

THERMAL COAL: A MACROECONOMIC PERSPECTIVE

The future of coal in the global energy mix is unquestionably positive. Today, over 42% of the world's electricity is generated by means of coal-fired power plants (Figure 1), but this share is sure to increase over time. Demand for power is growing, particularly in the developing world, and coal is plentiful and relatively inexpensive as a source of fuel. While North America, Europe and Australia are increasingly environmentally conscious in their quest to reduce carbon emissions, developing countries are more cost conscious in their quest for electricity to power growth and alleviate poverty. The future of nuclear power is clouded by last year's disaster at the Fukushima power plant in Japan and Germany's response among others, while renewable sources have not been able to increase or even maintain their share of power generation. Traditional gas

suppliers operate as monopolies and mostly depend on expensive infrastructure. These trends are not expected to change in the short- to medium-term future.

Short-term determinants

In the short term, factors such as exceptional weather patterns, exchange rate fluctuations and, of course, macroeconomic growth cycles influence the demand for coal, as illustrated rather dramatically by the significant increase in stocks and consequent fall in prices seen this year and detailed in this article.

Weather patterns

An unusually warm winter in the US and Europe has led to increased inventories, while in China heavy rainfall has led to increased hydropower generation, decreasing the use of coal. On the other hand,

the weather has been favourable for suppliers with few disruptions compared to those experienced in past years, for example in Australia and Indonesia.

Exchange rates

The 15 – 20% drop in the US dollar value of the Indian rupee means that, in rupee terms, coal prices have not dropped as significantly in India as they have in other parts of the world (Figures 2 and 3). In some cases, this has led Indian buyers to put off the purchase of coal in the hope that prices will fall further allowing them some upside; in others, it has led to default on the part of the purchaser. Eventually changes in exchange rates should be passed through to the end-customer (the purchaser of electricity, for example). However, in cases where price controls are in place, this mechanism may not function.

Coal's light continues to shine bright but trade in thermal coal may flicker, write Dr Lars Schernikau and Cathryn Carlson, HMS Bergbau AG – Ichor Coal N.V., Singapore/Germany.

Growth cycles

Weak economic growth, again in the US and Europe, but also in Japan, has led to lower coal burn rates in these markets, just as slower growth in India, China and other main Asian import countries could lessen the growth in demand for coal in the short to medium term.

Other

Other short- to medium-term influences on the market for coal include general market sentiment, oil price levels, freight rates and other short-term supply disruptions. For example, freight rates are likely to remain low for the next couple of years, resulting in low-cost transportation and higher competition among the high calorific value coal exporting nations such as Australia, South Africa, Colombia, the US and Russia.

This will keep a lid on high coal prices for some time.

Longer-term determinants

In the longer term, political considerations, as well as technological changes, play a substantial role in driving the supply and demand for coal. As outlined below, demand for coal is projected to stagnate in the west but continue to grow in the east. Meanwhile, supply of coal is expected to continue to grow, with Australia and, to a lesser extent, Indonesia leading the way. If present trends are indicative of the direction of future trade flows between major consumers and major producers of thermal coal, it is likely that several factors will take on increasing significance.

Demand/supply balance

While over the long term, demand will outstrip supply, there are indications

supported by many industry experts that supply of seaborne thermal coal could at times outstrip demand for the next 1 – 3 years (see Figure 4 for an overview of current thermal coal trade flows). Until recently, however, the situation was the reverse, with demand growth rates and volumes growing faster than supply.

Going forward, the following influences can be expected to play a role in future trade flows (Figure 5).

Demand

Asian demand

Asian demand will continue to increase with China and India accounting for the bulk of coal consumption: according to the International Energy Agency (IEA), China and India alone will drive 75% of the growth in coal demand through 2035. While demand in traditional

