煤炭科学研究总院

AN ANALYSIS OF COAL PRICE TRENDS IN CHINA

WU Lixin, QIN Rongjun and REN Shihua

COAL STRATEGIC PLANNING RESEARCH INSTITUTE | CHINA COAL RESEARCH INSTITUTE

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EXECUTIVE SUMMARY

This study shows that the rapid increase in China's coal prices since June 2016 was mainly driven by shrinking domestic supply due to China's effort to cut overcapacity in the coal industry. In order to stabilize coal prices, the Chinese government is taking measures to increase supply and is encouraging coal and power companies to sign long-term supply contracts. In the long term, China's coal demand will stabilize at around 4 billion tonnes, which can be fully met by domestic supply. As China reaches a balance in domestic coal demand and supply, the coal price and coal imports will decline.

Driving factors behind China's recent coal price surge

- There was no obvious growth in demand or production costs to support the recent price increase. The main cause was government policies designed to combat overcapacity that eliminated more than 200 million tonnes of supply and cut annual work days for coal companies from 330 to 276. As a result, coal output dropped by over 10%, creating a 222 million tonne gap between production and consumption in the first three quarters of 2016.

[1] The "two-tracked" mechanism of thermal coal pricing refers to two different pricing mechanisms adopted by thermal coal suppliers and consumers after the relaxation of coal pricing. One was the prices indicated in key contracts signed by coal producers and power companies at the beginning of a year, which lock in the whole years' supply volume at prices lower than market price; the other was market-based coal prices, decided by market conditions.

- High temperatures across China since July 2016 caused an increase in domestic power consumption which further contributed to the price increase.
- Transportation issues caused by heavy rainfall and strict rules on road overloading limited transportation of coal.

Analysis of future coal consumption in China

China's coal consumption has been steadily declining in the past few years with the first decline of 2.9% in 2014 followed by 3.7% in 2015. In the first three quarters of 2016, this trend continued and coal consumption decreased by 68 million tonnes or 2.4%. China's energy consumption per unit GDP has also been declining. China will gradually shift away from high energy consumption and increase the proportion of non-fossil fuels in its energy mix.

- China has increased regulation in the thermal power sector, which accounts for around half of China's coal consumption. The approval of planned thermal power projects and projects that have not yet started construction will be suspended.
- In 2015, the steel sector accounted for 15.8% of total coal consumption. Crude steel capacity will be cut by 12% to 19% in the next five years, which means coal demand will decline as well.
- Coal demand in the construction materials sector, which accounted for 13.2% of China's total coal consumption in 2015, has already begun to peak and will gradually decline.

Forecast of China's coal import demand

In the long run, China's coal demand will stabilize, and domestic coal supply will meet the country's demand. This analysis shows that China's demand for imported coal will decline in the years to come. China's coal capacity is currently around 5.7 billion tonnes, of which 800 million tonnes are illegal projects. About 310 million tonnes have been closed, leaving 4.6 billion tonnes of compliance capacity in 2015, which can fully meet China's projected 4 billion tonnes of consumption demand.

- As the policy on capping total coal consumption in southeastern coastal areas is implemented and coal consumption shifts west towards China's coal production sites, the market for imported coal will decrease.
- China has introduced several measures to control sulphur and heavy metal content in commercial coal. These measures extend to customs clearance and increases operational risk for countries exporting coal to China. Furthermore, Tariff rates implemented in 2014 and RMB devaluation have weakened the price advantage of imported coal.

