

**ECONOMIC RESEARCH INSTITUTE**



**COAL MARKET STUDY**

**Report**

**ULAANBAATAR**



**ECONOMIC RESEARCH INSTITUTE**

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**Report**

**31 March 2017**

**The Research Team**

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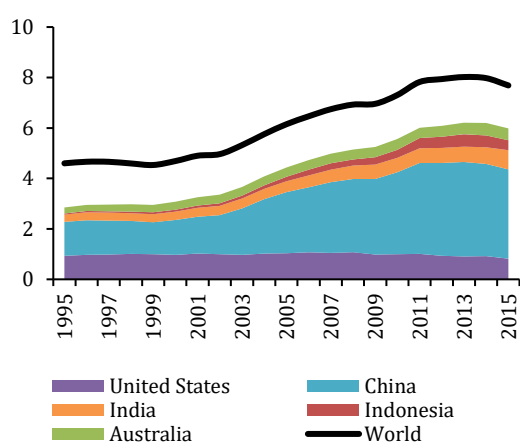
# 1. Demand Side

## 1.1 Data collection process and background of the industry

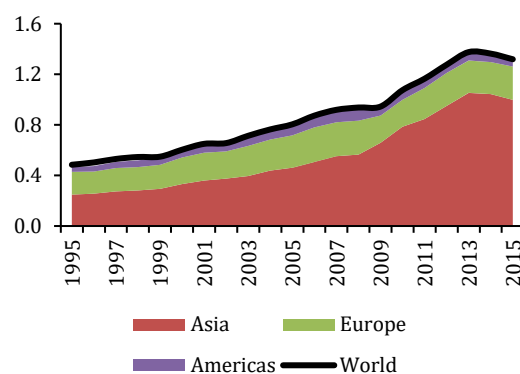
International coal trade consists of two markets—thermal coal and coking coal. Thermal coal is used primarily for electricity generations, steam and heat production. In contrast, coking coal is one of the raw materials for producing steel.

Coal is the second-largest source for electricity generation worldwide behind petroleum and other liquids. The top three consumer and producer of coal are China, the United States, and India, together constituted over 70% of world production and consumption in 2015 (Figure 1 and Figure 2).

**FIGURE 1. WORLD COAL PRODUCTION, BILLION TONS**



**FIGURE 2. COAL IMPORTS BY MAIN REGIONS, BILLION TONS**



Source: (Enerdata, 2016)

As announced during the 74<sup>th</sup> OECD Steel Committee Meeting, the largest exporters of coking coal are Australia, Mongolia, Columbia and Mozambique (OECD, 2013).

Mongolia, ranked 15<sup>th</sup> in the list of major coal producing countries (Appendix Table A1), exports coal to China. Currently, there are 3724 mining licenses owned by 2154 companies. Out of this, 242 licenses are related to coal, and 82 mines are registered. However, only 22 companies so far released annual report.

This study aims to inform about past, current and future state of the Mongolian coal at domestic and foreign markets, and hence, the research team entirely used official secondary data sources. Our report consists of three sections that have detailed information on demand, supply and price of the coal. Study on local coal market mainly used data published by public institutions, as well as data from economic journals, and from official websites of some large mining companies. In addition, because of its importance to the Mongolian economy, there are various scientific studies available on Mongolian coal, results and data of which have been reviewed and used in this study as well.

### Public Institutions

- National Statistics Office
- Mongolian Customs General Administration
- Mineral Resource Authority
- Ministry of Energy

### Economic Journals

- Mongolian Mining Journal
- Mongolian Economy

### Official Websites

- Tavan Tolgoi JSC
- Energy Resource LLC
- MAK

China is the largest consumer of coal as well as the main export destination for Mongolian coal. Therefore, we reviewed data on Chinese coal market in depth. Since China is a major export destination of coal for not only Mongolia but many countries, there are large number of studies available on Chinese coal market which we have reviewed and referred to in this study.

## 1.2 Analysis of Demand

The world coal consumption depends on several sectors such as power utilities, steel and chemical industry. According to data, in 2012, the share of electricity generation was 59% in the world coal demand, industrial sector's share of demand was 36% and other sectors consumed (residential and commercial) 4% of world coal (U.S Energy Information Administration, 2016).

The demand for coal can be divided into two markets. Demand for energy coal depends on power needs of population, growing urbanization, environmental concerns, fate of alternative energy sources such as nuclear power, cost of renewable energy, economic growth. It is estimated that coal consumption for electricity generation would decline gradually because of the shift towards renewable resource. For instance, in 2016 it has been estimated that coal's share for power generation may drop from 41% in 2012 to 29% by 2040 (U.S Energy Information Administration, 2016). However, the since the global changes in environmental policies initiated by the Trump administration in the US, those estimations may change and coal very well may continue to be a leading source of power generation for foreseeable future.

The coking coal's perspectives are relatively bright, as world steel production remains one of the leading industries. However, the recent oversupply of steel on global market may lead to temporary slump on the coking coal market, which happened in 2013-2016. Further trends for coking coal are closely related with the competition on the global steel market. Currently, Chinese steel industry is undercutting its major rivals and has been accused of price dumping and WTO sanctions have been initiated.

### 1.2.1 Demand for Mongolian coal: overview

According to the NSO, Mongolian explored coal resources are equal to approximately 162 billion tons, and amount of coal extracted by private and public mines per annum was 24.2 million tons in 2015, of which private mines produced 13.9 million tons and public mines produced 10.3 million tons respectively. In recent years, the decline in the price of coal strongly affected its production. Specifically, Mongolian coal production and exports had declined considerably in comparison with the previous years (Figure 3) but in 4Q 2016 exports picked up and prices increased considerably.

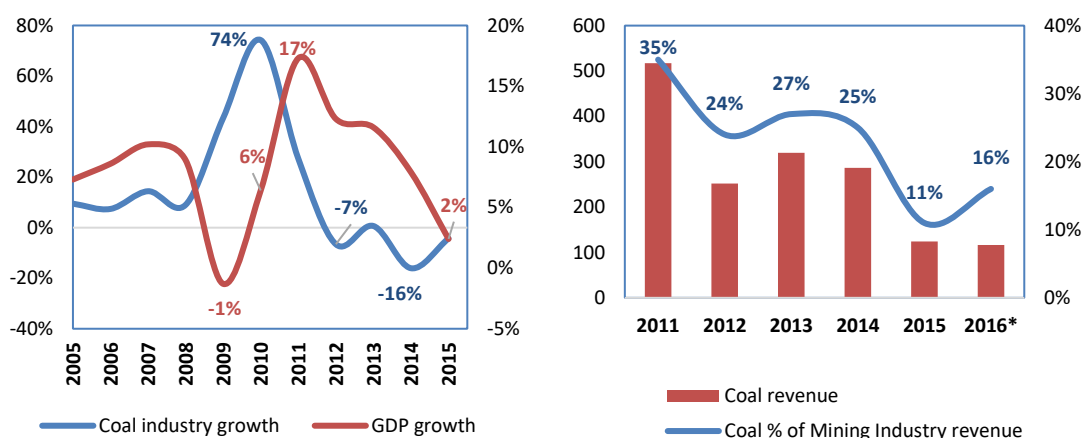
Coal is the second main export commodity of the Mongolia and economy's dependance on coal grew rapidly from 2011. At the current stage, the main market for Mongolian coal is China's market. Overall, 99% of Mongolia's exported coal went to China. In 2015, Mongolia exported coal to another three countries-Singapore (1.53%), Great Britain (1.12%) and Russia (0.53%).

Mongolia produced 24.4 million tons of coal by the end of October 2016, of which approximately 77% was exported. According to National Statistics Office (NSO), the amount of exported coal by the end



of October 2016 accounted to 18.7 million tons, representing an increase by 7.2 million tons compared to same period of previous year while revenue from coal export reached 609.6 million dollars constituting an increase by 141 million dollars compared to the same period of the previous year. Coal export's share in total exports expanded from 11.9% in October 2015 to 16.3% in October 2016. Majority of the Mongolian exports (over 80%) consist of minerals products while agricultural products, notably cashmere, account for remaining part of exports. Table 1 shows share of internal consumption of coal by different users as well as share of exports in the total coal production.