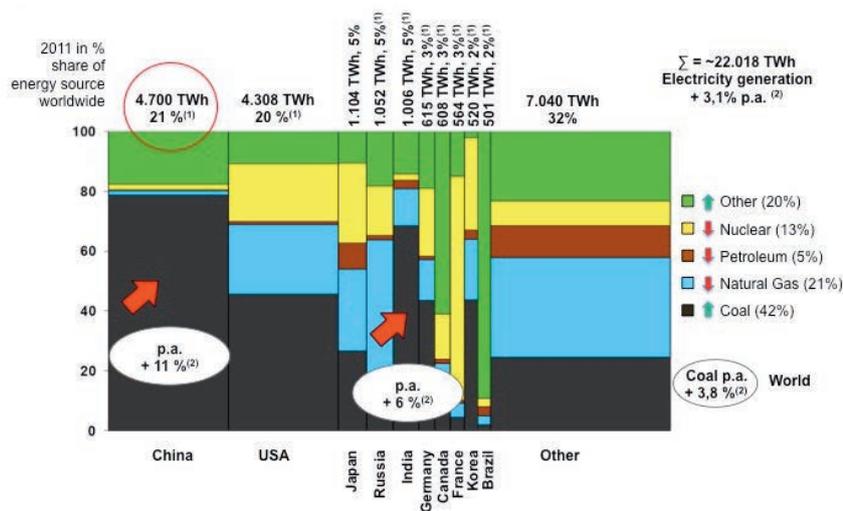


Figure 1. Electricity generation by source in 2011. China and India drive the increase of global coal use.

(1) Electricity production share of respective country. (2) CAGR 2005 – 2011 (%).
Sources: Authors' research and analysis; IEA Electricity Information (2011 Ed.); BP Statistical Review of World Energy (June 2012).

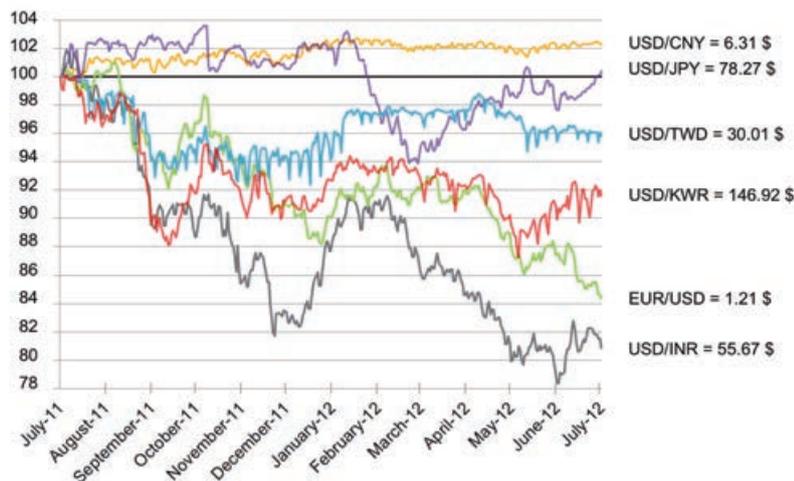


Figure 2. FX rate currency movement of the major coal importing nations against the US dollar from July 2011 to July 2012.

Sources: Oanda.com; Authors' research and analysis.

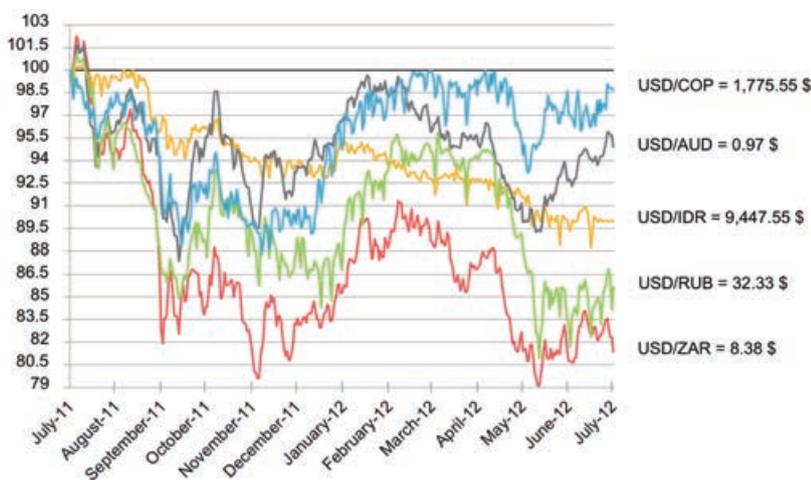


Figure 3. FX rate currency movement of the major coal exporting nations against the US dollar from July 2011 to July 2012.