REVIEW OF THE COAL PRICING MECHANISM IN CHINA

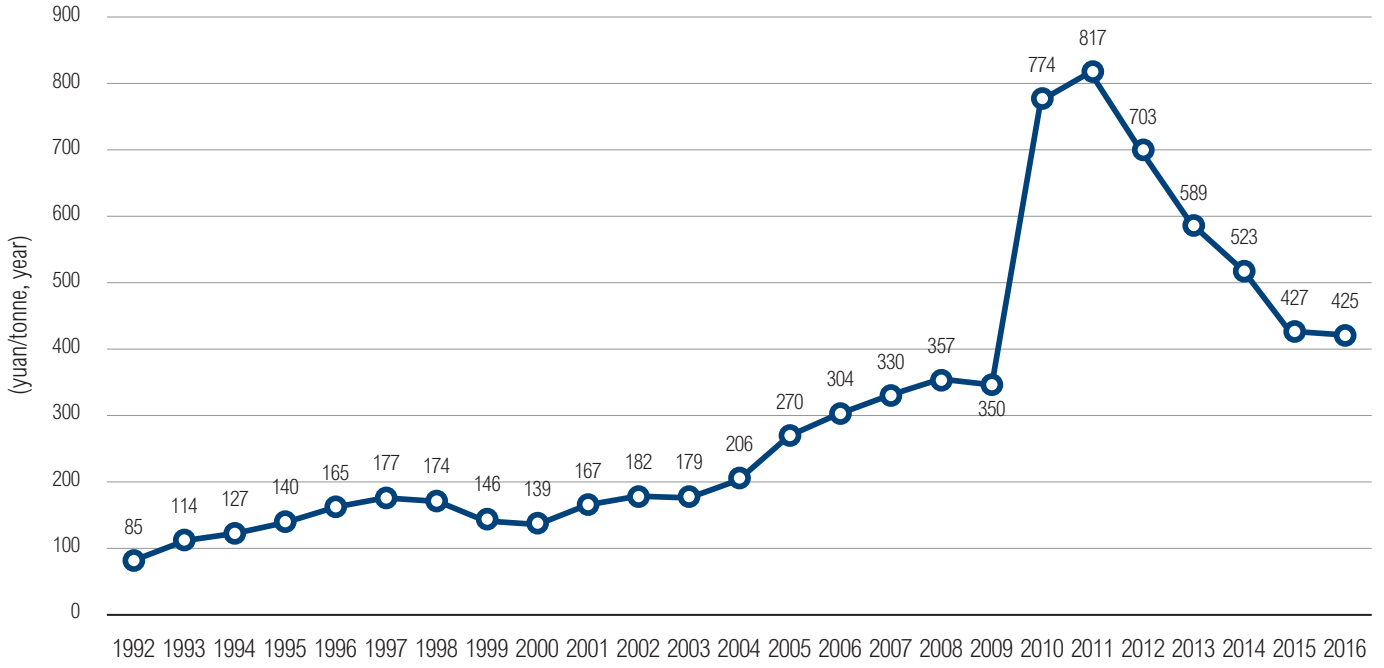
Coal pricing in China occurred in three stages: (1) The first stage was from the 1949 to 1985. In those days, China had a planned economy and coal pricing was subject to the state administration and insulated from market activities. (2) The second stage was from 1985 to 2005, when market-based rules were first introduced to coal pricing and coal prices were gradually relaxed. China had a "two-tracked" pricing mechanism, i.e. respective pricing for state-controlled thermal coal and for coal traded in the market. Some regions also adopted different prices for local and non-local coal. (3) The third stage was from 2005 to the present, when the state stopped intervening in thermal coal pricing and the market started to play a greater role. In December 2013, the General Office of the State Council issued *Suggestions for Deepening the Market-Oriented Reform of Thermal Coal*, which canceled key contracts and unified coal prices, marking the end of the long-standing coal pricing regime under the planned economy and a combination of planned and market-oriented economy. Because of this policy, coal pricing became market-oriented and the government adjusted coal supply volume according to market conditions, and thus indirectly affected coal prices.

Currently, coal pricing in China is affected by supply costs and market demand. Supply costs include production and operational costs, safety input, ecological restoration costs, resource costs and transportation costs. Market demand factors include changes in supply and demand, fluctuation of international energy prices, etc. Market demand growth drives up coal prices, and stimulates technological advances for difficult coal seam exploitation and safe production, and thus increases coal output. Market demand decline results in lower coal prices, and coal producers with high supply costs will be closed or suspended from production. Companies are encouraged to reduce costs through M&As and higher production efficiency.

ANALYSIS OF COAL PRICE FLUCTUATION IN CHINA

In the wake of improved market mechanisms, China's coal pricing is affected by multiple factors including supply

Chart 1 | **Annual Average Coal Price Index in the Bohai Rim from 1992 to 2016**



Note: The 2016 data is the average of data from January to September.

and demand, seasonal changes and prices of other energy sources. Recent coal price trends are illustrated in Chart 1.

(1) Supply and Demand Affect Price Fluctuation

Since domestic coal pricing was relaxed in 1992, China has witnessed four major coal price fluctuations.

The first fluctuation was from 1992 to 1997. As China started its economic reform and opening up, the economy took off and coal demand surged. Coal prices jumped from 85 yuan per tonne in 1992 to 167 yuan per tonne in 1997.

The second fluctuation was from 1998 to 2000. As demand increased, small coal mines grew rapidly which resulted in overcapacity. Coal prices dropped from 167 yuan per tonne in 1997 to 140 yuan per tonne in 2000.

The third fluctuation was from 2001 to 2011. China began to rectify coal production and shut down small mines. Meanwhile, high speed economic growth resulted in a shortage of coal supply, which was the country's primary energy source. Coal prices rose rapidly from 140 yuan per tonne in 2001 to 861.64 yuan per tonne in 2011. This was the golden decade for China's coal industry.

The fourth fluctuation was from 2012 to the present. Due to sluggish market demand and overcapacity resulting from the shift of economic growth from high to medium-high speed and energy restructuring, coal prices fell. On December 9, 2015, coal prices had fallen to 371 yuan per tonne.

The four major coal price fluctuations in China show that supply and demand is the dominant factor affecting coal prices. According to the research results of the Coal Strategy and Planning Institute, there is a prominent causality between coal supply and demand and prices. When other factors remain unchanged, for every 100 million tonnes of decrease in coal supply, coal prices will increase by 66 yuan. And for every 100 million tonnes of growth in coal consumption, coal prices will increase by 94 yuan.

(2) Seasonal Factors

Seasonal supply and demand also affect coal prices. Heating in the winter and power demand growth in the summer are two seasonal factors that affect coal prices. Normally coal prices go up by four percentage points from January to March, and decline from April to October. Coal prices often increase slightly in the peak season of August and September and go up by about one percentage point and three percentage

points respectively in November and December. Coal price fluctuation in 2014 is illustrated in Chart 2.

(3) Prices of Other Energy Sources

Price fluctuation of other energy sources, such as international crude oil, may also result in coal price fluctuations in China. Chart 3 shows the trends of international crude oil prices and Chinese coal prices in the past five years. Because oil and coal are mutually replaceable energy sources, domestic coal prices are strongly connected to international crude oil prices. International crude oil price fluctuation will certainly lead to domestic coal price fluctuation. Relevant research estimates the correlation coefficient between domestic coal prices and international crude oil prices at as high as 0.9429.

