Supply & Demand in the Global Fluorspar Market

• Presented by Ray Will, Director, IHS Chemical
  22-24 October, 2012
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Ongoing Fluorine Chemical Studies

- Chemical Economics Handbook reports on:
  - Fluorspar and inorganic fluorine compounds
  - Fluorocarbons
  - Fluoroelastomers
  - Fluoropolymers
Consulting studies cover a broad spectrum. The following types of projects are routinely performed for clients:

**Corporate Studies**
- Decision-focused scenario development
- Technology strategy
- R&D portfolio evaluation
- Environmental strategy

**Competitive Analysis**
- Benchmarking/best practices
- Competitor profiling
- Competitive positioning
- Competition models/simulators

**Feasibility Studies**
- New project techno-economic evaluation
- New product evaluation
- Market entry strategies

**Acquisition Services**
- Acquisition strategy
- Candidate screening
- Candidate valuation/due diligence
- Alliance/licensing assessment

**Other**
- Innovation search
- Valuation and pricing
- Litigation support
- Patent infringement
- Business interruption loss determination
- Asset redeployment opportunities
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### Overview – Market Trends: Demand & Pricing

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<th>Topic</th>
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<td>Macroeconomic concerns:</td>
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<td>Which import sources are growing in importance?</td>
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Fluorspar Consumption

- Consumption is highest in the regions of China, North America and Western Europe
- Global consumption has grown at ~4% driven by Asia, particularly China
Market Trends: Supply/Demand & Pricing

Acid-spar prices have generally risen since 2003. Acid-spar market became tight in 2008-2011. Prices have fallen in 2nd half 2012.

Price Flat
Price Rising
Chinese Export Restrictions
Disruption in South African Supply

Just in Time
Low Inflation
Divest Non-core Assets
Globalization

Acid-spar market became tight in 2008-2011. Prices have fallen in 2nd half 2012.

Chinese
Mexican

Price Falling
Price Flat
Price Rising

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Which import sources are growing in importance?
Short answer: Yes-- Europe’s flat or shrinking economy is reducing regional fluorspar consumption

But this is an acceleration of a longer term trend—Europe has had flat or falling fluorspar consumption for more than a decade. There are differences in consumption such as isobutane use in refrigeration.

Fluorspar consumption will likely stabilize in Europe with economic recovery, but the longer term shift to downstream fluorochemical production in China (emerging India, Middle East & Russia) continues
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Developments following the tightness in fluorspar supply since 2008:

• Fluorspar prices have generally risen—However weakness in demand is causing prices to fall in recent months

• Rising fluorspar prices have given confidence for new fluorspar ventures (mines)

• Renewed investigation of unconventional new sources of fluorine such as Fluosilicic Acid (FSA) derived from phosphate chemicals production (Phos Rock mines)
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Impact of China’s Slowing Economy on Global Fluorspar Market

2 events occurred in 2010-2012:
1) China’s economy slowed

China GDP Annual Growth Rate

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Growth Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1-2010</td>
<td>11.9%</td>
</tr>
<tr>
<td>Q2-2010</td>
<td>10.3%</td>
</tr>
<tr>
<td>Q3-2010</td>
<td>9.6%</td>
</tr>
<tr>
<td>Q4-2010</td>
<td>9.8%</td>
</tr>
<tr>
<td>Q1-2011</td>
<td>9.7%</td>
</tr>
<tr>
<td>Q2-2011</td>
<td>9.5%</td>
</tr>
<tr>
<td>Q3-2011</td>
<td>9.1%</td>
</tr>
<tr>
<td>Q4-2011</td>
<td>8.9%</td>
</tr>
<tr>
<td>Q1-2012</td>
<td>8.1%</td>
</tr>
<tr>
<td>Q2-2012</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

Source: National Bureau of Statistics of China
2) WTO ruled regarding China’s restraint of fluorspar trade:

• The complaint was filed in 2009 by the European Union, Mexico, and the United States regarding China’s policy of applying export duties, export licenses, export quotas, and minimum export prices on fluorspar

• The World Trade Organization (WTO) ruled that China’s export policies for fluorspar are inconsistent with China’s WTO obligations. The WTO panel recommended that China bring its policies into conformity with its WTO obligations

• WTO’s findings:
  ✓ China’s export duties and export quotas were inconsistent with WTO rules
  ✓ Certain aspects of China’s export licensing system restrict exports and are therefore inconsistent with WTO rules
  ✓ China argued that its export policies were justified on grounds of natural resource conservation, but China was unable to prove it imposed such export restrictions while restricting domestic production or consumption of the raw materials in order to conserve the raw materials
Impact of China’s Slowing Economy on Global Fluorspar Market

Also in 2010-2012:

a) The volume of China’s mined fluorspar was maintained:

![China Fluorspar Production Graph](source.jpg)

Source: US Geological Survey
Also in 2010-2012:
b) China’s acid grade fluorspar exports increased in 2010 and 2011, but seem off to a slow start in 2012.

China Acidspar Exports, kmt

Source: China Customs
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**Which regions are seeing the most growth?**

**Short and longer term outlook:**
Significant changes in the next 12 months?

**Which import sources are growing in importance?**
# Fluorspar Demand Growth by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Drivers</th>
<th>Annual Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle East</td>
<td>Aluminum Metal Production</td>
<td>16%</td>
</tr>
<tr>
<td>China</td>
<td>Domestic consumption, increasingly sophisticated downstream fluorochemicals for domestic &amp; export markets</td>
<td>7-10%</td>
</tr>
<tr>
<td>South Africa</td>
<td>Vertical Integration? Contingent on investment &amp; domestic stability</td>
<td>?</td>
</tr>
<tr>
<td>Mexico</td>
<td>Vertical integration. New horizons for downstream fluorochemical production domestically &amp; internationally.</td>
<td>?</td>
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### Significant Changes Short & Long Term

<table>
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<th>Driver</th>
<th>Potential results</th>
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<tbody>
<tr>
<td>South Africa</td>
<td>• Mining sector labor unrest—term?</td>
</tr>
<tr>
<td></td>
<td>• Slowing European demand—short term</td>
</tr>
<tr>
<td></td>
<td>A) No effect on fluorspar development projects</td>
</tr>
<tr>
<td></td>
<td>B) Delay in project startups</td>
</tr>
<tr>
<td></td>
<td>C) Care &amp; maintenance status for Witkop mine extended?</td>
</tr>
<tr>
<td>Global</td>
<td>Economic recovery</td>
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<td>Boost in demand across all fluoro-product categories</td>
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## Fluorspar Export Growth

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<th>Country</th>
<th>Drivers</th>
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<tbody>
<tr>
<td>Mongolia</td>
<td>Aggressive mining sector investments</td>
</tr>
<tr>
<td>Mexico</td>
<td>Fluorspar export opportunity coupled with value-added downstream fluoro-products</td>
</tr>
<tr>
<td>Kenya</td>
<td>Growing mining sector</td>
</tr>
<tr>
<td>New producers (Australia, Canada, Vietnam, etc.)</td>
<td>Fluorspar price exceeding cost of production?</td>
</tr>
</tbody>
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