**FIGURE 3. ECONOMIC GROWTH AND COAL PRODUCTION (LEFT), AND COAL REVENUE (BILLION MNT)**



Source: (National Statistics Office, 2016), and (Mongolian Mining Journal, 2016)

Historically, the Mongolian coal exports reached its highest point of 21 million tons in 2011. While coal exports have been fluctuating since 2011, domestic coal consumption has been stable, fluctuating around 6-8 million tons per annum. In the first ten months of 2016, Mongolia mined approximately 18.7 million tons of coal, 38% more compared to same period of 2015.

**TABLE 1. 2015 COAL BALANCE SHEET, MILLION TONS**

	Consumption, million tons	Share of the total (%)
<b>Exports</b>	<b>15.9</b>	<b>66.77%</b>
Of which: raw coal	13.3	55.83%
Of which: processed coal (CPP)	2.6	10.94%
<b>Domestic consumption</b>	<b>7.8</b>	<b>32.60%</b>
Of which: TPPs	6.7	27.97%
Of which: Enterprises	0.6	2.50%
Of which: Households	0.5	2.13%
<b>Waste of transporting and storing</b>	<b>0.2</b>	<b>0.63%</b>
<b>Total</b>	<b>23.9</b>	<b>100%</b>

Source: Coal Balance Sheet-2015, [www.1212.mn](http://www.1212.mn), NSO

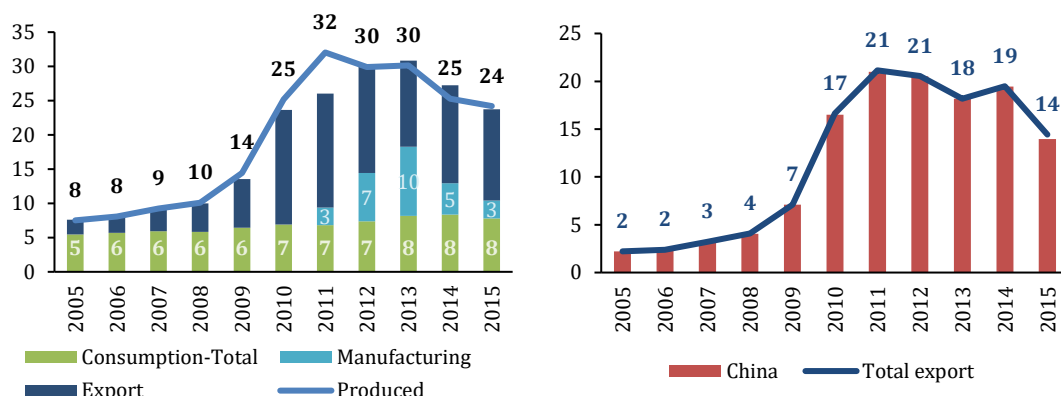
As shown in Table 1, in total, domestic and foreign (exports) consumption was 23.9 million tons in 2015. Out of this, exports were 13.3 million tons, constituting the largest share, while domestic consumption was at 10.4 million tons out of which consumption of coal preparation plants was stood at 2.6 million tons and the remaining 0.2 million tons registered as wasted during transport and storage.

### 1.2.2 Mongolia's internal consumption

Before 2012, internal consumption of coal used to comprise of coal used by thermal power plants, enterprises and households. Also, over half of total households live in Ulaanbaatar city, and usually

use coal of Nalaikh, Baganuur, and Shivee-Ovoo mine during winter. Since 2010, additionally, preparation plants in Sharyn Gol and Ukhaa Khudag began to use coal for coal handling, Ukhaa Khudag’s coal is destined for export. These coal preparation plants used 24% of the total produced coal in 2012, and 33% in 2013, while their demand declined in 2014 and 2015.

**FIGURE 4. MONGOLIAN COAL BALANCE AND EXPORTS (MILLION TONS)**



Source:

(National Statistics Office, 2016), and (Mongolian Customs General Administration, 2016)

In recent years, the decline in the price of coal strongly affected its production. Specifically, Mongolian coal production and exports had declined considerably in comparison with the previous years (Figure 4).

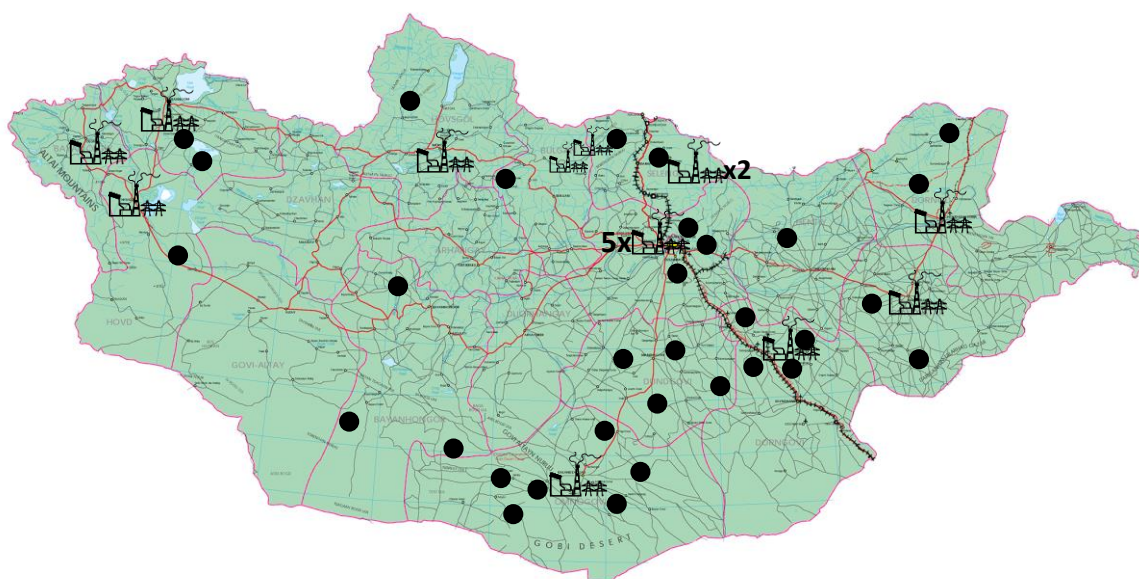
### 1.2.3 Geographical distribution and transportation of local demand

Figure 5 shows locations of the main local consumers as well as the type of transport they use to bring coal. The main local consumers of coal are TPPs majority of which are located in Ulaanbaatar. Consumption of TPPs as a share of domestic consumption constituted 64.4% (6.7 million tons out of 10.4 million tons) of total domestic consumption while consumption by enterprises and households constituted 5.8% and 4.8%, respectively.

The Mongolian power system is divided into three separate systems-Central, Eastern, and Western. TPPs located in Ulaanbaatar, Darkhan and Erdenet city are creating the Central Power System, the largest system of Mongolia. These TPPs have bigger capacity in comparison with ones located in Western or Eastern Power System.

There are 17 TPPs owned fully or partially by state, with differing capacities. The Fourth Thermal Power Plant has the largest capacity as it also includes the affiliated recently expanded Amgalan Thermal Plant as its branch since its opening for operation in 2015, and it is in total the biggest consumer of coal in the country.

**FIGURE 5. THE MONGOLIAN ROAD NETWORK, AND DISTRIBUTION OF TPPS**



\*note: black points are the operating mines; red line-paved road; pink line-gravel road. Also, railway is figured by black line. Please see more detailed information from Table A 4 of Appendix. Source: Ministry of Energy, Government of Mongolia

According to above figure, the Mongolian railway network covers provinces of Selenge, Darkhan, Erdenet, Ulaanbaatar, Dornod, Khentii, Choir, and Dornogovi.