THE IMPACTS OF CHINA'S COAL PRICES ON GLOBAL COAL PRICES

Before 2005, China's coal market was relatively insulated and thus the correlation between China's domestic coal prices and international market prices was weak.

Since 2005, when China's coal market became open and competitive, China's coal prices have gradually converged with global coal prices. China's coal industry has developed continuously in recent years, making China the largest coal producer and consumer in the world. According to BP's statistics, in 2015, China accounted for 47.7% and 50% of global coal production and consumption respectively. As the world's largest

Chart 2 | **Monthly Average Coal Price Index in the Bohai Rim in 2014**

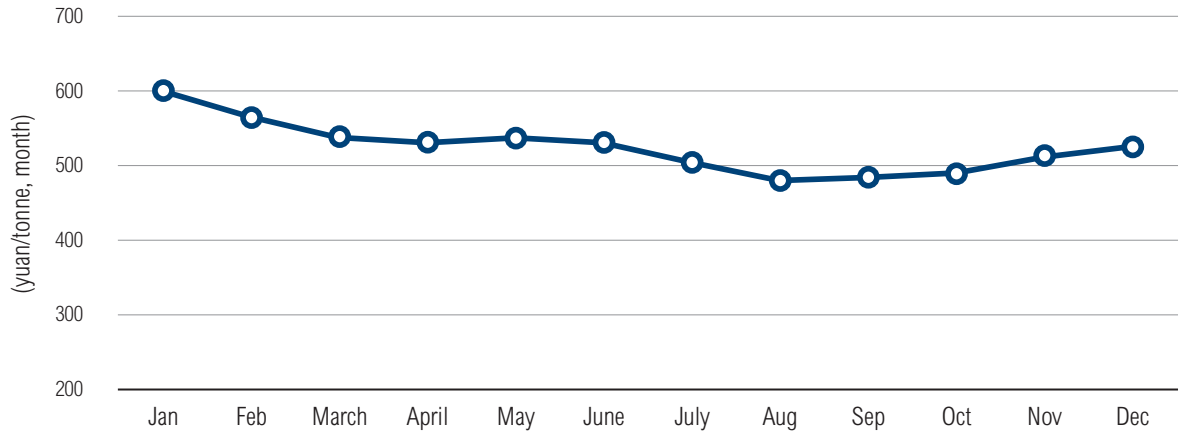
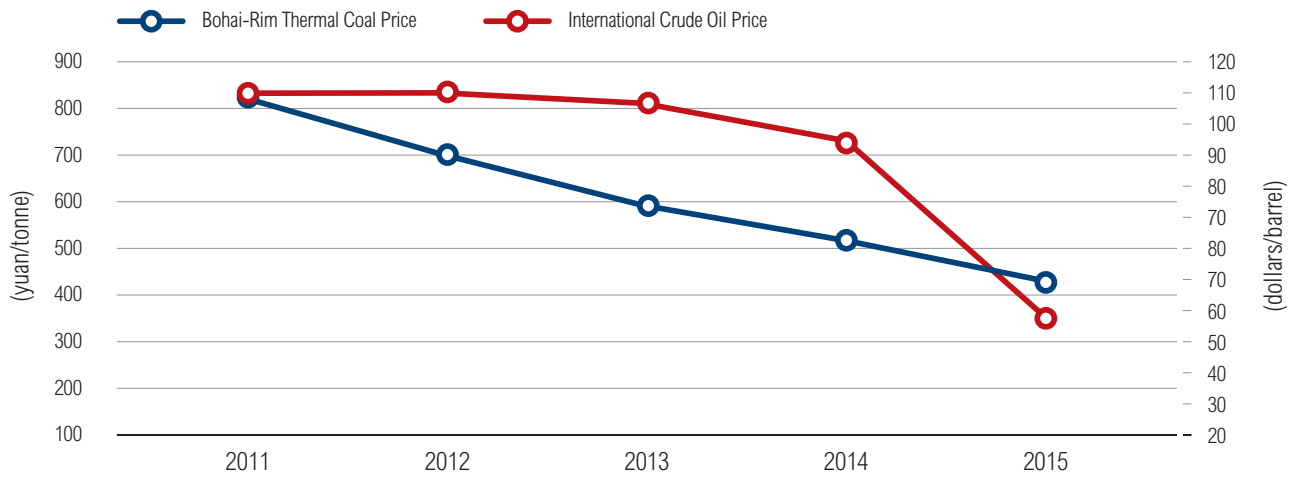
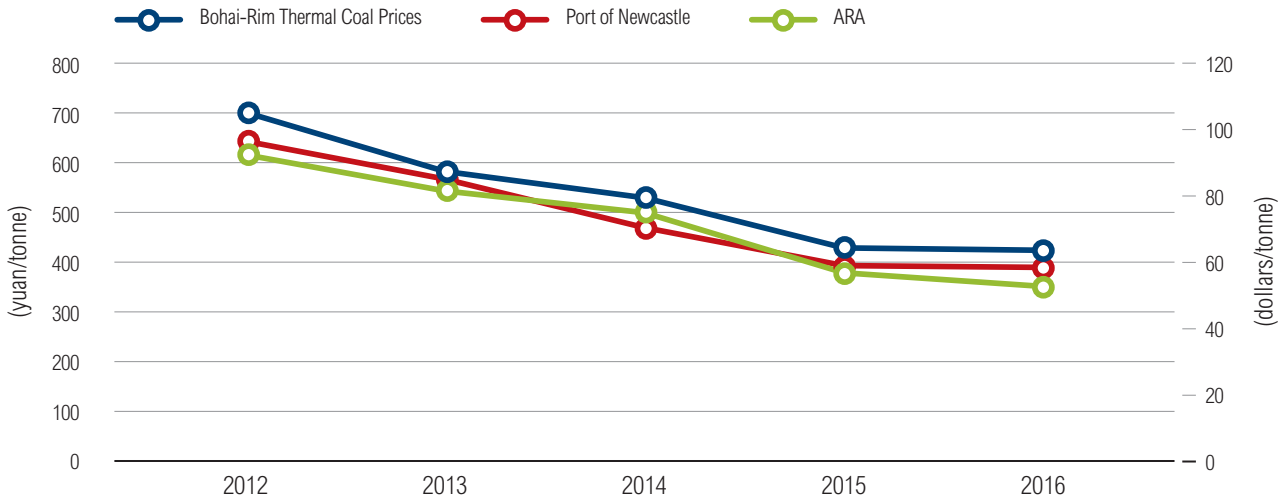