Sources: Authors' research and analysis; Oanda.com.

import markets such as Japan, South Korea and Taiwan is growing less substantially and may even remain flat, countries such as Vietnam are rapidly building coal-fired plants and demand from these non-traditional markets can be expected to increase.

India – the largest importer

India is expected to become the single largest importer of thermal coal in the years and decades to come. Imports of over 80 million t in 2011 are expected to rise to at least around 150 million t by 2017. According to a declaration by Sriprakash Jaiswalin, India's minister of coal, during the Indian Minerals and Metal Forum 2012, India's coal requirement can be expected to rise to 2 billion t by 2031, with import dependence at that time in the range of 35 – 36%.

US – demand will fall

Demand for coal within the US will continue to decrease, much driven by the current shale gas boom. This will tend to make the US a more regular exporter rather than the historic swing supplier. European import demand will remain stable due to reduced indigenous production. However, some experts predict that coal demand in the OECD countries will remain flat, and may even decline, from now until 2035.

Indonesia – domestic demand

Domestic demand for coal in Indonesia will increase significantly over time. For example, South Africa, another low-cost coal producing country and the world's fifth largest coal exporter, consumes 75% of its production domestically, while Indonesia consumes only around 25% domestically.

China – the key uncertainty

China remains the key uncertainty in terms of its imports. The country has huge coal reserves but transport logistics from the north (where reserves are found) to the south (where the coal is most needed) remain cumbersome. Predictions for China's imports continue to range from 100 – 600 million t over the next 5 – 10 years. The "China Factor" is thus the key determinant for coal demand.

Africa – the wild card

Africa as a whole is an importer to be kept on the watch list. While over the next five years it is not expected that African demand will have a large impact on the market, in the longer term Africa's expected population increase (approximately 1 billion in 2008 to almost 1.4 billion in 2025 according to the UN) and associated

growth in GDP will require large amounts of electricity, much of which will be generated by coal.¹

Supply

Indonesia

Indonesian supply is likely to increase in absolute terms (albeit at a slower pace than seen in recent years), but

domestic demand is set to increase more rapidly. Exports are thus expected to grow slower than in the past.

China and India

Domestic coal supplies in China and India are likely to increase as artificial price constraints and bottlenecks in production/transportation are resolved. However, in volume terms, Indian imports will continue to grow and possibly overtake those of China within the next five years. China will be more volatile than India, the future biggest coal importer driven by its structurally more stable import growth demand.

The US

Supplies from the US could become less competitive due to transport costs and other factors. However, excess supply will exist as production cannot be reduced as domestic demand, driven by shale gas production, falls.

Russia, South Africa and Colombia

Exports from these countries are expected to show little growth over the coming years, with those from Colombia being the least predictable and most likely to show growth.

Australia

Only Australia, the world's second largest thermal coal exporter, can be expected to continue to grow exports at rates similar to those seen in the past. However, as costs are higher in Australia than in other major exporting countries, lower prices could have the effect of curtailing production and thus, exports. Also, the exported quality will decrease as export volumes increase.

Mongolia and Mozambique

Other countries that will play a major role in future supply will be Mozambique and Mongolia. Mozambique has already begun exporting small volumes of metallurgical coal and some high cost thermal coal. While currently, infrastructure capacity in Beira and Maputo is limited, this will change over time. Mongolia will indirectly impact the coal trading market as

