

"Update on Metallurgical Coke Market & Production"

Andrew Jones
Resource-Net

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Introduction to Presentation

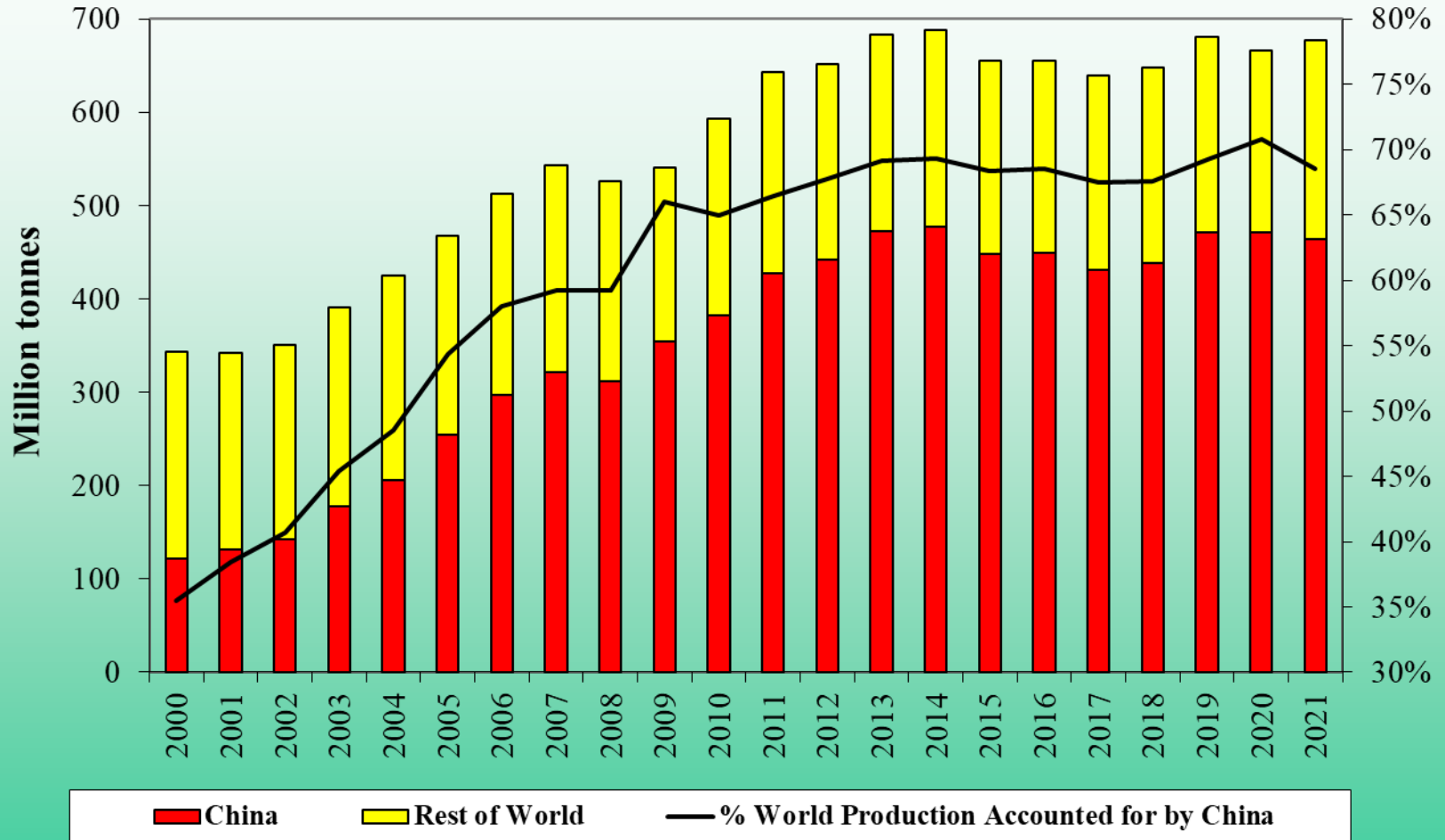
“**Resource-Net**” produces research reports (each month) on world markets for metallurgical coke, as well as related products such as coking coal and anthracite, i.e. about pricing, supply and demand.

