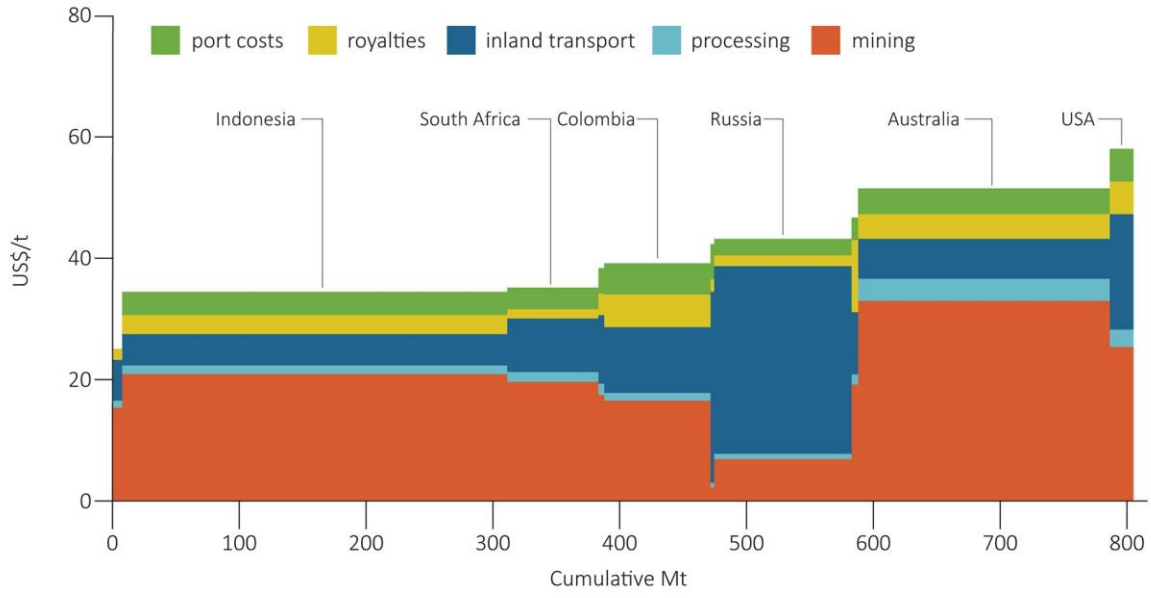
PRODUCTION AND SUPPLY CHAIN COSTS OF COAL

The cost of production is an important consideration from the point of view of both the coal producer and the buyer. For the buyer, the cost of producing and transporting coal indicates the floor price that the seller could accept during price negotiations. For the coal producer, control over their cost of operations ensures their mining interests are profitable and financially viable.

During 2007-11, coal producers worldwide enjoyed a cycle of high prices. However, since 2011 a steady decline in the price of coal in the international market has tested coal producers and forced many to adopt cost cutting measures in the higher cost operations. Mining companies positioned themselves operationally and financially to bear the risks of lower commodity prices by limiting their operations to the most profitable mines.

Price rises in late 2016 and 2017 have improved the profitability of all export producers operating in the market. A similar pattern was experienced by the suppliers of metallurgical coking coal. The size of the market for exported steam coal reached 850 Mt in 2016 where the cash costs ranged from 25–57 US/t free on board (FOB). The international coking coal market was smaller at around 320 Mt with costs ranging from 20–160 U$/t (FOB).



FOB cash costs for steam coal exports in 2016 by country, US/t (Metalytics, 2017a)

Indonesia, South Africa, and Colombia supplied some of the lowest cost steam coal on the international market. Russia, Australia, and US coal suppliers exported coal at the mid to upper range of the cost curve despite being highly productive. Australia supplies the bulk of the seaborne market for coking coal and has costs spread across the entire cost curve. Exchange rate movements between producer countries and the US dollar have been a principal factor in the competitiveness of export coal; some exporters, for

example Russia, have benefited more than others. This return to profitability amongst even the higher cost producers has enabled operators of coal mines to recover debt and invest in both existing and new mining operations; although to date mining companies have been cautious.

The FOB cash cost of export coal comprises chiefly mine operating costs, coal processing, inland transportation, and port costs. In most cases, mining costs are the main component of the FOB cash costs. In countries where mine costs may be extremely low, excessive distances or a lack of access to low cost infrastructure can inflate the FOB cash costs, for example in Russia.

Different mining methods have been adopted around the world based on local geological conditions, access to equipment, affordability, and availability of mining expertise. Most mines have attributes that are similar regardless of the method of extraction. Evidence of mine operations around the world shows that labour is the most significant component ranging from 20–50% of the total mining cost, even in modern highly mechanised operations. Other operating costs for machinery and consumables (for example fuel and spare parts) are also important.

Opencast mining is common across the world, and most prevalent in Indonesia, parts of Australia, the US Midwest, South Africa, Colombia, India, and Russia. Opencast mines tend to have cost components that differ from underground mining, for example earth moving vehicles such as draglines and shovels, a large fleet for overburden and coal haulage, and the extensive use of explosives. Diesel usage, electricity and lubricants and spare parts for vehicles are large consumable items used at opencast operations. Changes in the stripping ratio associated with opencast operations also provide a simple but predictable indication of the unit mine cost.

Underground mining is more challenging and requires specialised tunnelling and coal extraction machinery, for example longwalls and continuous mining machinery. Gas and water extraction, ventilation and roof supports are key features of underground mining. Consumables include electricity and spare parts for cutting and tunnelling machinery. Underground mines are considered more hazardous and risky working environments, but these risks can be largely eliminated with careful planning. Underground mining is common in parts of Australia, Poland, China, and eastern US.

New innovations in mining such as digital information systems, remote control, autonomous vehicles, machinery, and robotics may well feature as investment opportunities for the coal mining industry in coming years. Modern coal companies appear better prepared to adapt to potential changes in the coal market. Price rises in late 2016 and 2017 added 20 and 40 U$/t to the price of steam and coking coal respectively. Provided the operators of export coal mines maintain control over their mining costs, these market price increases would have further improved the profitability of almost all the export producers in the international coal market. Continued discipline in cost control and innovation will enable the coal divisions of mining companies to sustain a long term and profitable future in almost any market scenario.

The IEA Clean Coal Centre is a technology collaboration programme of the International Energy Agency (IEA). The objective of the IEA Clean Coal Centre is to provide definitive and impartial information on how coal can continue to be part of a sustainable energy mix worldwide.

Each executive summary is based on a detailed study which is available separately from www.iea-coal.org. This is a summary of the report: Production and supply chain costs of coal by Paul Baruya, CCC/289, ISBN 978-92-9029-612-6, 104 pp, August 2018.