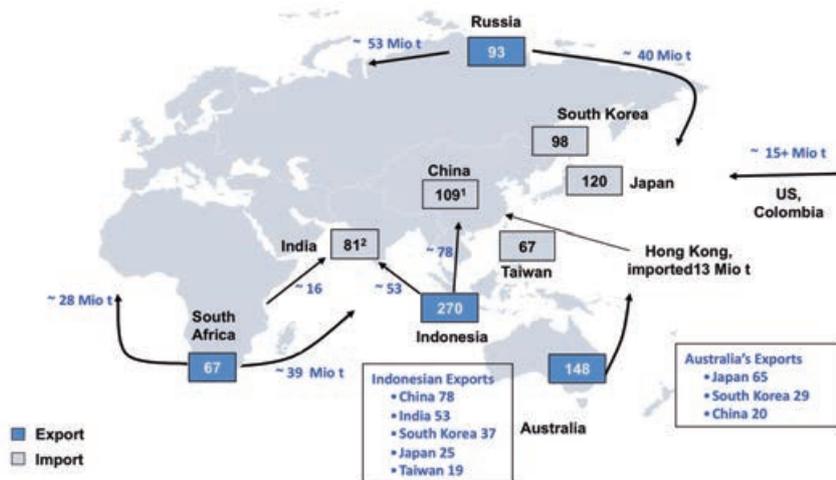


Figure 4. Asian thermal coal import and export distribution in 2011. Indonesia, Australia, South Africa and Russia play the key role.

(1) Excluding approximately 36 million t of anthracites (total imports of anthracite and thermal coal was approximately 145 million t).

(2) India's coal requirement would be 2 billion t by 2031 and import dependence could reach over one third.

Sources: Authors' research and analysis based on the VDKI Annual Report 2012 and various market research.

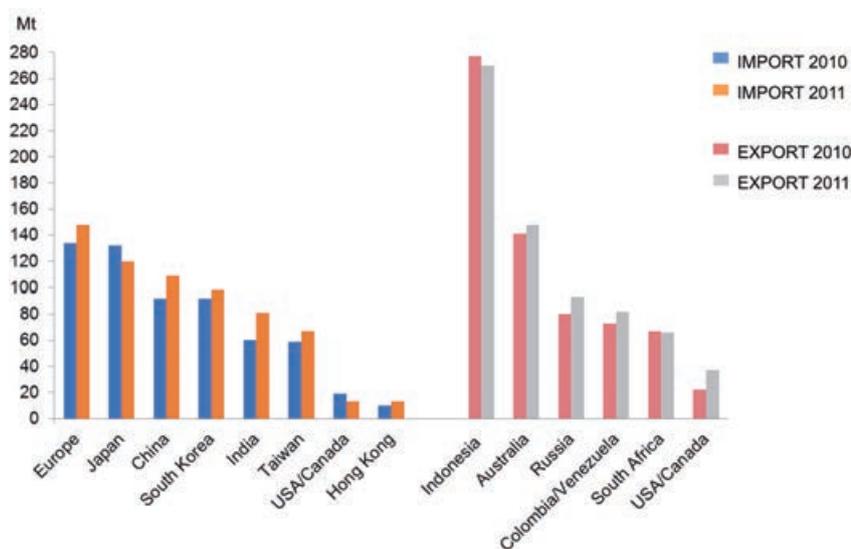


Figure 5. Thermal coal import and export nations in 2010 and 2011.

Sources: Author's analysis based on the VDKI Annual Report 2012.

some of China's import needs will be met by Mongolia via land.

Political will to avoid over-dependence

Between 1980 and 2000, OECD countries increased their use of coal in electricity generation by around 60% and reduced their use of oil in power generation by approximately 40%.² This transition/diversification was the direct consequence of the political will to decrease dependence on oil following the oil crises of the 1970s. While in the past, trade was regionally focused, the coal market has become global, has grown increasingly more sophisticated, and has quadrupled in size. While globalisation continues today, there is evidence of increasing protectionism in some countries, such as Indonesia and South Africa in particular (in the future watch also for Mozambique protectionism), due to concern that their national resources may be exploited by foreigners. They are thus enacting measures to ensure sufficient domestic supply.

Shift from long-term supply contracts to spot market sales

Use of coal continues to grow: this year, the market in globally traded thermal coal used to generate electricity is expected to reach 850 million t – twice the total in 2000. However, while stable, diversified networks of suppliers offered coal customers low energy costs and enhanced energy security based on long-term supply contracts in 1970s and 1980s. Today the story is different. Although it is estimated that 20 – 25% of international trade in thermal coal is still based on long-term contracts (prices are adjusted every six months), with Japan, South Korea and Taiwan as the principal buyers, spot trading is increasingly the norm. Significantly, China and India trade mostly on the spot market. Prices are thus more volatile than in the past and are increasingly based on more important real-time supply and demand and market sentiment.

