>Ford</td>
<td></td>
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<tr>
<td>Mondeo - 10%</td>
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<td>Focus - 30%</td>
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<tr>
<td>GM-Avtovaz</td>
<td>96%</td>
<td>95,4%</td>
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<tr>
<td>Renault</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>Logan, Sandero - 75%</td>
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</tr>
<tr>
<td>Duster - 66%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volkswagen</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>
| Toyota      | 15%  | 15% (с 2014 - 20%)
| GM          | 20%  | 20% (с 2013 - 60%)
| Nissan      | 20%  | 31,7%
| PSA         |       |      |
| Outlander - 10% | |
| Peugeot 408 - 33% |    |
| Peugeot 408 - 33% |    |
| Hyundai     | 45%  | 47%  |
| LADA Langus | LADA Largus - 62% (с 2013 - 75%)

Sources: Ducker Worldwide 2011, 2012, Autostat, estimates of UC RUSAL
Huge potential for new aluminum processing projects in East and West part of RUSSIA

The Centers of Production and Consumption of Primary Aluminum in Russia in 2013

- There is a geographic imbalance between the centres of production and centres of consumption of primary aluminum in Russia.

- UC RUSAL is attracting automotive component suppliers for local production (governmental influence, finance, assets, infrastructure, labor).

- UC RUSAL proposes to develop the ‘Aluminium Valley’ and advanced processing of aluminum in the Krasnoyarsk Territory.
6. RUSAL’s integrated approach to the Russian and other CIS markets development

- **Demand promotion**
  - Aimed at the production expansion and increase in sales with respect to the existing materials and consumers of materials containing aluminium in Russia and other CIS countries.

- **New products development**
  - Aimed at the development and implementation of utilisation of new materials and advanced materials containing aluminum in the future.
  - Improvement of aluminum attractiveness and expansion of its field of application.

- **Protection from imports**
  - Legislative initiatives aimed at protection and support producers from Russia and other CIS countries.
The demand promotion may increase aluminum processing in Russia by 765,000 tonnes by 2022

*With account of secondary aluminum*
The growth prospects of the demand for the Russian car components made of aluminum

**Opportunities**
- Increase in wheels manufacturing
- Increase in heat radiators manufacturing

**What needs to be done**
- To stop the counterfeit and dumped imports of wheels from China
- The programme for localisation should declaratively include the production of aluminum parts in Russia
  - Powertrain
  - Chassis & Suspension
  - Body panels
  - Interior trim
- Attraction of global manufacturers of auto-components into Russia through the provision of special tax treatment and privileges

The development of aluminum consumption in the cable industry requires the amendment of standards

The Quantities of Copper and Aluminum Processing at the Facilities of Electrokabel Association

- In October, 2012, the Ministry of Energy approved the investment programme of the Federal Network Company for 2013-2017. The approved plan proposed the investment in the amount of RUR 776 billion for commissioning 66,870 MW of transformer capacity and 16,985 km of power transmission lines.

- The demand for aluminum cables for the power transmission lines depends greatly on the level of the state budget.

- Aluminum consumption development in the Cable industry requires amendments to the construction standards.
The growth of extrusion production in Russia largely depends on the market protection measures

The most promising area is the production of anodized extrusions. This market is still developing in Russia, and most of anodized extrusions are imported from abroad.

The installed extrusion capacities in Russia are about 328,000 tonnes per year. The output in 2013 totalled 234,000 tonnes. The capacity utilisation is about 70%.

The imports share in the total market volume amounted to about 30% in 2012. The major importers of aluminum extrusion to Russia are Belarus and China.

The market must be protected from unimpeded import of aluminum extrusions with insufficient additional fabrication within Russia. Current practice of hole drilling, sawing, repacking and relabeling, together with improper custom treatment, must be banned.

It is necessary to introduce new GOST and SNIP standards (Aluminium in construction) and to harmonize them with the European standards.
In November 2013, UC RUSAL prepared and sent proposals on aluminium products market development in the Russian Federation to the Ministry of Industry and Trade.

### The List of Proposed Actions

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<tbody>
<tr>
<td>1.</td>
<td>‘The <strong>Aluminium Valley</strong>’ in the Krasnoyarsk Territory.</td>
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<tr>
<td>2.</td>
<td>Development of new high-performance uninsulated wires</td>
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<td>3.</td>
<td>Introduction of the innovative aluminum wires into the residential construction in the Russian Federation.</td>
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<tr>
<td>4.</td>
<td>Aluminum rail car.</td>
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<td>5.</td>
<td>Aluminum in construction (harmonisation of eurostandards with GOSTs and SNIPs)</td>
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<td>6.</td>
<td><strong>Car components</strong> (protection of the market from the Chinese wheels – <em>initiation of antidumping laws</em>).</td>
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<td>7.</td>
<td><strong>Termination of the grey and black imports</strong> of products containing aluminum into the Russian Federation from non-CIS countries and by transit through the Customs Union countries (first of all, aluminum engineered structures from Serbia and China), and from the Kaliningrad Region.</td>
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<tr>
<td>8.</td>
<td>To <strong>tighten requirements for the manufacturing of car components</strong> for assembly factories of international carmakers operating in the Russian Federation.</td>
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<tr>
<td>9.</td>
<td><strong>Amendment of the standards</strong> for application of paint coatings on industrial, transport, and infrastructural facilities in the Russian Federation using aluminum powders and dusts</td>
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### The Expected Economic Effect

- **Up to 20,000 new jobs** at aluminum processing facilities, and 5,000 related jobs in service sectors will be created.
- Additional taxes for the **amount of RUR 20 bln per year** will be collected. This amount is equivalent to the annual budget of the Vladimir Region.

**This programme will be implemented in 2014-2018**

**UC RUSAL invites other market participants to join this programme**
7. Several road maps to success

a snap shot year to date

Aluminum into alloys & castings

- VolkhOR, OMEN (VAZ)
  automotive components (HPDC) ~5,000 tons / y

- RusEL (NAZ), radiators (HPDC), 4 mio pcs/y ~4,000 tons / y
  - JV with int. company (UAZ), heavy vehicle - trucks components
    (Permanent mold) ~2,000 – 3,000 tons / y
  - JV with int. wheel producer (UAZ/VgAZ), ~2 mio wheels, ~20,000 tons / y

Aluminium into wire rod & cable - Russian / international cable producer

Aluminium into slabs & sheet/plate – international rolling company

Aluminium into billets & extrusions – Russian / international extrusion company