"Coking Coal Supply & Demand: Recent Movements & Trends"

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Introduction to Presentation

"Resource-Net" produces research reports (each month) on world markets for metallurgical coke, coking coal and anthracite, i.e. about pricing, supply and demand.

Today, we will discuss:

1. ***Coke Production, i.e. Demand for Coking Coal;***
2. ***Coking Coal Supply – a;***
3. ***Coking Coal Price Development, including role of indices.***

a – Based on available customs trade data, which are far from perfect. Include both hard and lesser grades of coking coal, plus often PCI (metallurgical) coal

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Coke Production

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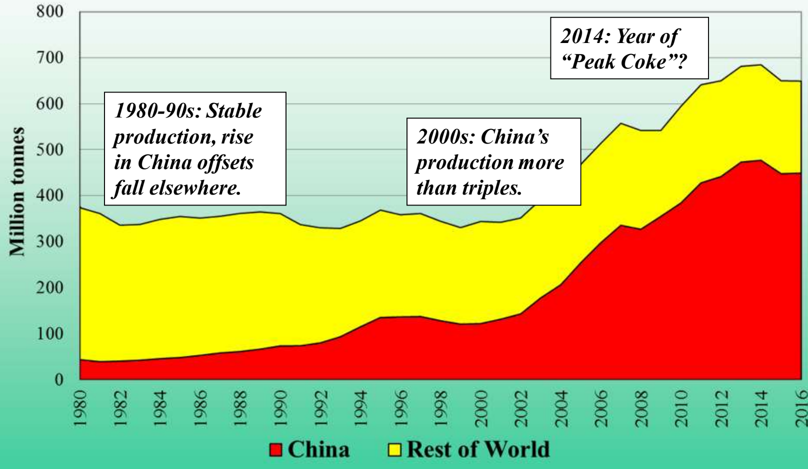
World Coke Production



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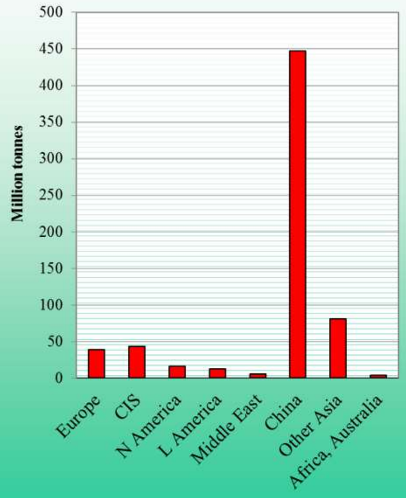
Coke Production by Region - 2016



Region	Avge Annual Change % (10 years)
Europe	-2.5%
CIS (fmr Soviet Union)	-2.2%
North America	-1.8%
Latin America	+1.5%
Middle East	+0.0%
China	+4.1%
Other Asia	+1.7%
Africa, Australia	-3.7%
World	**+2.5%**
World excluding China	***-0.6%***

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Coke Production Outlook

China accounts for major share of world coke production; its share has risen from 35% in 2000 to almost 70% in past few years. Since 2015 Chinese production has been in decline.

In most other countries, coke production is in long-term decline due to:

- Lower integrated steel production due to slow world economy, plus shift to EAF (some countries, not universal trend);
- Environmental legislation.

Few regions with positive trend in coke production over **past ten years**, China excepted:

- India, Korea, Taiwan, plus developing Asian economies;
- Brazil, Colombia (latter primarily for export market);
- Europe – “core” EU economies such as Germany;
- Middle East countries - Iran, Turkey.

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Coking Coal Supply

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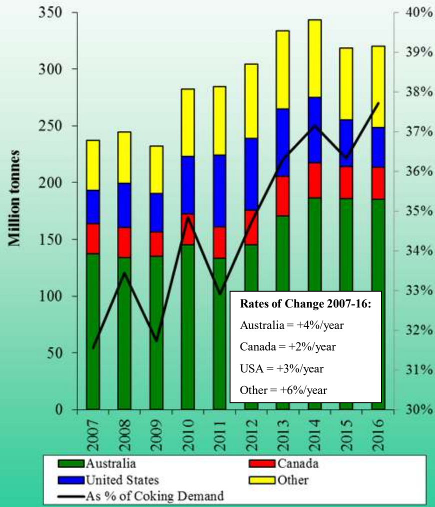
Coking Coal Exports



- Combined, Australia, Canada and the US ("Big Three") account for approx 80% of world trade.
- Australia remains the largest supplier with highest growth rate.
- "Other" countries has grown at 6% per year, due to Mongolia (by land to China), Mozambique and Russia.
- Estimated that coking coal trade accounted for 38% of coke production in 2016, up from 32% ten years ago.