Today, we will discuss:

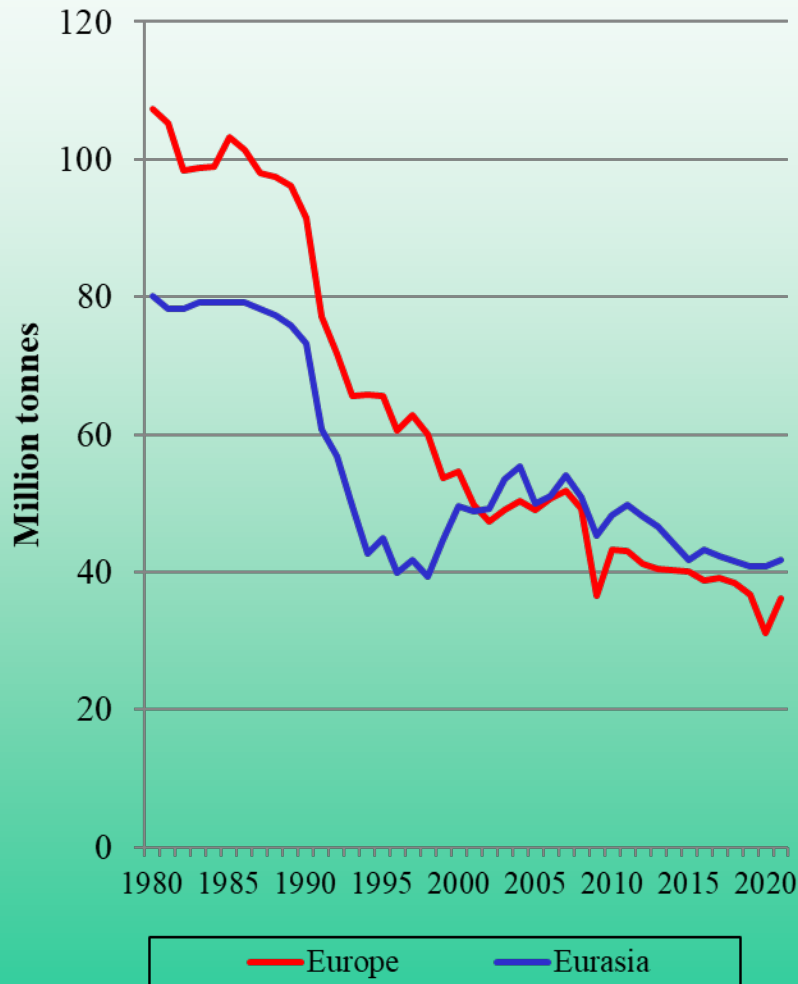
- 1. Coke Production: long-term historical view by region;*
- 2. Coke Market: current & historical review of prices.*

