

Analysis on the Current Situation and Future Outlook of Coal Market in Indonesia

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ABSTRACT—Based on the coal reserves, coal quality, geographical location and policy support of Indonesia, this paper discusses the prospect of coal resource development in Indonesia, and holds that Indonesia is rich in coal resources, has good coal quality index, is easy to opencast mining, and has a good coal export location, which can be the first choice for coal resource development in southeast Asia. At the same time, the advantages and problems of coal industry in Indonesia are analyzed, and it is suggested that joint ventures can be established with local companies to reduce investment risks caused by backward infrastructure and weak government supervision. Coal and electricity joint venture is an ideal investment and development model in the process of coal mine development in Indonesia.

1 INTRODUCTION

Located in southeast Asia, Indonesia is rich in coal resources, with over 100 billion tons of coal and over 20 billion tons of reserves. The potential for coal mining is huge. At current rates, it can be mined for 59 years.

Most of Indonesia's coal mines are open cut [1], with more than 90% of the coal produced in the east and south of Kalimantan and 9% of output coming from southern Sumatra, with about 74% exported. Indonesia's coal is mainly used for power generation because of its "green coal" characteristics, which are low in ash and Sulphur.

Based on the above background, this paper analyzes Indonesia's coal reserves, coal quality, geographical

advantages and relevant policies to explore the current advantages and problems of Indonesia's coal, and then makes predictions of future investment prospects.

2 CURRENT SITUATION OF COAL IN INDONESIA

Indonesia is now the world's fourth largest coal producer (as shown in figure 1) with a total annual coal production capacity of more than 130 million tons. It is the largest producer and exporter of coal in southeast Asia and the year-on-year growth rate of coal production is much higher than that in other countries, as shown in figure 2.

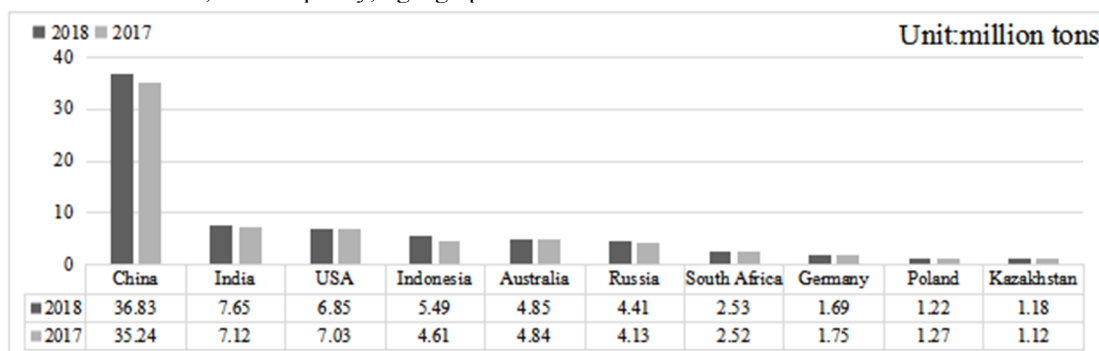


Figure 1. Output of the world's top 10 coal producers [5].

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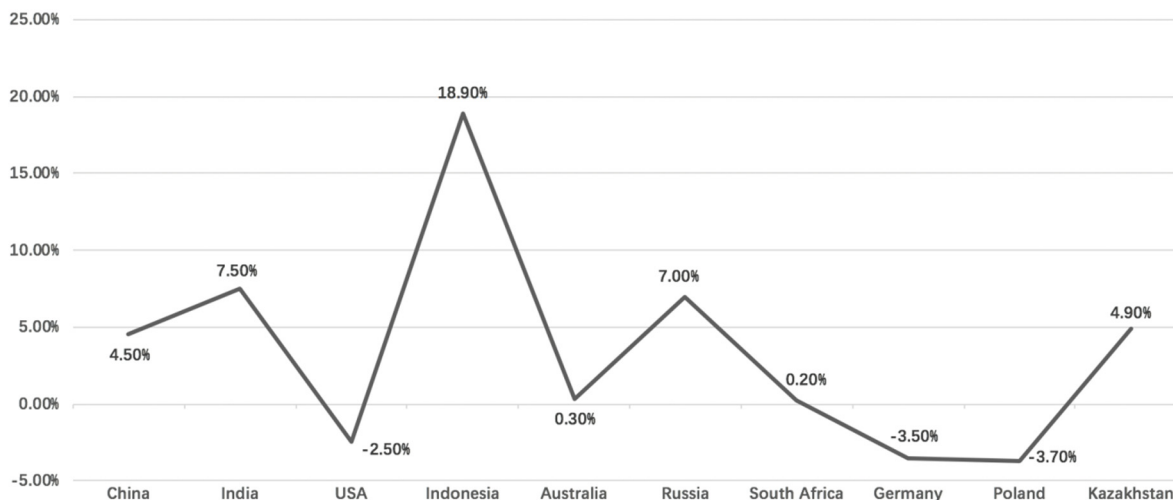


Figure 2. Year-on-year growth rate of coal production (2017-2018) [5].