Environmental concerns, changes in the price of alternative fuels and technology

As touched upon above, demand for coal in North America and Europe is at best stable but, more likely, trending towards decline in the long term. Headlines in US newspapers mention multiple coal-fired power plant closures and layoffs as gas-fired generation is increasingly favoured due to both the low price of feedstock in the US and the increasing political will to promote gas-fired power over coal for environmental reasons. Europe's environmental lobby and the resulting political pressure to close coal-fired plants is arguably even stronger.

In the US, shale gas has grown from only 1% of US natural gas supply in 2000 to around 20% today. Cambridge Energy Research Associates (CERA) estimates that, by 2035, its share could reach 50%.³ This abundance of shale gas has driven natural gas prices in the US down so dramatically that gas prices have converged with and, in some instances, then moved below coal prices. So not only does gas beat coal on the environmental front, but it can now compete on price in the US.

While experts point out that this could happen elsewhere in the world if drilling for shale gas is allowed, globally coal still remains the lowest-cost source of electricity. Furthermore, with regard to the environment, the authors believe that new technology to improve power plant efficiency and to potentially capture emitted CO₂ will have a substantial, positive environmental impact, while at the same time allowing energy-hungry developing countries to evolve further based on coal.

Costs

While coal is most competitive today as a source of fuel for power generation and is expected to remain so, production costs are increasing and will definitely lead to higher prices in the future. Production costs of coal are driven by geology (stripping ratio), oil prices (which typically account for one third of total costs in Indonesia) and

distances from the mine to the port, all of which are increasing over time as the easier-to-get coal is mined. Current freight rates are low but over the long-term are also expected to increase once again.

Coal asset prices are also expected to increase. While coal only receives 6% of energy investments with the bulk of the money still going to oil and gas (Figure 6), an increasing share of investment in energy resources will go into coal production. Just consider that a doubling of investments into coal would still only mean that coal receives US\$ 12 for each US\$ 100 invested, while oil and gas get US\$ 88. As the coal market attracts an increasing number of financial investors, there will be upward pressure on asset prices and, as a result, total costs since these investments will need to generate acceptable levels of return.

Import dependency

Contrary to the situation in the US, demand for coal in Asia continues to increase and this upward trend is expected to carry on for the foreseeable future. Although this situation has led to dramatic increases in imports, both China and India still rely heavily on domestic production. Chinese and Indian imports account for only a small portion of their total coal supplies: it is estimated that China is more than 95% self-sufficient, while India produces around 85% of the coal it uses.⁴

However, in both countries, the coal mines are located at great distances from the regions where coal is consumed. In China, inadequate and uneconomic transport options for domestically-produced coal lead to increased demand for imports, while in India, artificially low domestic prices for coal and inadequate rail transport are thought to hamper increased production. In China, power generation accounts for 77% of total thermal coal demand and in India, the figure is about 71% (Figure 1).⁵ In the latter case, power prices are controlled and Coal India Ltd's (CIL) fuel supply agreements are based on unfavourable terms. Should China and India find their respective political wills to overcome these internal barriers, possibly in combination with

technological advancements, perhaps domestic supplies of coal will increase over time. However, it is likely that demand will outstrip domestic supplies in both countries, particularly India, and thus imports will continue to grow.

Push towards domestic use of sovereign resources

The Indonesian Government continues to discuss policies that are intended to guarantee sufficient supply of coal in the face of expected increases in domestic demand, including the imposition of an export tax on coal, as well as a ban on the export of low calorific value coal. While neither of these measures has been implemented, the Domestic Market Obligation (DMO) is already in effect. Under DMO regulations, mining companies must sell a certain percentage of their production to domestic consumers of coal as determined by the Government, although only selected companies have been affected so far. The law also provides for a cap-and-trade system whereby mining companies that exceed their DMO obligations may sell/transfer DMO credits to mining companies that are unlikely to meet their DMO commitments, with pricing of DMO credits to be determined on commercial terms.

Other nations, such as South Africa, Australia and, in the future, Mozambique, have their own concerns about energy security, but also – and often more importantly – about keeping the economic gain within their countries resulting in upward coal price pressure.

