“International Market for Metallurgical Coke”

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Opening Comments

Some explanations to avoid any potential confusion:
This presentation will refer to metallurgical coke, the product derived from the destructive distillation of coking coal.

“Resource-Net” produces research publications on world markets for coke, as well as related products such as coking coal and anthracite i.e. about pricing, supply and demand.

We are not trading coke or any other commodity. Nor are we involved in any commercial activity related to these markets.

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Description of Metallurgical Coke

**Definition of coke:** the solid residue formed when bituminous coal is heated strongly in the absence of air under pressure.

**Methods of production:**
- Most commonly in *vertical batteries* (90-95% of world total) from which by-products - tar, CO gas, ammonia - are recovered;
- In horizontal *non-recovery batteries* in which by-products are burned internally;
- Minor production from “bee-hive” plants - small-scale primitive ovens - remains in some countries.

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Coke Market Structure - 2013

<table>
<thead>
<tr>
<th>Sector</th>
<th>M tonnes</th>
<th>% of total</th>
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</thead>
<tbody>
<tr>
<td>Blast Furnaces for Iron Ore Reduction (30/90mm)</td>
<td>600</td>
<td>89%</td>
</tr>
<tr>
<td>Cupola Furnaces needing Foundry Coke (&gt;80mm, low ash)</td>
<td>10</td>
<td>1%</td>
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<tr>
<td>Non-Ferrous Uses (10/30mm typical, reactivity CRI also important)</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Breeze (&lt;10mm), Available for Sintering &amp; Pelletizing of Ores</td>
<td>60</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>680</strong></td>
<td><strong>100%</strong></td>
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</tbody>
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(Above data are very approximate...)

Of world coke production, 70-75% is situated on steelmaking sites for captive use, balance typically in coal-mining areas.
In 2001-08, 6-8% of coke production was traded across borders; since 2009 just 3-4%.

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## Monthly Market Prices Reported by “Resource-Net”

<table>
<thead>
<tr>
<th>Grade</th>
<th>Basis, Shipment</th>
<th>Market Characteristics</th>
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</thead>
<tbody>
<tr>
<td>Blast Furnace Coke</td>
<td>Europe cfr, India cfr,</td>
<td>Main benchmark for the coke market, accounting for most of world trade. In the</td>
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<tr>
<td>(30/90mm)</td>
<td>China fob</td>
<td>blast furnace, injection of coal, gas or other materials can cut coke rate.</td>
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Prices obtained by informal communication with industry participants i.e. traders, consumers.  

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## Market Influences

**Chinese Export Prices:** From 2008 to 2012, most potential transactions from China were not workable due to rise in export tax to 40% (from 25%). But from 01/2013, Chinese pricing again became a major influence on world markets, as export tax was cancelled.

**Demand for Coke:** Unlike other process plants, by-product recovery batteries cannot be allowed to go cold without risk of damage to their structure. Hence, in a severe market downturn the production of coke continues at a rate above that required by the market.

**Battery Constructions & Shutdowns:** Rebuilds (needed every 30-40 years) are expensive due to environmental regulations. Since the onset of the “economic crisis” in 2008, 21 mtpy of capacity at almost 30 locations (outside China) has been closed due to repair costs as well as poor international market.

**Coking Coal Prices:** To produce coke economically, the market coke price needs to be at least 1.8-2 times the hard coking coal price (approximate rule).  

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Blast Furnace Coke Pricing

Shown are the annual averages of the prices researched each month by “Resource-Net”. We report “cfr” prices for Europe and India, as well as Chinese prices.

Following recovery in 2010-11, market (cfr) prices were lower in 2012-13.

Re-entry of Chinese coke impacted market prices in 2013; but prices were already on lower trend compared to 2010-11.

There remains over-capacity in many world markets, coking coal also in over-supply.

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Pricing for Coke Compared to Other Commodities

Prices for coke and coking coal are contrasted to those for energy products - such as thermal coal and oil - and steel over the past year.

Coke and coking coal have declined more than other markets, as the chart indicates. Both are down 15% from one year ago.

Alone among major commodities, oil price has remained at high level over past year.

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World Coke Production

Increase in Chinese coke production as % of world total from 2000.

Chinese Blast Furnace Coke Price & Exports
Export Pricing from China

- We report prices for blast furnace, nut and foundry coke from China through regular dialogue with industry participants.
- Blast furnace coke goes to markets like Brazil and India.
- Main markets for foundry coke have been other Asian economies like Japan, South Korea and Chinese Taipei.
- Nut coke is exported for ferroalloys production to India, South Africa and other countries.
- Of last year’s export of 4.7m tonnes, around one-third went to India.

Leading World Coke Exporters

- Poland has been world’s leading coke exporter since 2009; but China may re-gain this position from 2014.
- China: due to cancellation of 40% export tax from 01/2013, exports increased four-fold last year; replacing other countries’ coke exports in Asia.
- Japan: exports in long-term decline.
- Poland: supplies other European countries primarily; volumes will be stable.
- Colombia: traditional markets in Latin America, but also supplies Europe and North America.
- CIS (Russia & Ukraine): important suppliers to Europe and Middle East.
World Cross-Border Coke Trade

- By adding imports of all major economies, we obtained the figures for global coke trade since 2001.
- After 2008, coke trade has been lower due to a combination of the “economic crisis” and capacity additions.
- From 25-30m tonnes/year until 2008, volume has declined to around 20m tonnes/year.
- Coke trade volume is unlikely to return to level of before 2009.

Market Outlook for Coke

Due to cancellation of export tax from start of 2013, China’s export volumes increased significantly. Last year’s volume increased more than four times to 4.7m tonnes. At start of 2014, exports running at almost 9m tonnes/year (annualized); so China is likely to overtake Poland as leading coke supplier.

Main interest in China is due to its large supply base (70% of world production), meaning more possibility to find special grades of coke. It is likely to remain primarily a supplier to other Asian countries.

World trade volume will remain below the pre-2009 levels of 30m tpy due to capacity additions and slow economic growth around the world. In last four years, coke trade has been centred around 20m tpy.

Longer term, if closures of coke capacity for environmental and economic reasons continues, market may be short of coke in future.