According to the BP statistical yearbook of world energy, Indonesia's proven coal reserves are 3.7 trillion tons, accounting for 3.5% of the world's proven coal reserves, with a reserve-to-production ratio of 67. Among them, the reserves of anthracite and bituminous coal are 2612.2 billion tons, and the reserves of secondary bituminous coal and lignite are 1087.8 billion tons. According to the statistics of the coal industry association, Indonesia has 105.2 billion tons of coal resources and 21.1 billion tons of reserves.

Most of the coal seams in Indonesia are relatively shallow. Lignite accounts for 57%, secondary bituminous

coal 27% and bituminous coal 5% of the estimated coal reserves in Indonesia. Since Indonesia's coal is mainly used as thermal coal, the type of coal can be classified into four grades according to its calorific value: very high quality, high quality, medium quality and low quality. Indonesia's coal is predominantly medium grade and low grade, accounting for 62% and 24% respectively[3] (as shown in figure 3). Indonesia's coal industry has maintained rapid growth amid rising domestic demand. Geography has made Indonesia the world's biggest exporter of thermal coal, supplying about a third of seaborne coal.

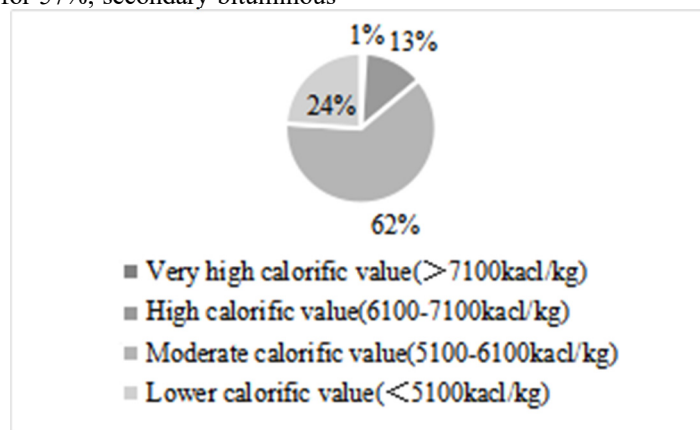


Figure 3. Statistics of Indonesian thermal coal by calorific value [3].

3 THE ADVANTAGED OF THE COAL MARKET IN INDONESIA

3.1 Stable investment environment

In International Institute for Management Development's 2019 annual report on world competitiveness, Indonesia improved its ranking by 11 places, mainly due to government efficiency, infrastructure and better business environment. In recent years, Indonesia has continued to attract relatively fast growth of foreign investment, especially since the 2008 international financial crisis, with an annual growth rate of over 13%. China has been

Indonesia's largest trading partner for many years, and many Chinese companies have rich investment management experience in Indonesia's power sector. The overall investment environment in Indonesia is attractive to Chinese companies.

3.2 The quality advantage of coal itself

By analyzing the coal samples of the major coal-bearing basins in Indonesia, Indonesian coal has the characteristics of medium and low grade, low ash, low sulfur and lower levels of harmful air pollutants. This kind of coal is an ideal coal for power plant.

TABLE 1. Coal quality characteristics of various regions in Indonesia [3].

Sample number	Water %	Ash %	Volatile %	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Calorific value/(kcal/kg)	Variety
1	3.1	7.33	42.84	73.16	5.41	1.35	0.53	7340	1/3 coking coal
2	18.02	9.68	39.93	50.69	3.74	0.77	0.29	4780	long flame coal
3	9.68	10.05	40.99	62.37	5.02	0.96	2.45	6290	gas coal
4	26.49	5.38	33.03	48.38	3.42	0.94	1.36	4610	long flame coal
5	19.36	4.33	34.99	57.47	4.10	1.31	0.46	5580	long flame coal
6	5.29	12.63	42.58	63.69	5.33	1.10	0.83	6490	gas coal
7	5.23	3.54	7.48	84.28	2.07	0.84	0.65	7500	anthracite
8	48.27	2.99	25.42	34.87	2.56	0.52	0.28	3280	lignite

3.3 The demand for coal is long-term and stable

It is widely known that nickel and coal are the main mineral resources in Indonesia. Nickel is the second but it is much more challenging market. A large part of the nickel mine is still in pristine forest condition, and everything needs to start from scratch. But the coal mine is basically off-the-shelf in production projects, so the choice of cooperation mode and thinking is very broad.