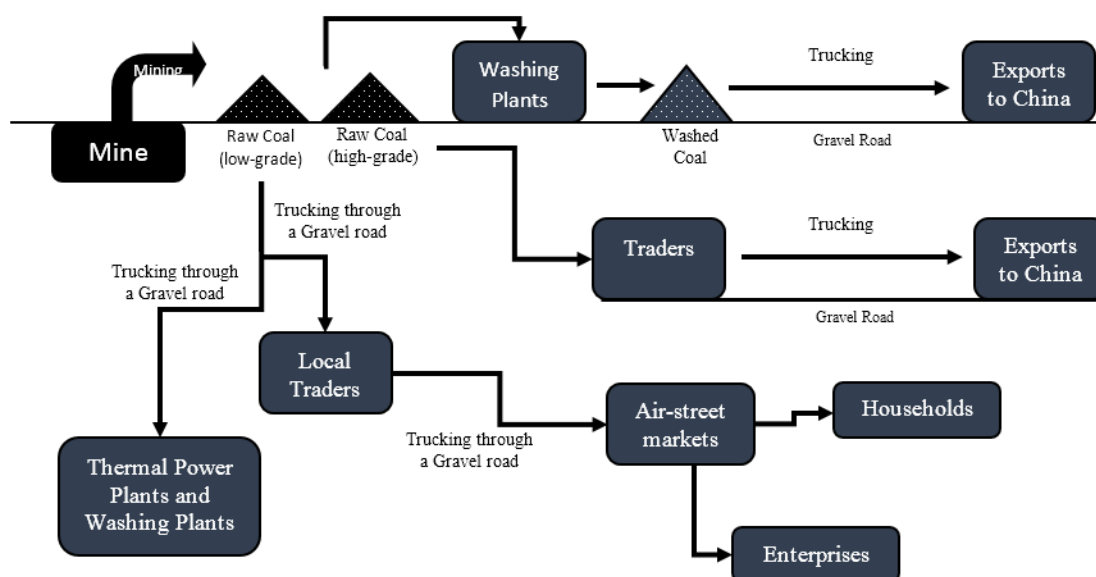
TPPs located in provincial centers, usually use gravel road to bring coal from mines because of a lack of railway and paved road network. But TPPs in Ulaanbaatar generally use railway to bring coal. For example, as illustrated in Appendix Table A4, TPPs in Ulaanbaatar use coal from Baganuur, Sharyn Gol and Shive-Ovoo mines, and railway network connects them with the mines.

#### **1.2.4 Main local buyers and distributors**

In 2015, the Mongolian domestic consumption was 7.8 million tons, with TPPs as main buyers whose share in the local demand was 85.8% of total consumption, while enterprises and households constituted 14.2%. In addition to these consumers, two coal preparation plants – Sharyn Gol and Ukhaa khudag – have been operating since 2012, and used 2.6 million tons in 2015.

Because of a lack of adequate infrastructure, most TPPs use gravel road to bring coal, and negotiate with the nearest mine to purchase coal on annual basis. In other words, the plants buy coal without participation of brokers. The two coal preparation plants, as they are located next to the mines, do not use brokers to buy coal as well. The following figure shows the Mongolian coal distribution chain.

**FIGURE 6. THE MONGOLIAN COAL DISTRIBUTION CHAIN**



Source: The research team graph.

With regards to enterprises and households who consumed 1.1 million tons in 2015, distributor for them is a bit different from TPPs and coal preparation plants. These domestic consumers connect with brokers to buy coal. Unfortunately, they pay higher price for coal per ton than the price at a mineshaft because of a higher transportation cost. For example, when a price for coal per ton at a mineshaft is 27 thousand MNT, it becomes roughly 180 thousands MNT when buying from brokers.

### 1.3 Outlook of Mongolian local demand for coal in near future (midterm 4 years, long term 10 years)

The main local demanders of coal are TPPs and coal preparation plants. By the end of 2015, there were 2 coal preparation plants and 17 TPPs, and the Government of Mongolia announced that some provinces will have a TPP in its centers within next 10 years.

**TABLE 2. LOCATIONS OF PLANNED PUBLIC AND PRIVATE TPPS**

No	Name	Planned location	Mine-1	Mine-2	Capacity, thous.t
<b>Public investment-Only Thermal Plants</b>					
1	Thermal plant	Bayankhongor soum, Bayankhongor	Uvurchuluun	Bayanteeg	28.0
2	Thermal plant	Arvaikheer soum, Uvurkhangai	Bayanteeg	-	21.0
3	Thermal plant	Undurkhaan soum, Khentii	Chandgana Tal	-	27.6
4	Thermal plant	Uliastai soum, Zavkhan	Mogoin Gol	-	21.0
5	Thermal plant	Tsetserleg soum, Arkhangai	Bayanteeg	Ereen	24.0
6	Thermal plant	Mandalgovi soum, Dundgovi	Tevshiin Govi	-	32.2
7	Thermal plant	Zuunmod soum, Tuv	Baganuur	Nalaikh	28.0
8	Thermal plant	Altai soum, Govi-Altai	Zeegt	Maanitiin	29.8

				<b>TOTAL</b>	<b>211.6</b>
<b>Private investment-Only Power Plants</b>					
<b>9</b>	Telmen	Telmen soum, Zavkhan	Mogoin Gol	-	270.0
<b>10</b>	Tavantolgoi	Tsogttsetsii soum, Umnugovi	Tavantolgoi	-	1420.0
<b>11</b>	Tsaidam	Bayan soum, Tuv	Tsaidam Nuur	-	1530.0
<b>12</b>	Buuruljuut	Bayan soum, Tuv	Tugrug Nuur	-	2490.0
<b>13</b>	Chandgana	Murun soum, Khentii	Chandgana Tal	-	3160
<b>14</b>	Erdentsogt	Altanshree soum, Dornogovi	Chandgana Tal	-	2970
<b>15</b>	Shivee-Ovoo	Shiveegovi soum, Govisumber	Shivee-Ovoo	-	700
<b>16</b>	Erdentsagaan	Erdenetsagaan soum, Sukhbaatar	Erdenetsagaan	-	72
				<b>TOTAL</b>	<b>12,612.0</b>

Source: Ministry of Energy, Government of Mongolia

A new coal preparation plant is expected to be built next to Tavan Tolgoi mine is reflected in Table 2 in addition to 8 new TPPs to be built in provincial centers.

In addition to these TPPs which will be financed by Government of Mongolia, there are another 8 Power Plants (PP) which will be funded by private sector. Of these PPs, Tavan Tolgoi Power Plant will have the largest capacity of 700 MW, and its coal consumption will be 1.42 million tons annually.

Within next 10 years, approximately 16 new TPPs and PPs will be built which are expected to have their coal consumption at around 12.8 million tons of which state owned TPPs consuming 211.6 thousand tons while privately owned PPs consuming 12.612 million tons. As a result, coal consumption is expected to grow by 12.8 million tons within next 10 years (from 7.8 million tons in 2015).

According to “The Mongolian Coal Program” which was developed by Ministry of Mining in 2011, domestic consumption would grow by additional 2 million tons by 2020 and by additional 4.5 million tons by 2025 compared to consumption in 2015. In addition, export will rise by 15 and 25 million tons for each period, respectively.