World Coke Production

World Coke Production

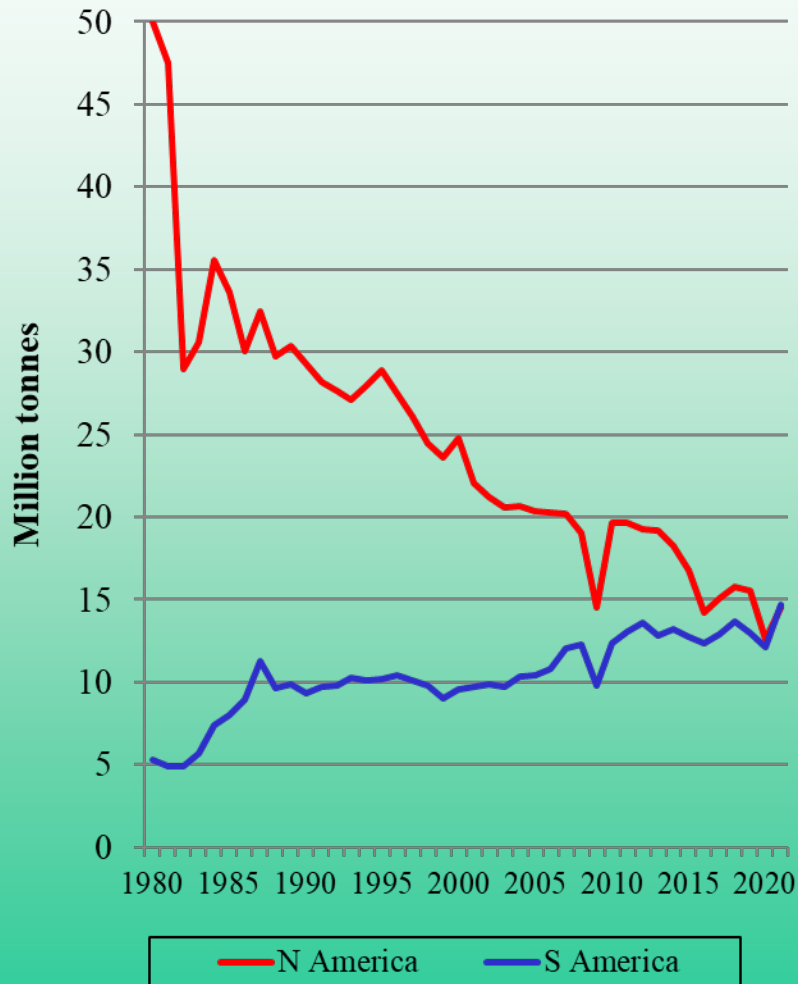


Coke Production – Europe & Eurasia



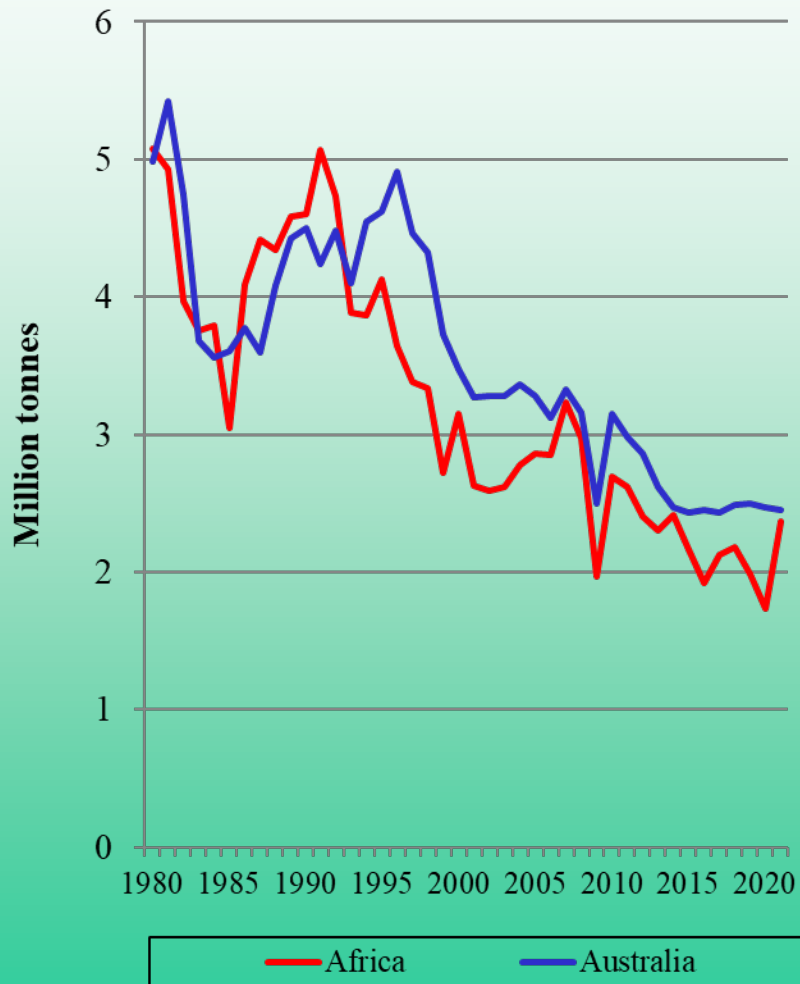
- Long-term decline in coke production in both Europe and Eurasia (i.e. Ex Soviet Union) since mid 1980s.
- In Europe, the decline has continued over last decade, but at a slower rate. Few outright closures. Many commitments to so-called “green” EAF steelmaking by end of decade.
- Eurasian coke production affected by conflict in Ukraine this year. Unclear situation regarding much of its coke capacity.