Indonesia's coal mine, like nickel mine, is open-pit mine with no safety concerns. However, coal is easier to extract than nickel. Even if the nickel ore is mined from the main vein, the grade fluctuation gap is relatively large. On the contrary, as long as the coal mine is mined to the main vein, the grade will be very stable without a large error. Therefore, it is only necessary to ascertain reserves and grades in the early stage to determine the mining surface in the coal mining process. The key lies in the later production construction. How to plan mining path rationally, reduce resource waste effectively and improve production efficiency is the most important work.

At present, Indonesia's mining market is mainly in the form of "semi-exploitation and semi-trade" : investors invest four hundred to seven hundred thousand dollars to the Indonesian mine owner in advance as the turnover cost to support the other party's early production. At the same time, the owner of the Indonesian mine pledges the mining rights to investors to fully guarantee their interest. Under a one-year contract, investors send their own staff to monitor production progress and financial conditions, and buy products on a FOB(Free On Board) basis at below-market prices. After the one-year cooperation expires, the contract will be renewed according to the cooperation situation and market conditions of both parties.

Foreign investors started projects with less investment in the early stage, avoiding the unnecessary problems of mining rights and cooperative mining, while also ensuring the grade and output of the mine. It not only reduces the credit risk, but also improves the work efficiency. So after about three or four shipments, not only do you make a profit each time, but you also recoup the initial investment of a few million dollars. For the Indonesian miners, once

the contract is signed, they can get a considerable amount of working capital to support the later operation of the project. In Indonesia, where any mine is now precious, investors can take advantage of the mindset that few miners are willing to give up their long-term interests in exchange for a one-off transfer of mining rights.

3.4 Laws and regulations in mines

According to Indonesia's national conditions, a new mining law enacted in 2009 stipulates that by 2014, raw ore will no longer be exported directly and must be processed. Metals, such as nickel, must be smelted into iron and nickel before they can be exported. As a result, Indonesia's nickel export prices soared. In 2017, Indonesia eased a ban on ore exports, partially lifting a ban on nickel. Indonesian nickel export prices fell slightly.

However, taking 2013, 2017 and 2018 as several key points, Indonesia's nickel output in 2013 was 440,000 tons of metal. In 2017, Indonesia produced 349,300 tons of metal from nickel mines and exported 5 million tons. In 2018, Indonesia's nickel production reached 560,000 tons of metal, and the nickel export volume was 22 million tons of real material.

It can be seen that the output and export of nickel mines in Indonesia have rebounded sharply since the export ban on nickel mines was lifted in 2017. The ratio of Indonesia's nickel reserves to its production is very different. At a rate of 560,000 tons of metal per year, the mining life of Indonesia's nickel mines is less than nine years, indicating a serious over-exploitation of nickel. This has brought huge decision-making pressure and economic burden to investors. Many policy innuendo and evasive ways appear, making the already complex market more chaotic, severely highlighting the lack of clear strategic policies and countermeasures for investors. But only coal, which cannot be further processed, is exempt from the rules. The new mining law does not limit coal, making it the biggest bright spot for mining investment in Indonesia.

3.5 Market-oriented power generation market

Indonesia's electricity market is becoming more market oriented. The opening up of power generation to private capital has attracted investment from local and foreign companies from China, Japan, South Korea, Malaysia, India and Europe [2].

President Joko Widodo says Indonesia plans to build a 35 megawatts power plant in the next phase. Foreign companies have been actively involved in the development of Indonesia's electricity market since the launch of the project.

4 EXISTING PROBLEMS

4.1 Infrastructure is generally poor

Coal mining sites in Indonesia are usually located in coastal areas or inland river systems, and transport by road is relatively short. Only Sumatra and Java have rail transport with dedicated towing lines carrying coal from production areas to riverbanks or coastal docks for loading.

The majority of the coal is mined in the open. Due to poor power supply in Indonesia, most of the machinery at the stripping site is powered by fuel oil or its own oil-fired generators. As international oil prices rise and fuel costs rise for the extraction of tons of coal, most miners are seeking to reduce their fuel burden by making full use of their secondary coal resources and building coal-fired power plants. In the process of repeated combustion of coal, the products of incomplete combustion will form toxic substances after combustion. This will not only greatly increase carbon emissions but also seriously pollute the atmosphere. However, existing technology is not enough to control pollution.

In the process of coal mining, as the vast majority of the coal is open field, tropical storms are very likely to adversely affect production. At the same time, roads, ports and other facilities needed to develop coal are also inadequate.