## **1.4 Foreign demand projection**

### **1.4.1 Overview of shifts in coal’s world market**

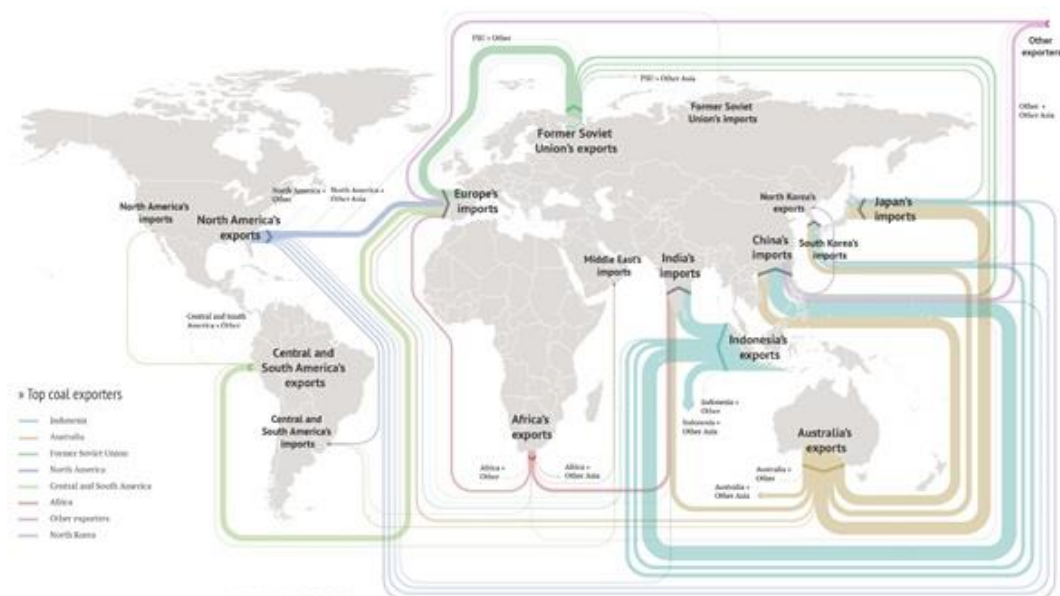
In the world, there are few major coal exporters, such as Australia and Indonesia, USA and Russia. On the other hand, major consumers of coal are Japan, Europe, USA, Korea, China who use it for their energy and steel production.

Some countries, such as China and India, despite producing huge amounts of coal, consume most of it domestically, gradually becoming leading importers. While most of the coal market is a competitive market, it is subject to fluctuations caused by domestic policies of Japan, China, USA and Europe that are regulating two major coal-related markets: energy and steel.

Japan is shifting away from nuclear energy to safer technology such as coal based technologies. Countries like India and Indonesia, feeling the need for more electricity, increasing their coal-based energy while USA and China are trying to move away from coal to gas and or renewables for energy generation mostly because of environmental concerns, which is especially true for China.

The world coal market has gone through a difficult time in recent years. Prices have been falling drastically in 2015 but rebounded in V-shape in late 2016, strongly affecting the world market and leading fortunes of many companies to become bleak first, then actually making it very attractive from an investment point of view.

**FIGURE 7. THE WORLD COAL MARKET AT A GLANCE**



Source: Bloomberg

**TABLE 3. COAL DEMAND, BY COUNTRIES**

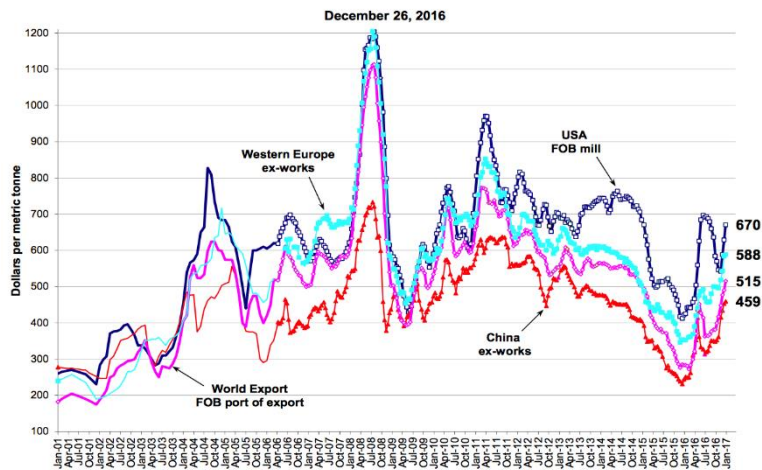
	2014	2015	2016	2017	2018
China	3,764	3,625	3,596	3,542	3,460
India	864	906	960	1,008	1,056
United States	835	730	666	676	679
Russia	227	230	234	240	247
Germany	227	225	220	217	215
Japan	205	202	203	202	201
South Africa	189	179	185	192	199
South Korea	131	131	135	139	142
Poland	134	135	135	135	135
Australia	122	127	127	128	128
Others	1,161	1,141	1,149	1,177	1,208
<b>World total</b>	<b>7,860</b>	<b>7,631</b>	<b>7,608</b>	<b>7,656</b>	<b>7,670</b>
% change	-0.2	-2.9	-0.3	0.6	0.2

Source: Energy Information Administration (EIA), and Economic Intelligence Unit (EIU)

### Industrial linkages as a demand factor

One of the main factors affecting demand and supply of coal is not the coal industry itself, but the steel industry as it is a main consumer of electricity, partially produced by thermal coal, and also uses a lot of coking coal as a main input for steel production. In that sense, coal demonstrates strong complementarities with steel production. As steel production increases, there is more demand for coal and vice versa.

**FIGURE 8. THE STEEL PRICES IN RECENT YEARS**

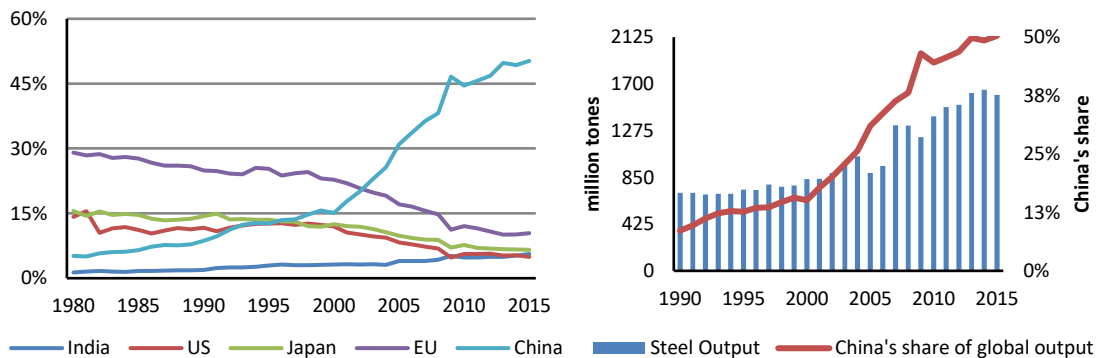


Source: (Steel Benchmark, 2016)

Coking coal is also the main cost ingredient as well. Therefore, decrease in coal price is good for steel production, significantly reducing the production cost of steel.

China grew to become the largest in the world with the market share of more than 50% of the world output. The reason behind fall in the steel price was due to oversupply created by China’s increased exports of steel. Steel supply from China increased because of capacity expansion of steel production in China following increase in government investment in infrastructure which was made to counter negative impact from reduced global demand during the Global financial crisis of 2007-2009.

**FIGURE 9. SHARE OF GLOBAL STEEL (LEFT) AND CHINA’S CRUDE STEEL PRODUCTION**

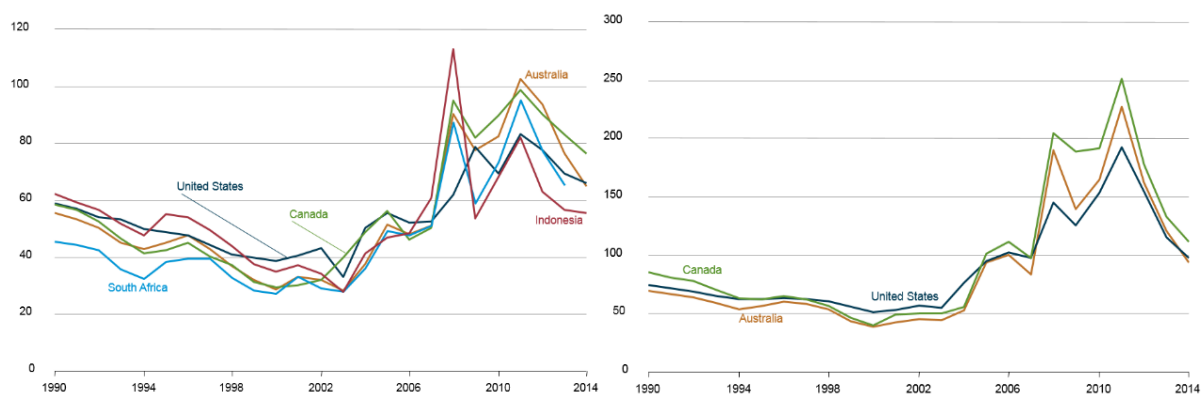


Source: The World Steel Association

China tried to save its steel industry through a combination of measures such as reorganization of the industry, supply of cheap coal and expansion of its exports of steel, which were viewed as dumping by many developed countries. The fall of the price of steel combined with the increase in supply of cheap Chinese steel, hit many steel producers in the developed countries, such as Europe, Japan or USA, which led to a number of price dumping inquiries in the steel industry across the world.