Coke Production – Americas, North & South



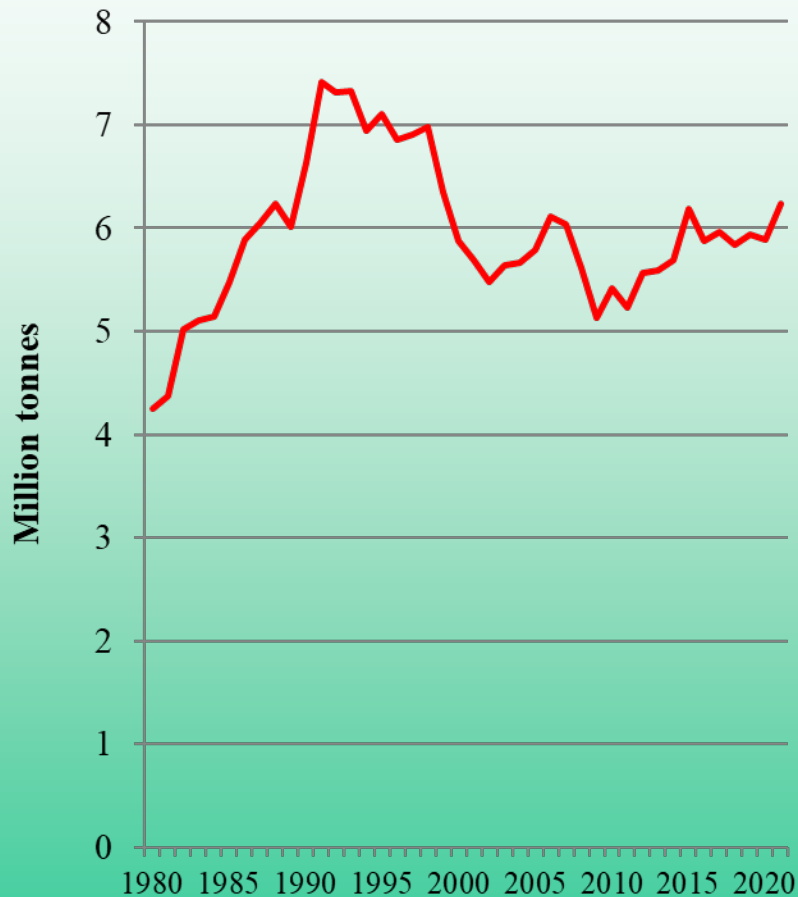
- Steep decline in North American output continues, in contrast growth in South America.
- Brazil and Colombia are primary drivers in South America. In Colombia, most capacity is non-recovery.
- In North America, closures of coke plants continue – three since 2020. Around 4m tpy of US coke production is non-recovery. In Canada, two of the three steelmakers have committed to abandon coke-based process by end of decade.

Coke Production – Southern Africa & Australia



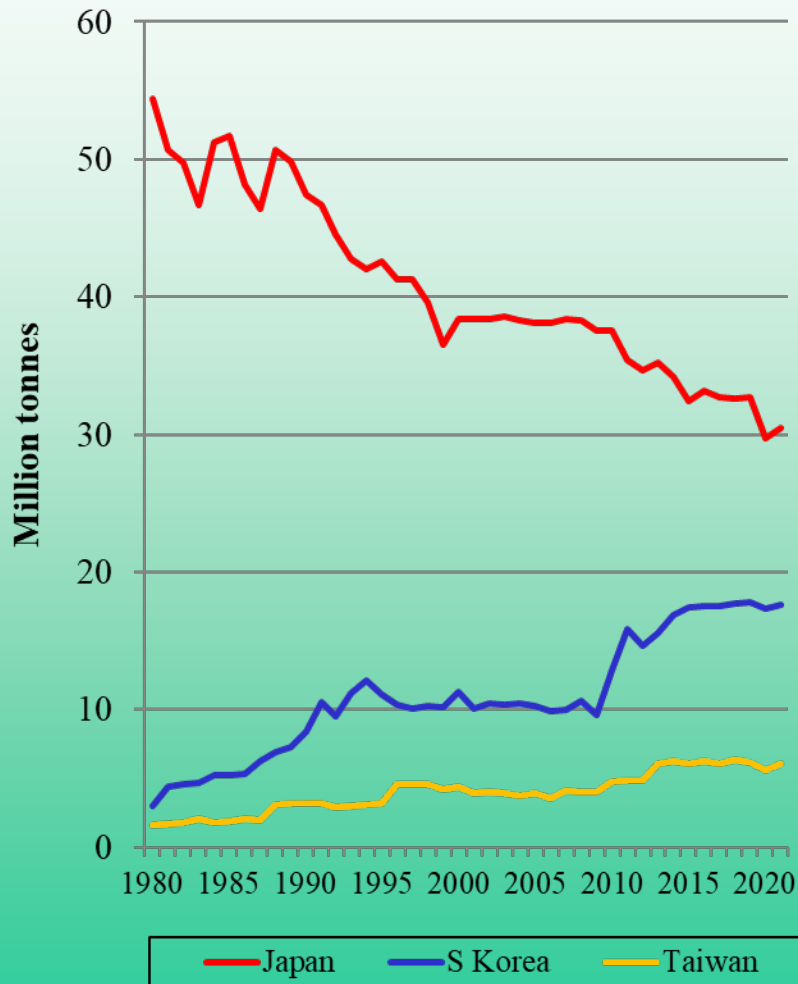
- Both these regions - both relatively isolated economies - have high age of batteries and long-term decline in production.
- In Australia, two coke plants remain. Their production has been stable in last few years.
- Coke production in Africa is in South Africa and Zimbabwe. In Zimbabwe, there has been Chinese investment in non-recovery capacity, leading to a turnaround in production.