Chart 3 | **The Impacts of China's Coal Prices on Global Coal Prices**



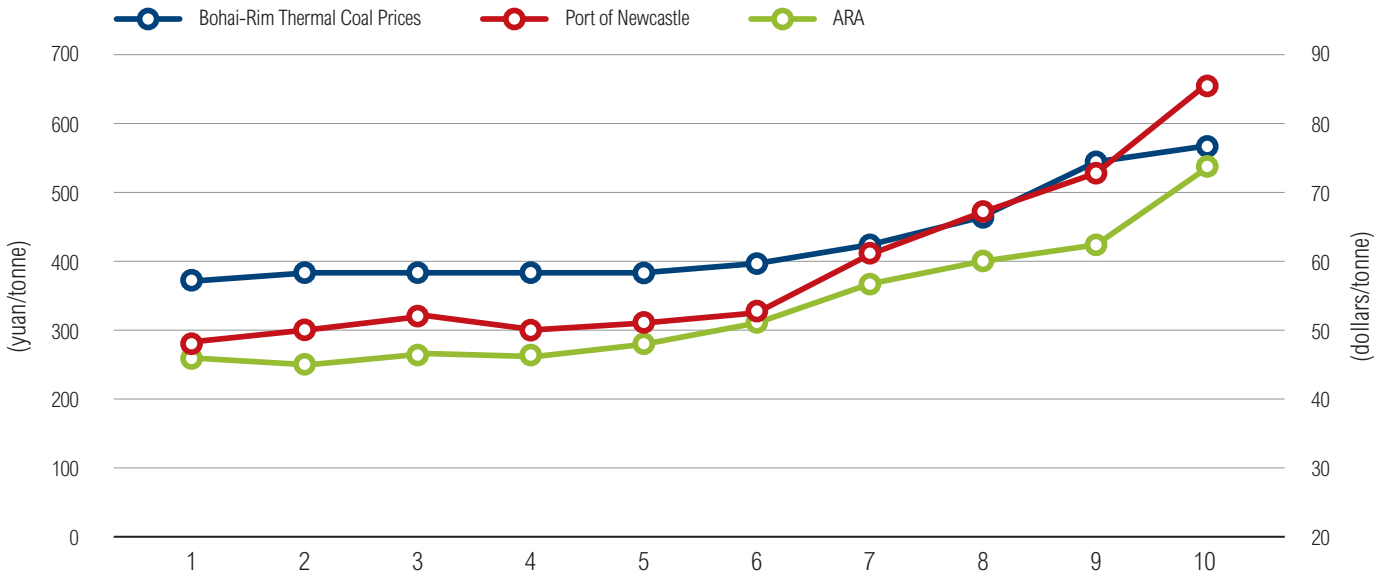
[2] The data before 2009 are average prices of raw coal of key coal producers in China, and the data for 2010 and beyond are from the Bohai Rim 5500 kcal steam coal price index.

Chart 4 | **Comparison of Coal Prices in the Port of Newcastle, ARA and Thermal Coal Prices in the Bohai Rim over the Last Five Years**



Note: The 2016 data is the average data from January to September. Bohai-Rim Thermal Coal Prices (blue), Port of Newcastle (red), and ARA (green)

Chart 5 | **Comparison of Coal Prices in Port of Newcastle, ARA and Thermal Coal Prices in the Bohai Rim from January to October 2016**



coal market, China plays a crucial role in global coal pricing. A comparison of coal prices in the port of Newcastle in Australia and ARA and steam coal prices in the Bohai Rim, as indicated in Chart 4, shows that they share the same coal price trend. Especially this year, weak global coal demand could not support a global coal price increase. However, global coal prices were driven higher by China's coal prices, as illustrated by Chart 5. This shows China's coal prices are having a significant impact on world coal prices.

