
EXECUTIVE SUMMARY

The global outlook for coal is marked by extreme uncertainty. On the demand side, recovery from the 2009 global economic recession has been tentative in many countries, casting doubt on future growth rates. While on the supply side, given China's significant share in global coal production and consumption, a minor imbalance in the domestic Chinese market would impact the rest of the world.

Power generation represents the largest absolute use of coal. As electricity demand is closely correlated with economic growth, so, too, is coal demand with GDP growth. The global economic recession in 2009 affected industrial production and electricity generation all over the world, which led to a stagnation in global coal consumption for the first time in the past decade. Nevertheless, the concentration of coal demand in developing countries and its importance in fast growing emerging markets was palpable: while global oil and gas consumption fell measurably in 2009, the consumption of coal only stagnated. In the midst of recovery, uncertainties around economic evolution during the outlook period (2011-2016) are tremendous. Hence, the following coal demand projections bear similar uncertainty levels.

China's share in global coal production is almost four times that of Saudi Arabia's production of oil. Its share in global coal consumption is more than twice that of the demand for oil in the United States. Overall, the Chinese domestic coal market is more than three times the entire international coal trade. Therefore, any imbalance between Chinese production and demand has the ability to have a large impact on global coal trade. This outlook illustrates the impact of Chinese coal production uncertainty on international coal trade by analysing two scenarios, a high Chinese production scenario (HPS) and a low Chinese production scenario (LPS).

The growth of average daily coal demand during the last decade was over 700 000 tonnes. As this growth has been stronger in some regions than others, the coal market landscape has changed.

Coal is the second most important primary energy source behind oil. Throughout the past decade hard coal consumption increased by more than 70% from 3 700 million tonnes (Mt) in 2000 to an estimated 6.3 billion tonnes in 2010. This boost in coal demand corresponds to rising coal usage, which currently amounts to approximately 720 000 tonnes every day. Yet, growth in coal demand varies from country to country: while coal consumption has stagnated among OECD countries in recent years, the surge in global coal consumption is driven primarily by developing economies, such as China and India.

This rapid growth in coal use has affected international coal trade substantially. Even though suppliers, such as Australia and Indonesia, ramped-up production quickly, a strong increase in demand caused an unprecedented spike in the price of coal in 2007 and 2008. Although prices plummeted in early 2009, due to the global economic recession, since then they have steadily continued to rise. This development was paralleled by supply cost increases due to higher prices for mining inputs and labour, as well as soaring freight rates. Yet, coal price increases have over-compensated for the cost escalation, leaving the coal industry with additional profits. Metallurgical coal markets have been even tighter than steam coal markets in recent years. This has caused coking coal prices to decouple from steam coal prices.

Coal demand will continue growing in the outlook period, but the pace of growth slows. China, in absolute terms and India, in relative terms, will lead the growth.

While global coal demand is projected to increase from 5 225 Mtce in 2010 to 6 184 Mtce in 2016 (2.8%), Chinese coal demand alone is projected to increase from 2 517 Mtce in 2010 to 3 123 Mtce in 2016 (3.7% p.a.). Indian coal consumption is projected to increase from 434 Mtce to 610 Mtce by the end of the outlook period (5.9% p.a.), which equates to an absolute increase of 40.55%. Coal demand growth is projected to be sluggish in the OECD. For nearly a century, the United States was the world's largest consumer of coal. However, coal demand in the United States peaked in 2007, due mainly to competition from other energy sources, such as natural gas, and increased environmental regulation. As such, coal demand in the United States is not expected to reach the pre-recession level in the outlook period. OECD countries in Europe and Asia, however, offset the decline in consumption in the United States, which lead to a total annual coal demand growth of 0.2%.

China: the dominant driver of global coal markets.

Chinese domestic coal extraction has increased at astonishing rates over the past decade: Chinese coal mining now produces more primary energy supply than Middle Eastern oil. Nevertheless, China started to import rising coal volumes from the international markets in 2005. This was due to a progressive tightening of the Chinese coal market when domestic production was unable to keep up with soaring demand. Today, China accounts for approximately one-half of global coal consumption. Thus, through sheer size, even a small mismatch between domestic supply and demand could have powerful worldwide effects on coal prices, trade flows and utilisation rates of coal supply chains.

In the coming years, the Chinese coal industry will face several major challenges in meeting its growing demand for coal. First, new mines will need to be developed and production increased in existing collieries (coal mines, including all buildings and equipment). Second, congested domestic transport infrastructure will require expansion and improvements to ship additional coal from production centres to demand hubs. Some new mines are located very far from major industrial cities, which will inevitably lead to transportation challenges. Third, productivity and efficiency gains must be achieved to keep coal affordable for consumers. Finally, as China aims to reduce the environmental impact of its coal consumption, significant investments will be needed for upgrading power plants. Chinese authorities are currently in the process of restructuring and consolidating the coal mining industry and have ambitious plans to ramp-up nuclear and renewable electricity production. The development of coal production, and hence the future level of Chinese imports, is dependent on how fast this reorganisation takes place and when investments are made. Due to these unknowns, we present two possible scenarios, noted below. A 5% production difference between the scenarios could lead to two very different outcomes for the global coal trade.

One scenario assumes that Chinese coal production and infrastructure expansion cannot keep up with domestic coal demand. This scenario referred to as the low Chinese production scenario (LPS), assumes a continued strong demand for imported hard coal. The other scenario, referred to as the high Chinese production scenario (HPS), assumes that Chinese coal production increases at higher rates during the outlook period. As a consequence, Chinese import demand is lower in this scenario.