As the competition in the steel market intensified and steel prices crashed by 2012, the increasing supply of coal from Australia, Indonesia, Russia, China itself and Mongolia led to an oversupply of coking coal, leading to fall in its price. The fall in the price of coal lasted 4 years, from 2012 to 2016, which coincides with the fall in the price of steel.

**FIGURE 10. THERMAL (LEFT) AND COKING COAL PRICES, BY COUNTRIES**

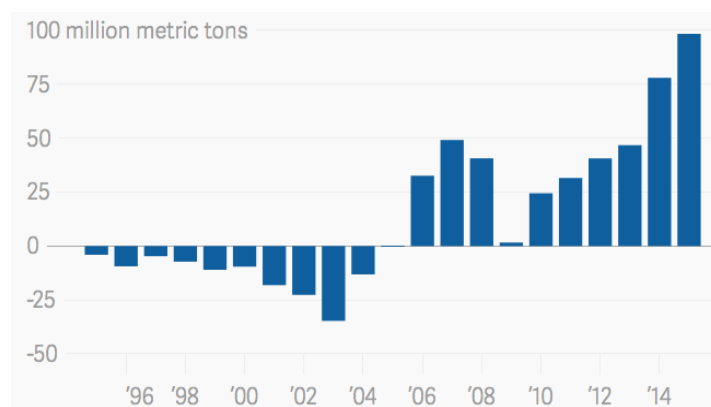


Source: Energy Information Administration (EIA), and Economic Intelligence Unit (EIU)

This fall in the price of coal could be viewed as very beneficial for China, which gained through cost savings for its steel industry as well as cost savings for its energy sector since 85% of its electricity is produced by coal. Using this combination, despite falling steel price in the world market, Chinese steel exports were able to expand very fast in the last 4 years.

For thermal coal, last few years were tough. Thermal coal at the port of Newcastle in Australia, a global benchmark, dropped to \$50.63 a ton in the week ended on Dec. 25, 2015, the lowest since December 2006<sup>1</sup>. Overall, prices have declined by 18% only in 2015. There were various factors behind price decline in coal markets, especially for thermal coal.

**FIGURE 11. CHINA'S NET EXPORTS OF STEEL**



Source: The World Steel Association

Some of these factors were related to policy-induced changes in the markets of major consumers (for example, Japan, USA, China, Europe), some were related to oversupply of coal, following opening of new coal fields in many countries, including Mongolia, and some factors were related to global environmental concerns. Only India, and Indonesia, are showing strong growth in demand for coal, amid robust economic expansion and rising electrification.

Following the major price decline in the world market, in many countries, there was a significant decline in coal production and many coal companies experienced serious financial difficulties<sup>2</sup>. As estimated, the problems for coal industry continued for most of 2016.

<sup>1</sup> Globalcoal, 2016.

<sup>2</sup> Even in Australia, a leading coal supplier in the world, difficulties in coal sector were substantial. For example, a local leading producer Cockatoo Coal is considering whether to sell or close its 1Mtpa Baralaba North LVPCI Mine in Central Queensland after the company went into voluntary administration in the December Quarter of 2015. In USA, A United States (US) bankruptcy court judge has approved the



As the fall in prices continued for most of 2016, supply has been adjusting slowly to the fall in demand in early 2016 with the some significant supply cuts being made in the US with a surge in bankruptcies of coal companies, including major companies as Arch Coal and Peabody.

#### **1.4.2 Overview of recent demand changes by major economies**

The USA is one of the largest producer and exporter of coal. However, it has been hit hard by the recent fall in coal prices, by environmental policies and by the shift to LNG and other energy sources. Large US coal producers are the ones hit the hardest by recent price fluctuations and it will take some time before they can revive their capacity.

Domestically, the Clean Power Plan (CPP), the Obama administration's flagship environmental policy, was announced in 2015. The Clean Power Plan, aimed at reducing carbon pollution from power plants, the nation's largest source of emissions, while maintaining reliability and affordability of energy, envisions to reduce domestic greenhouse gas emissions by more than a quarter by the year 2025, relative to their 2005 levels.

In addition, on August 3, 2015, EPA issued Final Carbon Pollution Standards for new, modified, and reconstructed power plants, and proposed a Federal Plan and a model rule to assist states in implementing the Clean Power Plan. These were the first-ever US standards that address carbon pollution from power plants.

The Clean Power Plan, aimed at cutting significant amounts of carbon emissions from power plants as well as emissions of other pollutants that cause soot and smog which are harmful to health, laid the foundation for a long-term strategy that is needed to tackle the threat of climate change while advancing clean energy innovation, development, and deployment. By providing the states and the utilities the flexibility and the time needed to achieve these pollution cuts, the Clean Power Plan offered the power sector the ability to optimize pollution reductions while maintaining a reliable and affordable supply of electricity for citizens and businesses.

The Clean Power Plan (CPP) triggered protest and opposition by many states as well as coal companies and businesses, following which the Supreme Court decided to pend the implementation of the Clean Power Plan until judicial review. Officials from 24 Republican-controlled US states wrote to the Trump Administration, as well as to the leaders of GOP House and Senate majority, urging them to ensure quick cancellation of the Clean Power Plan and to introduce legislation that would block similar policies in the future. However, a number of CPP supporting states also emerged. Top legal officials in more than a dozen states have asked President-elect not to abandon the CPP. In addition to Massachusetts, the letter of support for CPP is endorsed by the attorneys general of New York, California, Hawaii, Iowa, Illinois, Maine, Maryland, New Mexico, Oregon, Rhode Island, Vermont, Virginia, Washington, and the District of Columbia, along with local government officials in Boulder, Colorado, New York City, Florida and Miami. Either way, in the USA, the CPP has led to nation-wide divide and a possible prolonged legal fight over the policy.

With this in mind, it is highly probable that the CPP will not be implemented in the USA. With the new Trump administration<sup>3</sup>, it is estimated that the US coal consumption is expected to rise modestly in 2017-18, by 1% a year on average. As expected, this will be driven by higher natural gas prices, which

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sale of Walter Energy's mostly coking (met) coal production assets to a group of investors called Coal Acquisition LLC. Another US producer Arch Coal entered Chapter 11 bankruptcy in January 2015. In November 2015, Arch reported a US\$2bn September Quarter net loss and stated it would have problems servicing its US\$5.1bn debt. Source: AME, McCloskey

<sup>3</sup> Trump signed an executive order in March 2017 calling on the Environmental Protection Agency (EPA) to review the Obama-era Clean Power Plan.

[http://www.bostonherald.com/news/us\\_politics/2017/03/how\\_the\\_world\\_is\\_responding\\_to\\_president\\_trump\\_s\\_climate\\_policies](http://www.bostonherald.com/news/us_politics/2017/03/how_the_world_is_responding_to_president_trump_s_climate_policies)

will prevent utilities from further switching from coal to gas, as well as by the exhaustion of coal-fired capacity retirements covered under the USA Mercury and Air Toxics Standards regulations.