DRIVING FACTORS BEHIND THE RECENT COAL PRICE SURGE IN CHINA

At the end of 2015, China's coal prices began to rebound. By October 19, 2016, the Bohai Rim 5500 kcal steam coal price index was 577 yuan per tonne, 206 yuan per tonne (55.5%) higher than that at the beginning of 2016. The recent coal price surge in China was mainly driven by shrinking domestic

supply and seasonal factors. As China reaches a balance in domestic coal demand and supply, coal prices will decline.

(1) Price Hike Due to Policy Impacts on Domestic Supply and Demand

Coal companies strictly follow the *Suggestions for Solving Overcapacity, Overcoming Difficulties and Achieving Development in the Coal Industry* (Guofa [2016] No.7). By September 2016, the coal industry eliminated 200 million tonnes of capacity, and effectively curbed illegal production, production beyond capacity and production of low-quality coal. Coal companies cut work days from 330 to 276, and coal output dropped by over 10%. In the first three quarters of 2016, coal consumption went down by 68 million tonnes or 2.4% year on year and output declined by 290 million tonnes or 10.5%. The 222-million-tonne gap between production and consumption changed the supply conditions. In terms of of driving factors, there was no obvious growth in demand or production costs needed to support the price increase. The price rose largely because of the impacts of capacity-cutting policies on domestic supply.

According to the *Suggestions for Solving Overcapacity, Overcoming Difficulties and Achieving Development in the Coal Industry,* the coal industry will eliminate 500 million tonnes of capacity, and cut or restructure 500 million tonnes of capacity in the next three to five years, which will result in around 1.3 million laid-off workers. To resettle those workers laid off from eliminated coal mines, seven departments, including the Ministry of Human Resources and Social Security and NDRC, jointly issued the *Suggestions for Solving Overcapacity, Overcoming Difficulties and Achieving Development in the Coal Industry* (Renshebufa [2016] No.32), and the NDRC issued the *Notice on Resettlement for Workers involved in Economic Restructuring to Promote Social Harmony and Stability* (Fagaidian [2016] No. 161), which put forward specific requirements for resettling workers. The Ministry of Finance issued the *Administrative Measure on Special Rewards and Subsidiary Funds for Restructuring of Industrial Companies*, which clarifies that the 10 billion-yuan special reward and subsidiary funds for restructuring of industrial companies will be allocated from the central budget and earmarked for worker resettlement.

(2) Seasonal Coal Demand

Since July 2016, most regions in China have suffered from high temperatures and little rainfall. Higher temperatures contributed to greater domestic power consumption. At the same time, hydro power generation growth rate slumped from 4% in the first 6 months to negative 12.8% in September. Thermal power consumption increased considerably by 4.8%, 7.3% and 12.9% respectively in July, August and September. It is estimated that coal prices will continue to rise in the coming winter, which is predicted to be unseasonably cold due to La Niña.

(3) Other Factors

Since the beginning of this year, railway breakdowns caused by heavy rainfalls have affected coal transportation in some regions in China. Strict rules on road overloading also limited transportation of coal. Short supply of transportation vehicles drove up coal prices. Hoarding and speculative activities by coal users and trade agents also created price bubbles in the short term.

The state has recently released safe, efficient and advanced capacity to increase coal supply. At the same time, the government is also encouraging coal and power companies to sign long-term coal supply contracts to stabilize coal prices. However, as China begins the heating season for a unusually cold winter, coal demand remains high. Coal prices are projected to increase slightly by Q1 next year. In the long term, China's coal demand will stabilize at around 4 billion tonnes. Currently compliance coal capacity has reached 4.9 billion tonnes. Since it is unlikely that the fundamentals of supply and demand will change substantially in the long run, coal price growth rate will be limited and will stabilize.

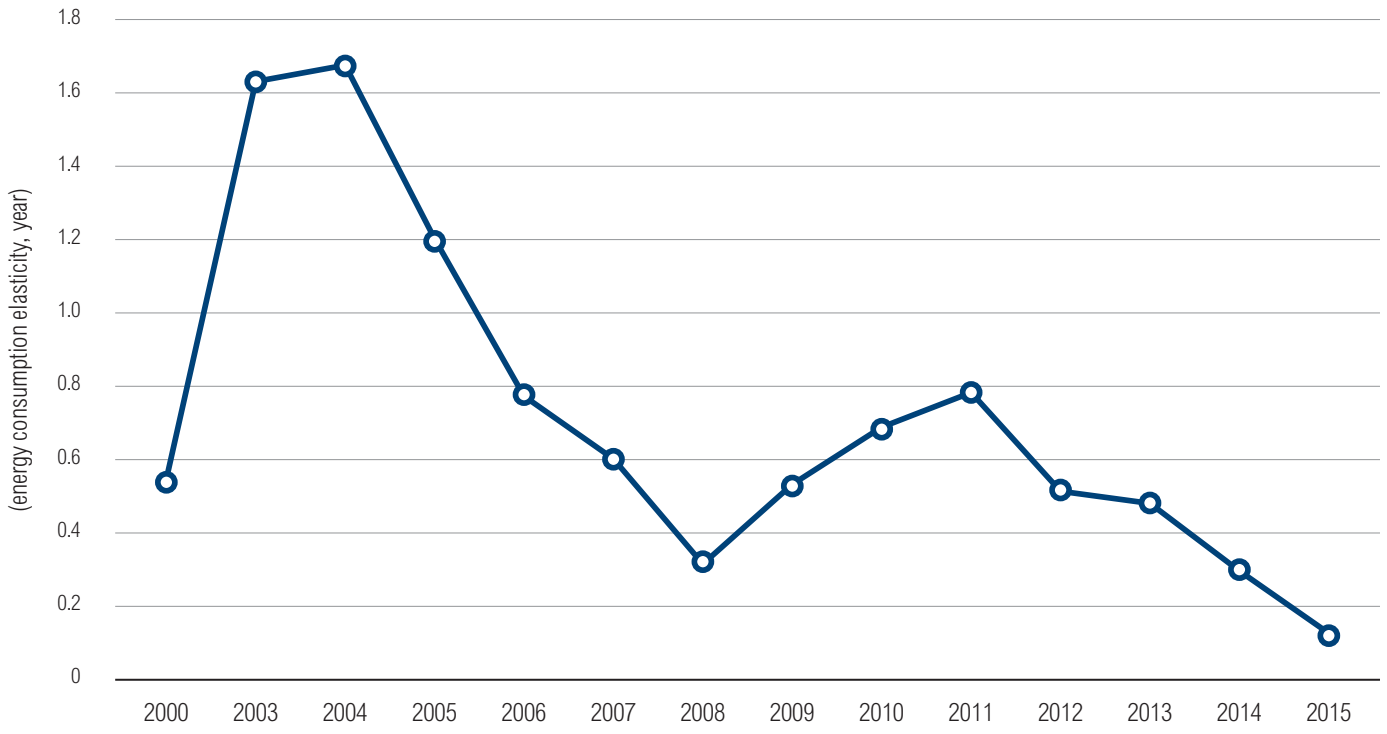
ANALYSIS OF FUTURE COAL CONSUMPTION IN CHINA