In the LPS, Chinese hard coal production grows from 2 399 Mtce in 2010 to 2 913 Mtce in 2016. This production level causes Chinese hard coal imports to almost double from 92 Mtce in 2010 to 180 Mtce in 2016. In the HPS, Chinese production grows to 3 054 Mtce in 2016. This production level causes Chinese hard coal imports to drop by 58% from 92 Mtce in 2010 to 39 Mtce in 2016.

The difference in Chinese seaborne imports, which reaches its maximum of 141 Mtce in 2016, has various implications for seaborne hard coal trade. High imports (LPS) tighten the seaborne hard coal market and call for suppliers world-wide. Compared to the HPS, which results in lower imports, the utilisation of export mining and infrastructure capacity is higher on a global scale. Given a tight market situation with high Chinese imports, several suppliers provide higher volumes than they would with lower Chinese imports.

Coal in the United States will balance the market if needed, but at higher prices.

These additional volumes stem from collieries that incur higher mining and/or transport costs, as well as from mines that produce lower coal qualities. The United States is a key swing supplier in both, metallurgical and steam coal trade, and plays a crucial role in balancing the market when low-cost supply is scarce. Depending on market conditions, the United States is capable of ramping-up exports quickly and nearly doubling their exports from 58 Mtce in 2010 to 110 Mtce (in 2012) in the LPS. On the other hand, US coal exports are increasingly crowded out by low-cost suppliers in the HPS. The United States were already a major coal exporter during the 1990s and have the necessary infrastructure in place. With relatively low natural gas prices coal-burn is currently low in the US power sector giving coal producers the opportunity to export additional volumes.

While traditional exporters keep their place in the coal market, some new players, such as Mongolia and Mozambique emerge as important producers.

The bulk of global coal exports come from the traditional base suppliers including Indonesia, Australia, Russia, South Africa and Colombia. However, Mongolia and Mozambique are two promising new players who are becoming more relevant with regard to the highly concentrated metallurgical coal trade. Mongolia will treble its exports from 10.3 Mtce in 2010 to 30 Mtce in 2016, and exclusively serves China with low cost coal through the “backdoor” via overland trade. Mozambique started exporting coal in 2011 and is projected to reach 21 Mtce by 2016. These entrants are low cost alternatives and gain market share at the expense of high cost producers, such as the United States or Canada, especially in the HPS.

In the HPS, India becomes the largest coal importer. In the LPS, importing countries will pay higher coal prices.

With more costly supply utilised in the LPS, marginal costs of supply (FOB) are projected to be approximately USD 10/t higher for steam coal and about USD 15/t higher for metallurgical coal, compared to the HPS. The lower supply costs in the HPS attract Indian buyers, making India the largest steam coal importer by 2016. In this scenario, Indian imports escalate from 81 Mtce in 2010 to 204 Mtce in 2016 compared to 174 Mtce in the LPS. Additional Indian imports absorb some decline in Chinese imports and reduce export-capacity slack in this scenario. Therefore, the lower Chinese imports in the HPS are partly offset by higher Indian imports and supply costs are, hence,

partially stabilised. This mainly affects steam coal trade (seaborne steam coal market volume differs by 71 Mtce in 2016) whereas in metallurgical coal trade, the lower Chinese imports fully feedback to seaborne trade market volume (metallurgical trade market volume differs by 37 Mtce in 2016).

Investments in the pipeline are solid, both in mining and infrastructure capacity.

From a supply security perspective, global hard coal supply capacity is sufficient to meet demand over the medium-term, however, bringing excess capacity to international markets usually implies a substantial increase in supply costs due to higher transport distances, lower coal qualities or more costly mining. The relatively high prices throughout the past five years have triggered investments in the coal industry, thus project pipelines are healthy, with substantial additions to mining and infrastructure capacity being scheduled to become operational over the medium-term.

Global export mining capacity is projected to increase from nearly 1 180 Mtpa in 2010 to almost 1 600 Mtpa in 2016 if all projects are developed on time (including mines that also serve the domestic markets). Out of the additional 420 Mtpa of mining capacity, almost 140 Mtpa are in an advanced state and are thus considered as probable additions in this outlook. The remaining 280 Mtpa are less advanced and are considered as potential additions. Export terminal capacity is projected to increase from 1 288 Mtpa to 1 528 Mtpa over the outlook period.

Nevertheless, poorly co-ordinated investments, project cancellation and weather-related disruptions may result in nervous markets in the medium-term forecast.

Newly developed deposits are often located farther away from existing infrastructure and thus require substantial complementary investments into port and railway capacities. Projects in mature mining regions often experience deterioration of product qualities or mining conditions. These factors put fundamental upward pressure on future supply costs. Although scheduled projects are theoretically sufficient to accommodate trade market growth, even in the LPS, the reality may be different. Current projects are in various stages of advance, and depending on market conditions some might be cancelled and others delayed. A major problem in coal supply chain investment is the involvement of various stakeholders with differing objectives. In the past, this has caused situations where supporting or complementing investments, *e.g.* into railway lines or port capacities were not synchronised and coordinated with mining investments, resulting in temporary overcapacities or bottlenecks along the supply chain.

Therefore in the LPS, temporary bottlenecks and high capacity utilisation rates may nevertheless be a likely feature in the medium-term, if key projects in low-cost countries, (*e.g.* Australia, Colombia or South Africa) are delayed or cancelled.