Conclusion

While demand for coal is increasing, especially in China, India and other parts of Asia, it can be expected that supply will also grow, albeit more slowly. Australia and Indonesia are expected to remain major suppliers, although Indonesia will face increased domestic demand and Australia may eventually be forced to cut production in response to lower prices.

Other main exporting countries include Russia, South Africa, Colombia, the US and China. If prices continue to trend or remain lower in the near future, it is likely that production in higher cost countries (including transport) may be cut back, thus supporting a price floor. There are already reports of production cuts and mine closures in the US – the trade’s historic swing supplier – and discussions with mine owners, as well as articles in the press, indicate impending cuts in Russia, Australia and Indonesia. In addition, increasing

costs will erode margins even further with a more pronounced effect on production in times of low prices.

Today, 42% of the world’s electricity is generated by means of coal-fired power plants and this share is sure to increase over time. Demand for power is growing, particularly in the developing world, which is in the midst of the renaissance of thermal coal. There, coal is plentiful and relatively inexpensive as a source of fuel. In the short term, factors such as exceptional weather patterns, exchange rate fluctuations, and of course macroeconomic growth cycles influence the demand for coal.

However, in the end, political will and technological developments will decide the fate of coal. Long-term, the authors are bullish on coal prices because of increased costs, limited supply expansion and increased demand from China, India and other Asian developing nations. Over the next 1 – 3 years, however, the authors believe prices will be volatile and will remain below historic levels.

Coal’s light continues to shine bright but trade in thermal coal may flicker. 

Note

Dr Lars Schernikau is co-founder, a main shareholder in and supervisory board member of Ichor Coal N.V. (distributed by HMS Bergbau AG), where he is in charge of South African and Asian trading and marketing. Cathryn Carlson works as an independent consultant for IchorCoal in project management.

References

1. UN, “World Population Prospects: the 2010 Revision Population Database”, http://esa.un.org/unpd/wpp/Analytical-Figures/htm/fig_2.htm
2. MORSE, K.R., “Cleaning up coal – From climate culprit to solution”, *Foreign Affairs* vol. 91.4 (July/August 2012; Stanford University’s Program on Energy and Sustainable Development).
3. IHS CERA, *Fueling North America’s Energy Future of March 2010* (Cambridge Energy Research Associates, Cambridge; 2010).
4. UBS, Investment Research, *Global I/O®: Coal*, 25 June 2012 (Union Bank of Switzerland, Zürich; 2012).
5. Deutsche Bank, *Global Market Research (Macro)*, *Commodities Quarterly of 3 July 2012* (Deutsche Bank AG, London; 2012).

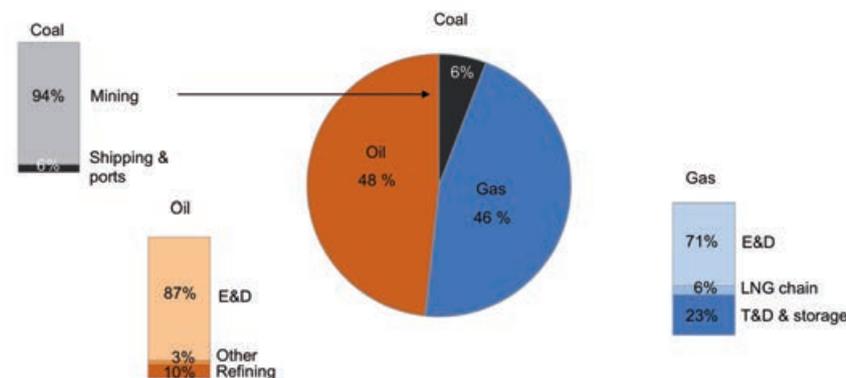


Figure 6. Investment share of coal, natural gas and oil in the energy supply from 2011 to 2035 (T&D: transmission & distribution; E&D: exploration & development). Global cumulative investment in energy US\$ 37.9 trillion, of which 44.6% or US\$ 16.9 trillion are investments in electricity generation and US\$ 20.7 trillion in coal, oil and gas.

Source: Authors’ research and analyses based on the IEA World Energy Outlook 2011.