In recent years, thanks to the scale-up of technologies on energy conservation, emission reduction and energy consumption reduction and enhanced awareness, China's energy consumption elasticity coefficient (energy consumption per unit GDP) has been declining. As illustrated by Chart 6, the elasticity coefficient dropped from 1.67 in 2004 to 0.13 in 2015. As China accelerates its energy consumption structural readjustment, it will gradually shift away from the economic growth pattern featuring high energy consumption, gradually increase the proportion of non-fossil fuels and limit total coal consumption. Therefore, China's GDP growth will not lead to sharp energy and coal demand growth.

(1) Coal Demand Growth Slows in the Power Sector

China pledged that it will increase the share of non-fossil fuels in primary energy consumption to 15%. In the future, the

Chart 6 | **Energy Consumption Elasticity Coefficient Per GDP Unit in China from 2000 to 2015**



power sector will certainly prioritize clean energy projects. The China Electricity Council and the Coal Strategy and Planning Institute estimated that power generated from clean energy sources will jump from 1.6 trillion kwh in 2015 to 2.5 trillion kwh in 2020. To address the risk of overcapacity of thermal power, in the eight months since March, NDRC and the National Energy Administration issued four documents.

The *Notice on Promoting the Orderly Development of Thermal Power Sector in China* (Fagainengyuan [2016] No.565) explicitly canceled a number of disqualified thermal coal projects, and suspended the approval and construction of a number of thermal projects in provinces with surplus power capacity. The *Notice on Further Regulating Launch and Construction Order of Power Projects* (Fagainengyuan [2016] N0.1698) clarifies the launch labels for power projects. Thermal power projects that have been approved but not started construction should be suspended by the end of 2017.

The *Notice on Establishing the Risk Alarm Mechanism for Thermal Power Planning and Construction and on Issuing Risk Alarm for Thermal Power Planning and Construction in 2019* (Guonengdianli [2016] No. 42) sets out the index system of thermal power planning and construction risk alarm. For regions of red alarm, local governments are encouraged to suspend approving thermal power projects.

The *Notice of the National Energy Administration on Further Regulating Thermal Power Planning and Construction* (Guonengdianli [2016] No.275) stipulates that for planned projects that have yet to be approved, their approval should be suspended; for approved projects without necessary supporting documents or projects with necessary supporting documents but not launched, their construction should be suspended; for projects started in 2016, their construction should be halted. From "suspending the approval and construction of a number of thermal power projects in provinces with surplus power capacity" to "suspending the construction of new thermal power projects", China has stepped up regulation over thermal power projects, thus the installed capacity and coal consumption growth will slow. Relevant research by the Coal Strategy and Planning Institute, China Electricity Council, State Grid and North China Electric Power University show that by 2020, the installed capacity of thermal power will increase to 1 to 1.2 billion kw, and thermal coal consumption will increase to 1.9 to 2.2 billion tonnes, accounting for 55% of total coal

Chart 7 | **Steam Coal Consumption and Forecast in the Power Sector from 2010 to 2020**