Coke Production – Middle East



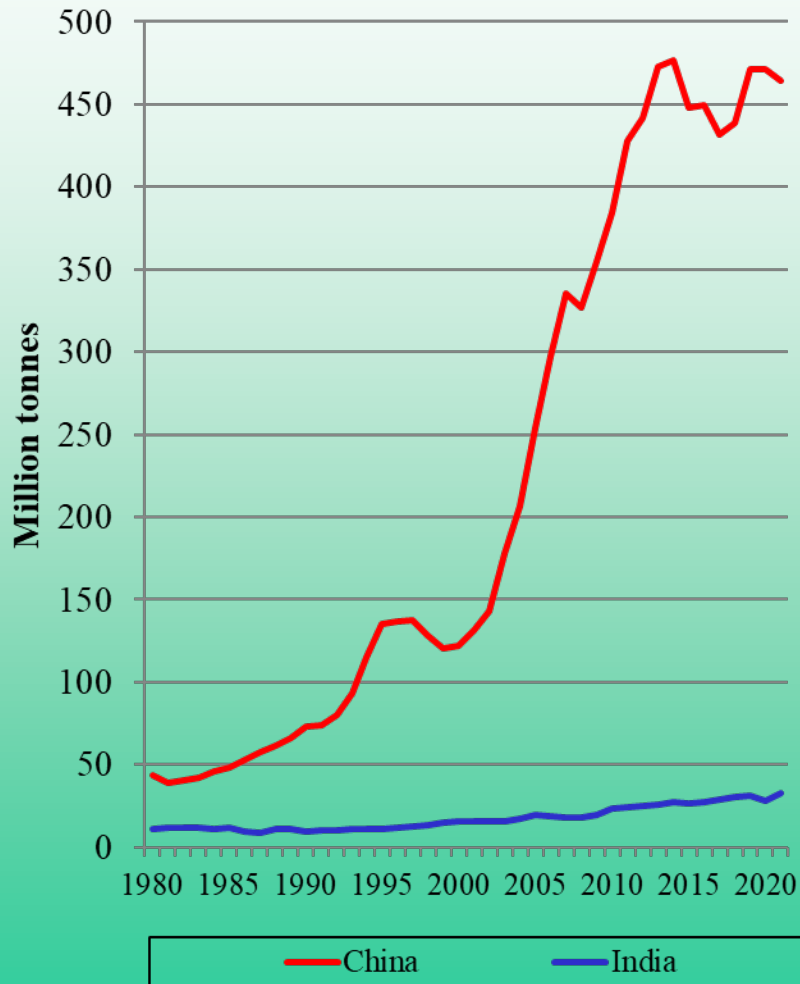
- In this context – Middle East - we include Algeria, Egypt, Iran, Pakistan and Turkey.
- Production in Algeria and Pakistan stopped in 2009 and 2015, respectively. By the end of this year, it is likely that the only Egyptian coke plant will also close.
- Coke production in Iran and Turkey has been on upward trend in last few years (data on Iran are difficult to obtain, however.)

Coke Production – Japan, S Korea & Taiwan



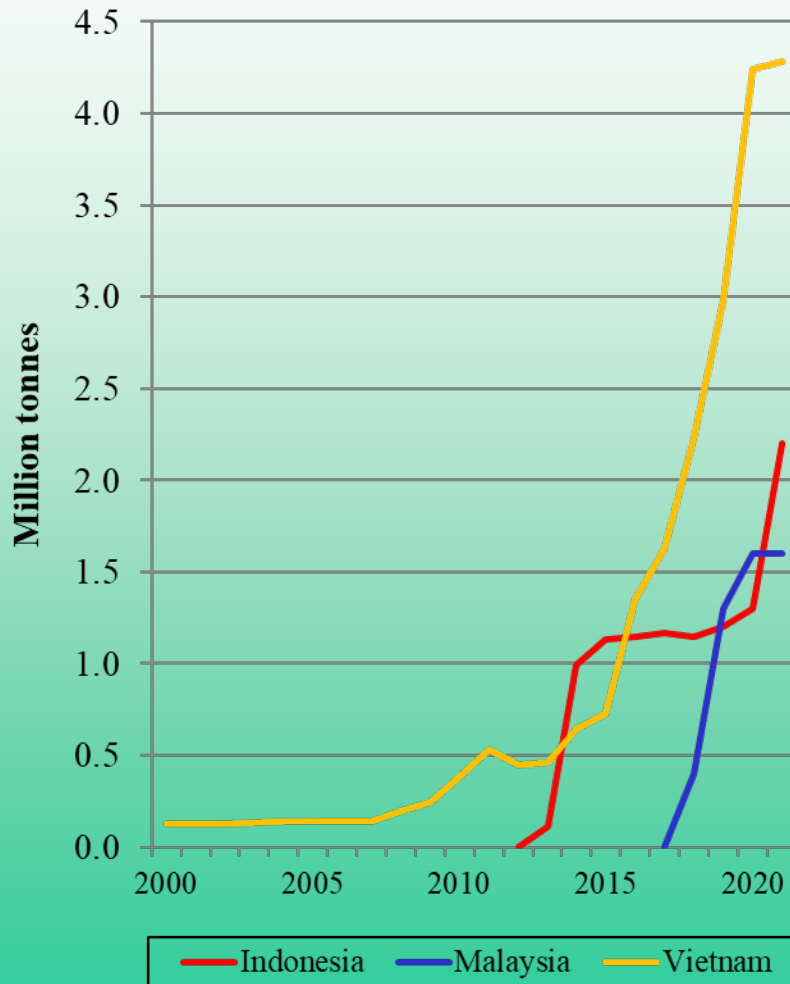
- In developed East Asian economies, Japanese production continues to fall, stability in South Korea and Taiwan.
- Japan has high age of batteries, declining production, but no outright plant closures. Battery-repair programme continues.
- In South Korea and Taiwan, investments in the pipeline to replace old batteries. But production will be unchanged.