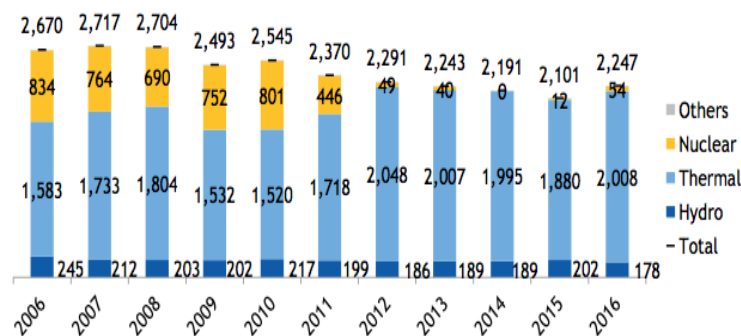
Trump administration policies will impact the implementation of the Paris agreement as well as worldwide environmental agreements in general. This has direct implications for world coal market, as coal is considered as one of the main sources of carbon emissions. It is already clear that US may pull out of Paris agreement completely.

## Japan

While the USA tried to cut its thermal coal consumption but without success, utilities in Japan are increasingly switching to cheap coal<sup>4</sup> as a way to reduce its nuclear energy consumption. In 2000, Japan's coal demand was only slightly bigger than its LNG consumption, around 60 million tons a year versus 55 million tons of LNG, but since then gas consumption has stalled while coal imports have nearly doubled.

The Fukushima accident led to a drastic reduction in the use of nuclear power generation (Mita, 2016). However, Japan has restarted a limited number of nuclear power stations located in Sendai, Takahama, and Ikata, and planning to restart more stations for operation. Even though it will take some time, as many stations as before the Fukushima accident will probably be operational in the coming years.

**FIGURE 12. JAPAN'S ENERGY OUTPUT, BY SOURCES**



Source: METI

Following the changes, on April 11, 2014, the government of Japan decided to approve the new Strategic Energy Plan and in 2015, Japan has changed its Long term energy strategy. The new plan puts more emphasis on energy conservation and safety issues (Morita, 2016).

Basic viewpoint of the new energy policy

1. 3E (Energy Security, Economic Efficiency, Environment) + S (Safety)
2. Importance of the Global Viewpoint
3. Importance of the Economic growth viewpoint

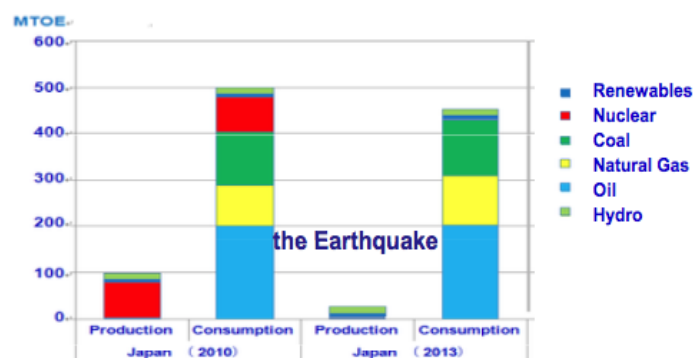
Based on the Cabinet decision, the Advisory Committee on Natural Resources and Energy announced the Long-term energy supply/demand outlook In July 2015. The outlook indicates the desirable structure of supply/demand in 2030 that should be realized.

<sup>4</sup> Japan recently gave environmental approval to three more coal-fired power plants out of 45 planned.

Japan's thermal coal imports rose by 4.8% to a record high of 114.145 million tons in 2015<sup>5</sup>. However, with the country's long-term commitment to worldwide environmental goals, it is not so clear in which direction the energy consumption<sup>6</sup> will go.

However, looking at number of coal stations planned, it can be concluded that the coal consumption in the Japan's energy production will remain significantly high for years to come.

**FIGURE 13. THE SHIFT TO COAL ENERGY IN JAPAN<sup>7</sup> IMMEDIATELY AFTER 2011**



Source: The Institute of Energy Economics, Japan

On the coking coal market, the recent rise in coking coal prices was not favorable for Japanese steel industry. According to Morgan Stanley, in 2015, Japan imported 54.1 million tons of coking coal, making it the biggest buyer of the seaborne coking coal. Output cuts and flooding in the Shanxi province helped to boost total overseas purchases in August 2015 to its highest level since December 2014. Japan imported 7.21 million tons of coking coal in March 2016, which is an increase by 21.92% from previous month and an increase by 33.13% from the same period in 2015. Of this, coal from Australia constituted the highest volume at 3.09 million tons, an increase by 10.98% compared to previous year or by 9.14% from previous month. Australia and Indonesia are primary suppliers of coking coal for Japan. However, there is also a significant share of supplies coming from Canada and Russia. Imports from the USA are not so big, but interestingly shipments from Mozambique to Japan sharply increased in 2016.

However, as prices for coal increased, representatives from Japanese steel makers such as Nippon Steel & Sumitomo Metal Corp and, JFE Holdings Inc said "Current steel prices exceed the levels at which they are able to secure profit margins and therefore they must pass along higher costs to customers if contract prices of coal increase". The increase in the price of coking coal, therefore, leads to price pressure on Japanese steel companies which still have to compete with Chinese steel makers. That competition has been heating up in Europe and the USA.

## China

As China's economic growth slowed, the demand for coal-driven energy has been falling which led to drastic price falls for thermal coal in general. In addition, China uses about 4 billion tons of coal every

<sup>5</sup> "The figures are consistent with the government's 2030 basic energy plan which aims to reduce LNG usage and maintain coal," Tom O'Sullivan of energy consultancy Mathyos Japan.

<sup>6</sup> Japan's trading houses are decreasing coal investments over concerns about the environmental fallout, Reuters reported on June 16 2016. Mitsui plans to cut its investment exposure to coal by a third within three years, citing environmental concerns after the U.N. climate agreement in Paris 2015. Another trading house, Sojitzu, also said it would limit investments in coal due to environmental issues, after Tokyo agreed at 2015's U.N. climate conference to cut carbon emissions by 26% by 2030 from 2013 levels. However, the Paris agreement itself maybe endangered by the position of Trump administration in USA on carbon reduction.

<sup>7</sup> Koji Morita, Board Member, Director, The Institute of Energy Economics, Japan

year and pledged at the Paris Climate Conference in 2015 to reduce coal-burning by 60% by the end of 2020.

Decline in the China's coal consumption is attributed, in particular, to the shift in the country's economic structure, the growth in environmental concerns as well as slower growth in its thermal power generation. China, a major coal importer, imported a total 204.06 million tons of coal in 2015, including lignite, thermal and coking coal, which is a reduction of around 29.9% from the year before (General Administration of Customs (GAC) on January 13, 2016). In Western Europe, power generation continues its slow shift to alternatives, notably natural gas and renewable energy. The estimate is that growth in global coal demand will fall reaching 0.2% by 2018.

The NEA estimates that China, in 2016, consumed 3.96 billion tons of coal, 550 million tons of oil and 205 billion cubic meters of natural gas. In 2016 China's thermal power generation increased in line with its strong economic growth and rising electricity consumption. Growth in China's electricity generation will be met with coal-fired capacity as China has over 200 gigawatts of coal-fired power plants under construction but the utilization rate of coal plants has fallen to below 50%. However, policies related to coal-fired power plants will have strong impact<sup>8</sup>. According to Energy Transition Advisors, a consulting firm, around 114 gigawatts of planned capacity increases were canceled in the first half of 2016, as more concerted efforts are being made to match the supply of coal-fired power generation capacity with demand for electricity from coal. China's imports of thermal coal—including bituminous and sub-bituminous coal—fell by 38.17% compared to previous year to 83.21 million tons in 2015, according to the General Administration of Customs.

In 2015 domestic electricity production grew by 0.5%, or 25 billion kilowatt-hours, from a year earlier, however, currently the highest increase in power production comes from renewable energy sources such as solar power with an increased capacity of 20 billion kilowatt-hours and hydraulic power with an increased capacity of 70 billion kilowatt-hours, the wind power with an increased capacity of 40 billion kilowatt-hours as well as nuclear power with increased capacity of 30 billion kilowatt-hours. Coal-fired power generation dropped more than 4%, according to the National Statistics Bureau.

As for China's domestic steel production and related coking coal demand, prices went into a steep decline in 2013-2014 and China's coking coal imports fell by 30% from a year earlier to 48 million tons in 2015. Several major steel mills and coke plants were shut because of a slowing economy, while the government has clamped down on the sector by squeezing credit availability and limiting output. In 2015 coking coal spot prices have fallen by almost a third since the beginning of the year. Prices fell to the \$100/t cfr and have since declined by another 20% to around \$79.08/t for low-vol coking coal.