4.2 Adverse government regulation

Indonesia has a large population and privatized land, so it needs to deal with encroachment when building coal mines and power plants. In some areas, the legality of mining has been difficult to discern, as excessive issuance of mining licenses by local governments has led to an increase in illegal mining and coal export activities. Moreover, the local coal resources are running by the local authorities. The government, with its low efficiency and high level of corruption, intervenes a lot in mining investment, which is not good for investors to invest in coal projects in Indonesia.

4.3 Credit problems in the commercial sector

From the perspective of investment risks, credit problems in the commercial sector are prominent in Indonesia. Some Indonesians use cooperation as bait, taking advantage of foreign investors' lack of investment experience and legal awareness to harm the legitimate rights and interests of enterprises [4].

Especially in cases where mining rights cannot be obtained, the enterprise needs to sign cooperation contracts or establish joint ventures with Indonesian mining rights holders. Foreign investors are responsible for the majority of the investment, while the Indian side is responsible for the application of mining licenses. This cooperation mode requires very high credit and strength of the partners, thus amplifying the credit risk of the partners.

5 PREDICTIONS

5.1 Large-scale mining

Much of the increase in Indonesia's coal production is due to large-scale mining. An increasing proportion of future coal production growth will come from small and medium-sized mines. Kalimantan and Sumatra are Indonesia's two main coal producing regions. In the process of coal development in Indonesia, cost analysis can make coal enterprises optimize their business activities, thus enhancing their market competitiveness.

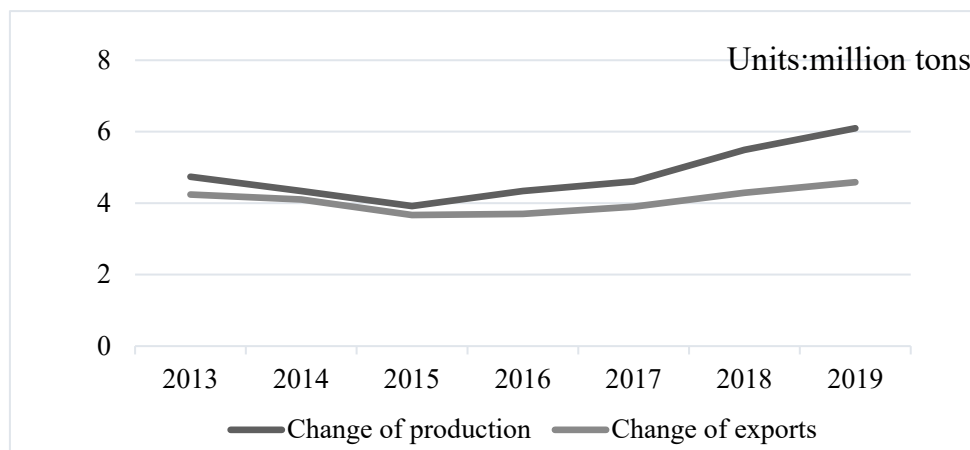


Figure 4. Changes in Indonesia's coal production and exports [6].

Electric power planning

Coal plays an important role in Indonesia's existing power generation plans, which will see huge growth in both installed capacity and power generation over the next decade. At the same time, Indonesia is a power shortage country, and the government will greatly increase the installed capacity in the future, among which coal-fired power generation can reach 50% ~ 60% of the new installed capacity. The coal power pool project in Indonesia has a broad prospect for investment and development.

5.2 Coal and electricity joint venture

Coal and power pool project refer to the construction of coal mine and power plant simultaneously in the coal mine area according to the unified plan and the joint operation of the two enterprises to obtain the maximum comprehensive benefit[2].

Coal mines and power generation plants are integrated and cooperates with each other, linking each other in coal supply and sales, linking up the upstream and downstream of the industrial chain, so that coal mines and power plants can enjoy benefits, share risks and make up their own structural defects. Therefore, the concept of coal and power pool in the broad sense breaks through the limitation of the geographical distribution of coal mines and power plants, and extends from the economic benefits and management, which is especially suitable for such an archipelago country as Indonesia. To develop the coal and power joint venture project in Indonesia, it is necessary to find a suitable entry point, take measures in line with local conditions, develop strengths and avoid weaknesses, and formulate reasonable investment strategies, so as to obtain a better development prospect.

6 CONCLUSION

Indonesia has a stable investment environment, abundant coal resources, and can set up joint ventures with local companies to reduce investment risks due to poor infrastructure and poor government supervision. Coal and electricity joint venture is an ideal investment and development model in the process of coal mine development in Indonesia. In addition to what is mentioned above, renewable energy is another factor that may affect the coal industry in Indonesia. Renewable energy can completely replace coal mines to reduce environmental pollution caused by non-renewable energy. However, renewable energy is still in its development stage and its own cost is higher than that of coal. Coal remains the dominant resource in Indonesia, but renewable energy is bound to become the new trend. Therefore, these questions will be further explored in future papers.

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