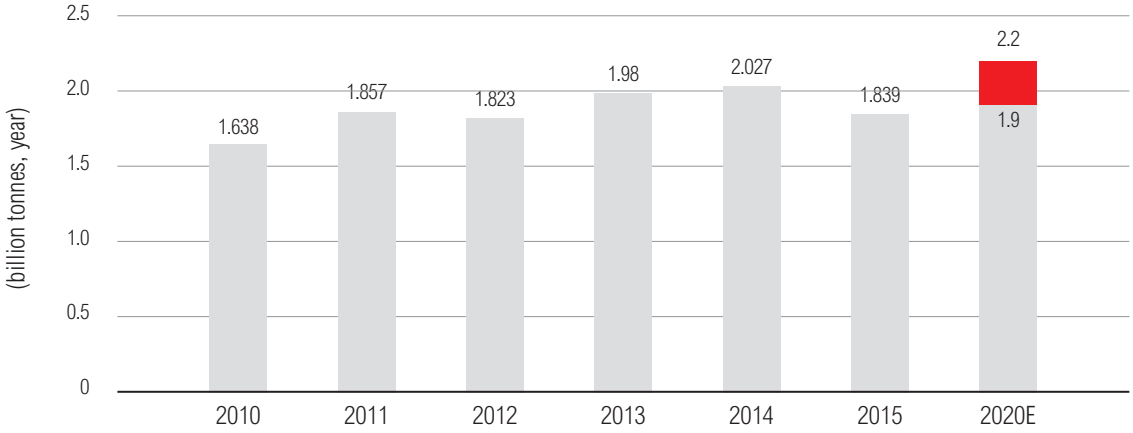
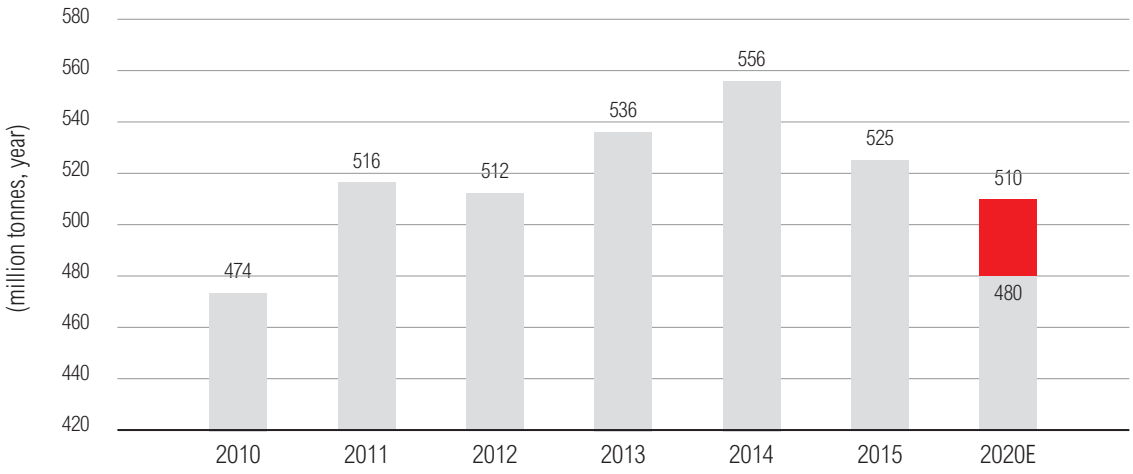


Chart 8 | **Steam Coal Consumption and Forecast in the Construction Materials Sector from 2010 to 2020**



consumption, as shown in Chart 7.

(2) Shrinking Demand in the Steel Sector

Facing the important task of restructuring, transformation and upgrading, the steel sector will experience low-speed growth in the long run. In 2015, the steel sector consumed 627 million tonnes of coal, accounting for 15.8% of China's total coal consumption. According to the *Suggestions on Solving Overcapacity, Overcoming Difficulties and Achieving Development in the Steel Industry* (Guofa [2016] No.6), China will further cut crude steel capacity in the next five years by 100 million to 150 million tonnes, equivalent to 12% to 19% reduction from the 2015 level, which means coal demand will decline as well.

(3) Coal Demand in the Construction Materials Sector Has Entered a Peak Period

In 2015, China produced 2.348 billion tonnes of cement, and the construction materials sector consumed 525 million tonnes of steam coal, accounting for 13.2% of China's total coal consumption. Relevant research shows that coal demand of the construction materials sector has entered into a peak period, which will last until around 2020, when coal demand from the sector will begin to gradually decrease. It is estimated that by 2020, steam coal demand of the construction material sector will be 480 million to 510 million tonnes as indicated by Chart 8.

(4) Coal Consumption in the Coal Chemical Industry Unlikely to Surge

Coal demand in the traditional coal chemical industry remains relatively stable. Coal demand of basic chemical materials will be in tandem with industrial production, but with greater potential for energy conservation and consumption reduction. Therefore, coal demand is projected

to stabilize and slightly decline in the future.

The coal chemical industry will see moderate development. In recent years, many projects of the new coal chemical industry have gotten the "green light". The technology has become more mature and some projects of the new type of coal chemical industry have demonstrated good results. However, there is uncertainty about the national policy on the new type of coal chemical industry. The emerging coal industry represented by coal oil, coal gas and alkene will become the priority of the future chemical industry, but it will not achieve large-scale and high-speed growth in the short run. Coal demand of the new type of coal chemical industry will increase but only moderately.

In summary, thermal coal will remain the focus of coal consumption in the next decade and its proportion will continue to rise. Driven by the new type of coal chemical industry, the proportion of chemical coal will also grow moderately and the share of coal used for steel, construction materials and other sectors will decrease. By around 2020, China's coal consumption will stabilize at around 4 billion tonnes, similar to the 2015 level of 3.965 billion tonnes.