In 2015, Australia remained China's largest seaborne supplier of coking coal with shipments of 25.7 million tons, 17.6% lower than a year earlier. Mongolia was the second-largest supplier with 12.7 million tons, down by 14.2% from 2014. Shipments from Canada fell by 29% to 5.7 million tons over the same period. Imports from Australia were supported as steel mills entered the spot market to restock after China eliminated its 3% import tariff on Australian coking coal on 20 December under the free-trade deal agreed by the countries in 2014.

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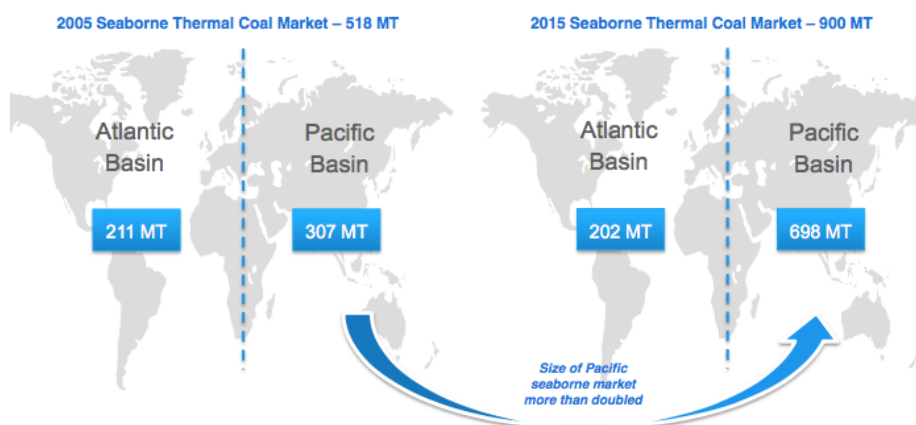
<sup>8</sup> China will further limit construction of coal-fired power plants by cancelling some projects that were already approved in 2016, the National Energy Administration (NEA) said on 20 October 2016. The agency will also stop the building of any project that started in 2016 and reassess the schedule for those that started in 2015, it said. It was not immediately clear how many plants this might involve. The NEA will also limit the capacity of some big coal power projects in major coal producing regions that are still under construction, it said. In northwestern Xinjiang, the planned output for the East Junggar Basin Coal Electricity Complex plant will be cut in half, while in northern Inner Mongolia, the Xinlingol project capacity will be capped at 7.3 GW per year by 2020, it said. The plan is an expansion of the government's prolonged effort to produce power from renewable energy such as solar and wind, and wean the country off coal, which accounts for the majority of the nation's power supply. Source: China Coal Resource

However, the general supply decrease and rebound in economic growth in China<sup>9</sup>, as well as the rising Chinese exports of steel, led to increase in prices for coking coal in 2016 and the increase in imports as well. Already by May 2016, China’s coking coal imports surged by 135.7% compared to previous year. The yearly increase was mainly due to the tight supply amid coal producers’ strict implementation of production cut as well as a 1.8% year-on-year rise of crude steel output. The average price of imported coking coal was \$57.9/t in May 2016. However, since then, coking coal has staged a dramatic recovery, rising by 164% which has made it the best performing commodity of 2016.

### Asian and European coal markets

In Europe, demand for coal is falling since 2013, mostly because of the shift to alternative sources of energy in more developed countries. UK coal consumption is in structural decline, and the British government remains committed to phasing out coal-fired power by 2025. Four plants, with over 6 gigawatts of capacity, were retired in 2016, and the impact of these closures will continue to be felt in 2017 when the UK’s coal consumption fall by 11%. In most of Europe, however, coal-fired power generation remains a key source of the power mix.

**FIGURE 14. THE WORLD COAL MARKET FOCUS MOVED TO ASIA**



Source: (Sacristan, 2016)

In Germany’s total power generation, the share of coal-fired power is likely to remain at just over 40% for the foreseeable future as nuclear power continues to be retired. In September 2016 the German government released a climate strategy document, **Climate Action Strategy 2050**, which avoided a commitment to phasing out coal, even in the longer term. According to Sigmar Gabriel, the minister for economics and energy, and leader of the centre-left Social Democratic Party, “it was unlikely that coal would be phased out by the 2040s”.

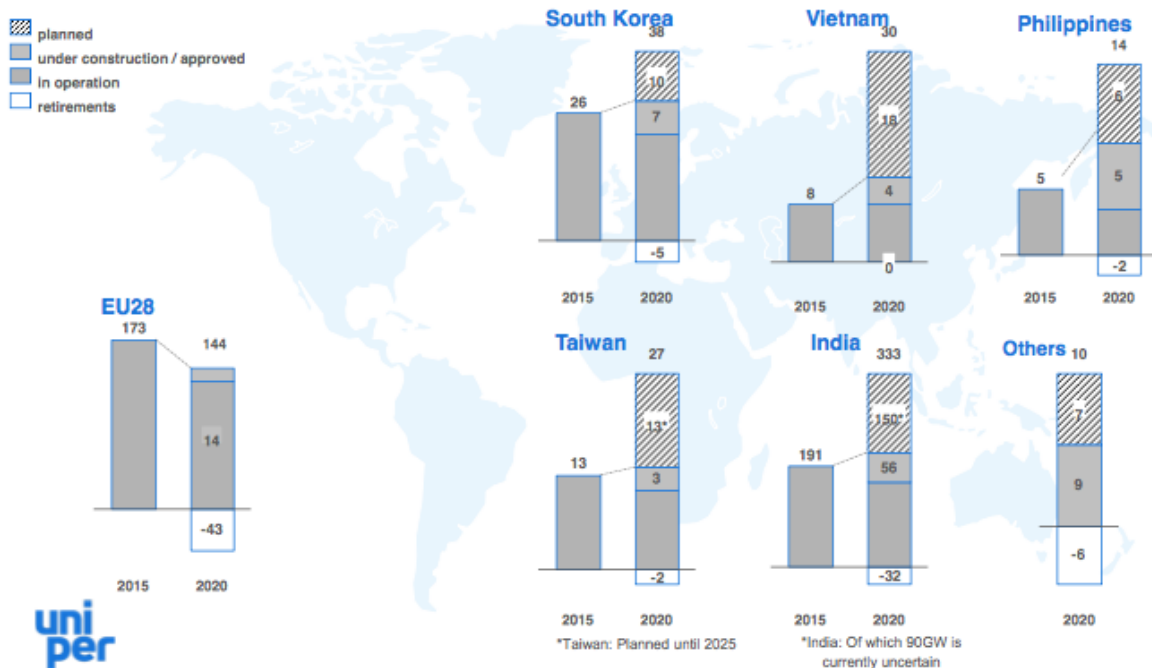
However, while in Europe the coal consumption is steady or slowly decreasing, in Asia the growth in thermal coal consumption is spectacular. Many developing countries in Asia are viewing coal as an attractive and cheap energy source. Even developed countries like Japan or Taiwan are importing more coal. Taiwan, for example, imported 6.3 million tons of thermal coal in April 2016, climbing 11% year on year and up by 24% on month to an eight-month high. Suppliers like Indonesia or Australia are supplying thermal coal, but there are also imports from Russia.

South Korea plans to shut 10 of its aging coal-fired power plants by 2025, (Paris climate summit promise) to reduce greenhouse gas emissions. Coal accounts for 40% of South Korea’s electricity

<sup>9</sup> China’s policymakers injected a huge amount of cash into the banking system and announced a large number of growth supporting infrastructure projects in 2016. This boosted construction activity and demand for steelmaking materials such as iron ore and coking coal. The credit surge was followed by the 276-day policy, which first lifted the price of thermal coal, used to generate electricity in power stations. Coking coal started its rise in July when heavy rain and flooding reduced supply from Shanxi province.

supplies, but the country is hoping to tilt the balance of its energy mix towards cleaner fuels to reduce pollution. Korea wants to spend about 42 trillion won (\$36 billion) in renewable energy investment by 2020<sup>10</sup>. In Korea, among the country's remaining 43 coal power plants, eight plants that are more than 20-years old will be retrofitted with improved parts to curtail emissions, while the rest, operational for under 20 years, will get expanded emission-reduction facilities.