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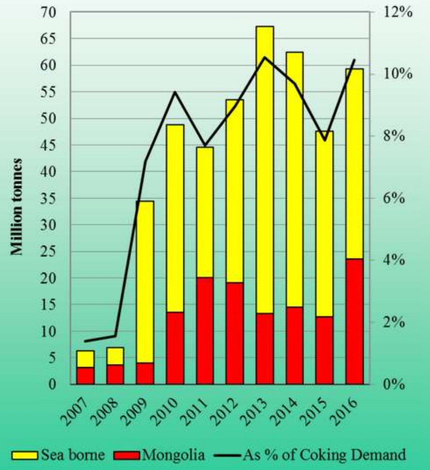
China’s Coking Coal Imports



- From 2009, China emerged as major market for coking coal. Coastal provinces - accounting for 40% of China’s coke production - are the buyers of sea-borne imported coal.
- Rebound in imports last year, as the government controlled on domestic production. Major increase in supply from Mongolia.
- Of the sea-borne coal, Australia accounted for 27m tonnes.
- By our calculation, imports account for 10% of demand last year, compared to 1-2% before 2009.

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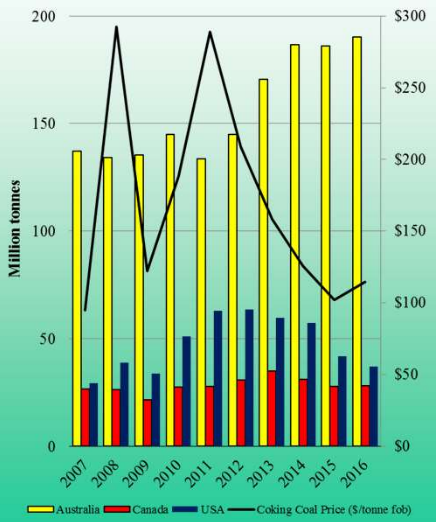
Coking Coal Exports vs Price



- Here, we contrast exports from the leading three suppliers versus the coking coal price (average of quarterly benchmarks).
- Despite price downturn of 2013-15, Australia’s exports continued to grow. Aided by lower value of A$ versus US$. “Take or pay” rail and port contracts are also a factor.
- High-cost nature of US production is evident by downturn in this period.
- Relative stability in Canadian exports.

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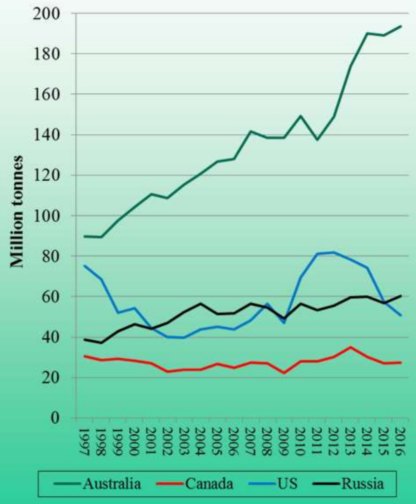
Coking Coal Production



- For the four major exporters, production over past 20 years are estimated using trade data and coke production.
- **Australia:** By far the highest growth rate as well as the largest volume.
- **Canada:** Competitive exporter, able to sustain its production even when prices are low.
- **US:** Swings in production dependent on the market, currently in downtrend.
- **Russia:** Growth over last two decades, led by exports to Asia and Ukraine.

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Coking Coal Price Development

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Pricing Methodologies

According to our interpretation, these are the main pricing methods for coking coal:

- **Annual:** Until 2010, this was the norm for most consumers.
- **Quarterly Benchmark:** From April 2010, there was switch to quarterly pricing in most key markets.
- **Spot:** China is main buyer on spot. These transactions determine indices produced by various parties.
- **Monthly Index:** Takes average of whole month or a number of days (e.g. ten) prior to the contract date. Much variation in how they are used.

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Coking Coal Price Indices

Developed from 2010-11 by Argus, Metal Bulletin, Platts and TSI; based mainly on Australia-China leg. In last two years, their time has come...

On-line, physical-trading systems were originally envisaged (cf "GlobalCoal"); however, indices are produced by journalists using transactions communicated in various ways by market players.

How coking coal indices are/might be used:

- As "starting point for discussion" between two parties;
- Fall-back position in the event of failure to agree;
- Monthly indices, as previously described;
- Swaps, plus other financial derivative instruments (danger of "tail wagging the dog"…).