Coke Production – China & India



- Large difference in the trend of Asia's two major developing economies.
- Indian coke production continues to grow, in line with domestic demand.
- After declining from 2014 to 2017 under government environmental pressure, thereafter there was a rebound in Chinese coke production. In 2020-21, there were significant imports of coke by China due to domestic shortages.

Coke Production – Indonesia & Vietnam



- Explosive growth in coke production in developing Asian economies. Justification comes from large steel trade deficit of these countries. China's "Belt & Road Initiative" behind many of these investments.
- In Vietnam, four coke plants now operate, two of which are non-recovery. Indonesia and Malaysia each have two coke plants.

Permanent Battery Closures in 2020-22 *

Plant	Location	Capacity, M tpy	Year
Al-Nasr Co	Helwan, Egypt	0.20	2022
ArcelorMittal	Florange, France	0.70	2020
Azovstal	Mariupol, Ukraine	1.50	2022
Bluestone Coke	Birmingham (AL), USA	0.35	2021
Cleveland-Cliffs	Folansbee (WV), USA	1.20	2022
Cleveland-Cliffs	Middletown (OH), USA	0.35	2021

* Outside China.

Major Battery Additions 2020-22 *

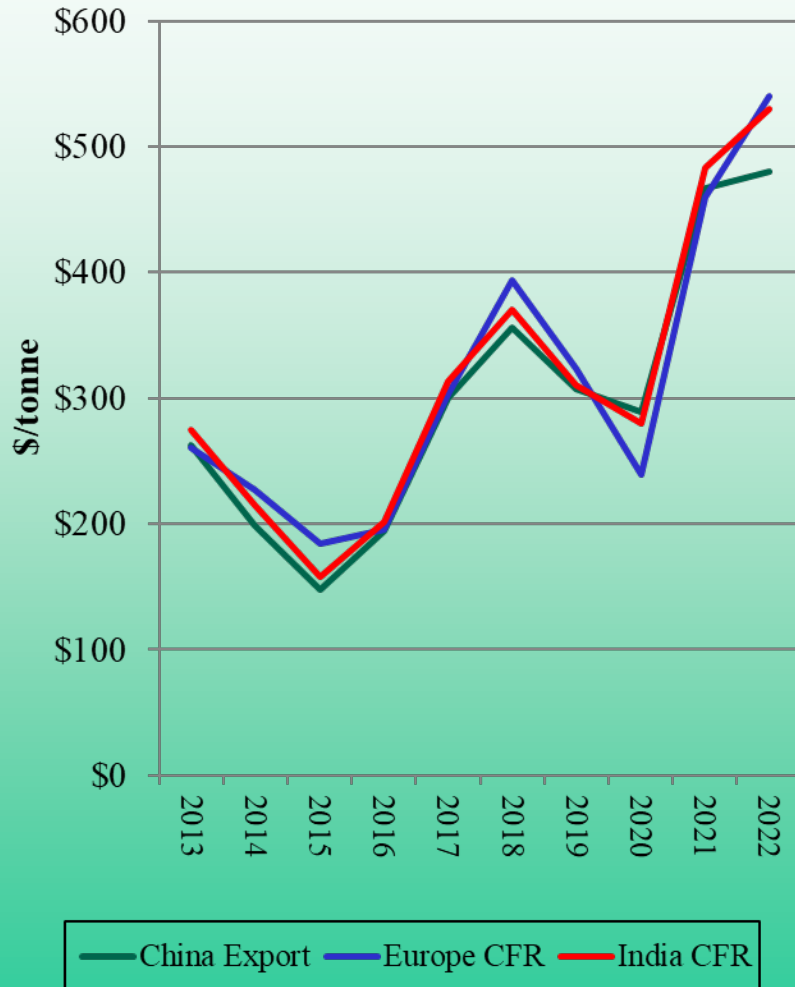
Plant	Location	Capacity, M tpy	Year
ArcelorMittal	Serra, Brazil	0.70	2022
Dexin Steel	Sulawesi, Indonesia	1.30	2020
Eastern Steel	Kemaman, Malaysia	0.80	2021-23
NMDC	Chhattisgarh, India	1.70	2022