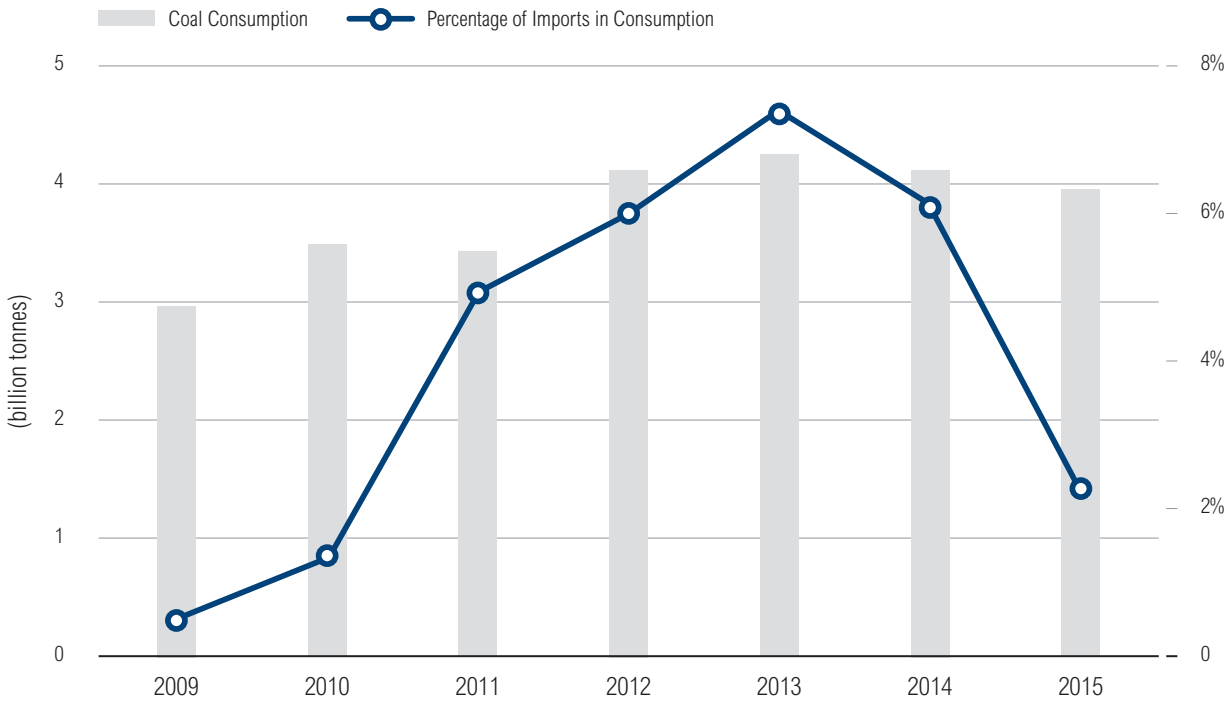
FORECAST OF CHINA'S COAL IMPORT DEMAND

In the long run, China's coal demand will stabilize, and domestic coal supply will meet the country's demand. As China's coal consumption moves west, the price advantage of imported coal will further weaken. A combination of factors shows that China's demand for imported coal will decline in the years to come.

(1) Coal Import Volume Depends on Domestic Coal Supply and Demand

By the end of 2015, China's coal reserves had reached 1.57 trillion tonnes, with new reserves discovered every year. China's coal capacity is around 5.7 billion tonnes, of which 800 million tons are illegal projects. About 310 million tonnes of illegal capacity will be closed, leaving 4.6 billion tonnes of compliance capacity. China's coal output can fully meet the country's consumption needs. As the global economy continues to slow, China's coal demand has been declining. In recent years, shrinking coal demand in China has also led to the rapid decline of coal import growth (see Table 1). Despite the increase in coal imports due to the coal

Chart 9 | **Coal Import Volume Changes in China in Recent Years**



price hike in the first nine months of this year, under China's capacity-cutting policies, the prospects of coal supply and demand in China will not change and there will be a downward trend for coal import demand.

(2) Coal Imports Limited by Sales Radius

Imported coal is transported to coastal ports in China by large oil tankers and then distributed from the ports to consumption areas. Because the shipping lanes of Chinese inland areas are too narrow for large oil tankers to pass through, coal has to be reloaded onto small vessels, which adds to the costs of imported coal in inland areas and limits the sales radius. Therefore, the price advantage and major markets of imported coal are mainly concentrate along the coastal areas in southeast China and the market within reach has been saturated. As the policy on capping total coal consumption in southeastern and coastal areas strengthens and coal consumption shifts west, the market for imported coal will shrink.

(3) Possible Policy Impacts on Future Coal Imports in China

The *Interim Measures on the Administration of Commercial Coal Quality* stipulates that the sulfur content and other indices in commercial coal sold by enterprises must meet requirements. It also puts forward clear stipulations on indices related to mercury, arsenic, phosphorus, chlorine and fluorine. The implementation of the *Measures* extends the custom clearance cycle of imported coal and increases relevant operational risk. *The Notice on Adjusting Coal Import Tariffs* canceled the interim zero tariff for imported coal starting on October 15, 2014. The new tariff rates are as follows: 3% for anthracite coal and coking coal, 6% for bituminous coal other than coking coal, 5% for other coal and 5% MFN rate for coal balls and other coal fuels. The measures have enhanced the threshold of coal imports, weakened price advantage of imported coal and affected coal import volume to some extent. In addition, as the dollar gets stronger and RMB enters into the devaluation cycle, the costs of imported coal will rise and thus also affect the volume of imported coal.

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