Longstanding problem with coking coal indices is lack of standardization of grades; whereas thermal coal and iron ore have broadly homogenous specifications, coking coal does not…

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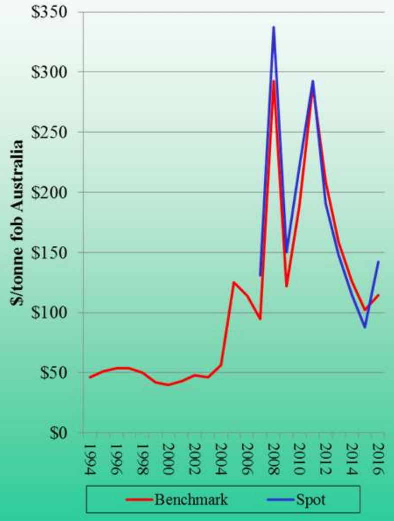
Historical Coking Coal Pricing



- Shown are annual averages (quarterly contract and spot) for hard coking coal "$/tonne fob Australia".
- In years up to 2005, relative stability in annual settlements; little pressure on supply.
- Pricing peaked in 2008 – as China opened up to imports - and again in 2011 – reduced supply from Queensland due to flooding.
- Decline from 2012 to 2015, as discussed earlier (weak A$, "take or pay" rail and port contracts).
- Switch from annual to quarterly pricing from 2010. And from 2017 to monthly indices?

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Recent Coking Coal Pricing

- Over past year, the coking coal market has shown much volatility, as the chart shows.
- Two major price escalations: Sept-Dec 16 due to controls on Chinese mines' operating days; and in April 17 as a result of Queensland cyclone.
- Spot market clearly is the major influence on the quarterly benchmark.
- Domestic price in China (Shanxi) shows far less volatility than the international spot price. Chinese coal producers appear to be "price-takers" rather than "price-setters" (discuss later).

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Coking Coal vs Coke Pricing

- We show spot coal versus the Indian import coke price (i.e. Chinese export price plus freight); also the ratio of coke price to coal price.
- For long-term economic health of Indian coke producers, ratio of coal to coke should be at least 1,8 or so. Since 09/16, it has been far below that most of the time.
- Note: in chart we include $25/tonne anti-dumping duty on Chinese coke from 11/2016.

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Coking Coal Pricing Methodology by Region (1)

Europe	Until two years ago (?), pricing was quarterly; but there is growing interest in indices. Australian benchmark was starting point to set prices from other sources. To cut risk, steelmakers try to pass raw material costs onto customers in their price agreements; but this is complex process… E Europe: Polish, Czech pricing becomes more important. Turkey: Six-month or annual tenders by steelmakers, price either fixed or variable.
CIS (Russia)	Historically, monthly or quarterly by local negotiation (rouble based). Last year, some pricing based on the quarterly benchmark was introduced.
North America	Mostly annual (J-D), with some quarterly adjustments. Both the coal and steel industries have precarious financial situations and so want to avoid un-necessary price volatility.

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Coking Coal Pricing Methodology by Region (2)

Latin America	Brazil: Unclear situation with each steelmaker having own policy. Mix between annual, shorter term and spot. Colombia: Spot, under influence of international market.
East Asia (Japan, Korea, Taiwan)	Mainly quarterly (benchmark), plus spot and monthly index-based agreements. Total change from benchmark to some form of indexing looks certain.
China	Prices in China's down-stream coke and steel markets have greater influence on domestic coking coal prices than in rest of world. Steelmakers in coastal provinces are main buyers of imported coal on spot basis.
India	Steel plants have used the benchmark, with freight adjustments for other suppliers. Shift to index pricing imminent, if not already in progress.

Note: This slide and the previous one represent what I understand to be the situation, taking "broad brush" approach. We regret in advance if anyone believes something to be widely inaccurate.

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Summary & Conclusions

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Supply & Demand for Coking Coal

World demand for coking coal – as evidenced by coke production – is likely to decline from now on. “Peak” coke production was in 2014. Cyclical upturns may well occur, of course.

Demand for sea-borne coking coal will continue to rise, however, due to the displacement of high-cost mining in Europe, China and other countries.

Australia enjoys clear leadership in cost and volume growth. Its exports continued to expand despite price downturn of 2013-15 for reasons described.

Stable volumes from Canada; US more price-dependent. Other suppliers (Mongolia, Mozambique, Russia etc) have grown faster than the “Big Three” over past ten years.

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Coking Coal Pricing

Coking coal pricing has moved to increasingly shorter term pricing: annual → quarterly in 2010; now, quarterly → index-based in the current era looks likely.

Due to varying business cultures and situations, there remain differences in pricing methodologies around the world. After East Asia, Europe comes second in use of indices (appear to be more willing adopters than the Asians…).

Considerable momentum behind their adoption, yet there is likely to be resistance in some geographic markets (e.g. North America) and by other suppliers. So roll-out worldwide is likely to be un-even and may not be complete.

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How Will Pricing Shift Affect Coke & Coal Industries?

Pricing volatility set to become the norm, as transactions to China and India are currently main basis for indices; here, users are not able to carry level of stock that counterparts in East Asia do.

- "Gaming" of the system likely to rise.

Major steelmakers will manage this volatility through a combination of hedging and/or writing raw materials costs into price contracts.

- The less well-resourced consumers - e.g. merchant coke plants, steelmakers in developing countries – will be more exposed.

Relatively small size of coking coal market will make it easier for derivatives to exert undue influence.

The "commodification" of coking coal may lead to the disappearance of established premiums for specific grades.

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