Above excludes some non-recovery battery investments in India, Vietnam and Zimbabwe.

* Outside China.

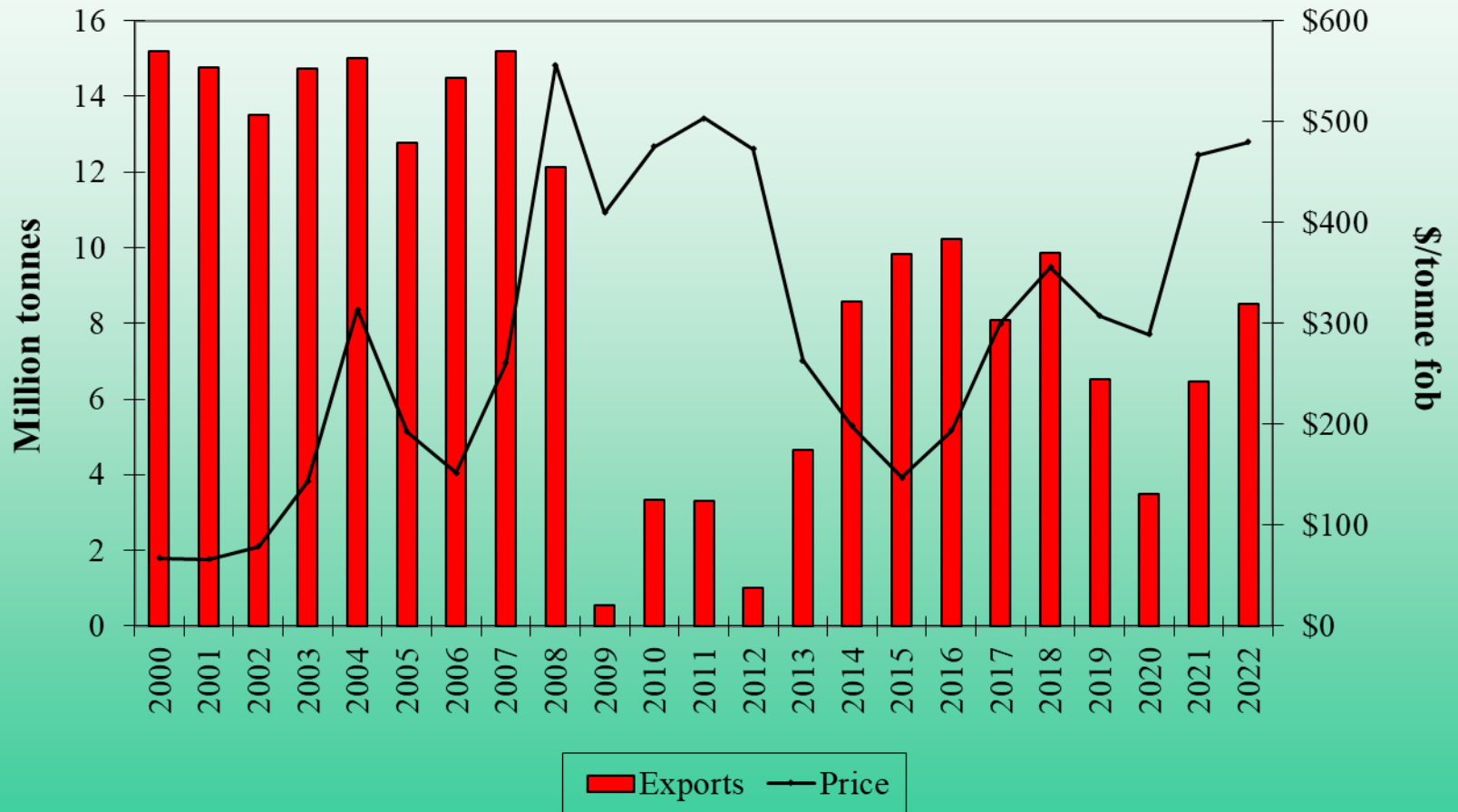
World Coke Market

Blast Furnace Coke Pricing

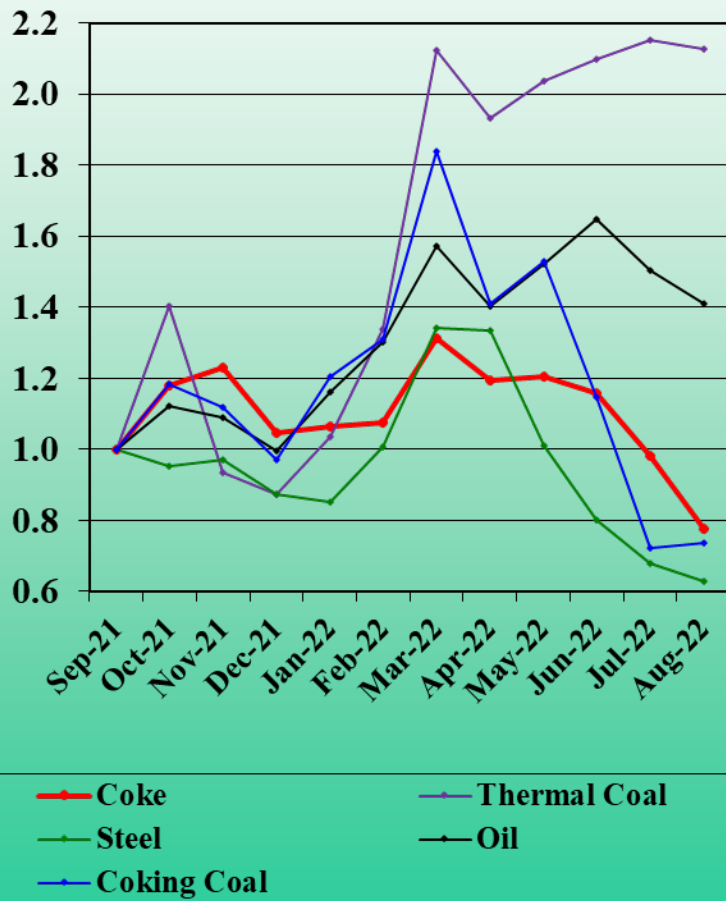


- Shown are the annual averages of the prices researched each month by “Resource-Net”.
- On average over the last ten years, there has been a general uptrend in coke prices. There are various reasons: high coking coal prices, high capacity utilization rates at coke plants; Chinese government policy, high world coke trade demand.
- Market remains highly volatile, though prices in Asia and Europe tend to move in tandem. Upturn in 2021-22 due to restocking following Covid crisis, and this year the invasion of Ukraine.

Chinese Blast Furnace Coke Price & Exports



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 12 months.
- This year, there has been marked divergence between the energy and other commodities. The former remain high due to the sanctions on Russia. The steel-related commodities have fallen due to expectations of an economic recession.

Summary & Conclusions

Coke Production Outlook

From around ten years, world coke production has stabilized into an annual range of 640-680m tonnes. China's share has also been stable at 68-69%.

Largely due to China's coke production, there was a rebound after 2017, following a few years of decline. Emerging production in SE Asia.

In most countries of the world, coke production is in long-term decline due to:

- Lower integrated steel production;
- Environmental legislation – primarily, of course, the move to “carbon neutrality by 2050”, to which most developed countries have signed up.

Hydrogen-based steelmaking is the long-term aim, of course. But as is well known, producing “green” hydrogen requires large amount of renewable energy sources, either hydro or solar.

Coke Market Outlook

Over the last ten years, coke prices have been on broad uptrend: three-four years of increase followed by two years of decline.

China remains key to world coke market as it accounts for around 70% of production and a major part of world trade. It effectively sets the price in the Asian economies, and it is a major influence on the European coke market. Availability from China has increased over past two years or so.

World coke trade has remained high. From 2017, it has returned to the annual level of 26-29m tonnes, which was almost at the level of the years leading up to the 2008-09 crisis.

Prices in 2021 increased by 70-90% on average, as the market was short of stock after the Covid crisis. At the start of this year, there also a major rise due to the expectation of shortages of coke and coal due to sanctions on Russia - fears that have proved unfounded.

**Please do not hesitate to make
contact with any questions or
comments:**

Andrew Jones

Cape Town, South Africa

andrew@resource-net.com

Tel: +27 21 786 1511

Cell: +27 82 048 5827