**FIGURE 15. EXPECTED DEMAND IN THERMAL COAL IN ASIA**



Source: (Sacristan, 2016)

Yet, South Korea will build 20 new coal-fired plants by 2022 as planned, but no additional plants will be considered when the government maps out its power supply plan for 2017-2031 next year. This should boost the share of low-carbon and environment-friendly fuels such as natural gas and renewable energy in the country's energy mix by 2029. In the short-term, however, its demand for coal is expected to shoot up as new plants come online.

Other countries like India, Vietnam, and Indonesia are planning to increase their thermal coal power station capacity, but may supply them more from its domestic production.

The coking coal in Asia, however, is the one which is definitely witnessing increasing demand over the years. There are rising new demand for coking coal from emerging countries in addition to existing world consumers such as Japan, China, and Korea, mainly driven by their developing steel industries. It generally requires 0.9 ton of coking coal to produce one ton of steel.

One of those countries is India. India is now driving the growth in the global coal demand, not only in Asia, but globally. During 2017 to 2018, India is expected to lead the global demand with average consumption growth of 4.9% a year. Coal currently accounts for about three-quarters of India's power generation. India has over 300 billion tons of coal reserves, only about 10% of which are coking coal, and a large chunk of that remains unexplored till date. The Indian government had imposed 2.5% duty on coking coal imports in 2014, in order to rationalize the duty structure on all varieties of non-agglomerated coal. Recent estimates show that India is currently constructing coal fired power plants

<sup>10</sup> Korea expects the shutdown of the 10 old coal power plants, which have a combined capacity of 3.3 GW, to lower fine dust levels by 24% by 2030, from 2015 levels. State-run utilities will spend 10 trillion won for the closure and for the upgrade of existing power plants by 2030 to lower emissions. Of the 10 plants that Seoul plans to retire, two will replace coal with biomass from 2017.

with capacity of around 60 gigawatts for electricity generation. However, in an effort to decrease its thermal coal imports, India is trying to cancel some new planned capacity.

On the other hand, with increases in steel production, imports of coking coal in India have been on the rise for the last few years. For coking coal, India needs to rely largely on imported coking coal coming from various countries, including Australia, South Africa, and others. India imported 43.5 million tons in the last fiscal year, a 123% increase compared to 19.5 million tons in the 2010-11 fiscal year. The country's steel industry consumed 66 million tons of coal in 2014-15 fiscal year which is a three-fold increase from 2005-06 fiscal year. Almost two-thirds of coking coal consumption were contributed by imports, according to a study (Yang & Huo, 2016). The domestic steel industry would require 96 million tons of coking coal by 2020, considering projections of the India's steel production. In light of this projected increase, Indian steel makers, such as JSW Steel, Essar Steel, and others, asked for abolition of 2.5% import duty on coking coal.

This growing demand for coking coal allowed coking coal producers to increase their prices recently as well as made them rather optimistic about the projections. Australia is emerging as a leading coking coal supplier for steel companies. According to a briefing by Mike Henry, president of BHP Billiton's minerals operations for Australia, BHP Billiton is expecting strong growth in steel production in India and China. BHP's existing coking coal portfolio allows it to utilize its low-cost capacity as the company plans further to reduce cash costs to \$52/t in fiscal year 2017 at its Queensland coal mines, down by 20% from the fiscal year ended on June 30, 2015. BHP Billiton expects to boost its coal output by 8% over the three years until June 2018, and plans to cut costs by 16% over the next year to boost profits. It also wants to maximize its output from existing mines to 44 million tons in the fiscal year of 2017 and to 46 million tons in the fiscal year of 2018, from the 42.5 million tons planned in the fiscal year of 2016. BHP was focusing on cost reduction, with the aim to have low-cost supply ready even if the coking coal prices increased. BHP said the coal business has delivered over \$3 billion of productivity gains since 2012 and the company was targeting another \$600 million by the end of its 2017 financial year. BHP is now focused more on Queensland coking coal, withdrawing from some other countries.

Another major coking coal producer Glencore signed a coking coal contract at price of \$200/t with Asian mills in the fourth quarter of 2016. The price is more than double the the previous quarter's benchmark of \$92.50/t FOB Australia . Peabody Energy has sold North Goonyella premium mid-vol coal at price of \$200/t FOB to Japanese steelmaker Nippon Steel under contract for the fourth quarter 2016.

#### **1.4.3 Changes in export transportation and logistics**

Since coal is one of the products which is traded in huge volumes, changes in related infrastructure in the region have a huge impact on coal prices. There are two related trends: one is when coal prices were low, the transport companies tried to cut down their tariffs to become more cost competitive; another is the development of infrastructure which cut costs and makes countries more competitive. As coal prices were collapsing everywhere in the world, some of the price falls was amortized by a reduction in transportation costs as traders began to lower freight charges. Countries such as Indonesia and Australia have gained a lot of reduction in freight costs and were actually able to benefit from it despite the sharp fall in price of coal. Moreover, new shipments from Africa also started recently through seaborne routes.

As transportation tariffs decreased, coal from far destinations became cheaper to trade. That created new trade opportunities. For example, Vale initiated the first shipment of coal from Africa to Poland, which would be the first direct shipment of Nacala coking coal to Swinoujscie in Poland. Vale shipped Mozambique coal from Beira to Poland in 2015 as part of a regular sales to Europe, and the company used the smaller port until the new rail and port facilities at the deep-water Nacala were open. "Poland has never imported substantial amount of coal from Africa, its main partner is the Russian Federation that accounts for more than 60% of its imports," Luigi Bruzzone, an analyst at Banchemo Costa, said, adding that Vale expects coal production to reach 11 million tons/year in 2016 and 22 million

tons/year in 2017. In November 2015, Vale also had sent the first shipment of coking coal from Nacala to the west coast of India.

### **Coal prices and Chinese railway freight charges**

As China's economic growth slowed down in recent years, the amount of rail freight fell by about 10% from 2014 to 2015, the largest decline the country has ever seen, because of fewer shipments of bulk commodities such as coal and steel. For example, Daqin line, China's leading coal-dedicated rail line, transported 24.85 million tons of coal in April of 2016, down by 18.9% from a year earlier. Daqin rail line transported 108.13 million tons of coal over the period from January to April of 2016, which is a fall by 20.86% compared to same period of previous year. China's local railway authorities had offered 10% discount to boost coal transportation when demand for shipment was low following weak demand for power.

Furthermore, the government of China offered more investment in the sector and planned to invest over 2.8 trillion yuan (\$\$617 billion) to build more than 23,000 kilometers of railway lines over the next five years. The state-run Economic Information Daily said this was part of China's 13th Five-Year plan, a blueprint for economic and social development between 2016 and 2020, which Chinese leaders agreed on during a meeting on June 29. The focus will be on inter-city projects as well as the central and western regions of the country, and that the central government will increase budgetary funds to support the sector. Almost 3.5 trillion yuan has been spent on China's railway sector since 2011, far exceeding the 2.8 trillion yuan target from the country's 12th Five-Year plan, the newspaper said. The railway construction will increase demand for materials like steel products and cement, which is expected to further support metallurgy, machinery and steel sectors.

However, as coal prices increased, the transportation companies began to increase their freight charges. China's leading local railway authorities in the coal-rich northern provinces have rolled out measures to increase rail freight rates. The Taiyuan and Zhengzhou railway bureaus have resumed the standard freight rate set by the central government by eliminating previous 10% discount to boost shipment. The Xi'an bureau called off a 0.01 yuan/t.km discount for coal deliveries within its administration. The Urumchi Bureau also increased freight rate by 5% from the national standard. This was led by the surge in thermal and coking coal prices. As the prices increased, China's Ministry of Transport released a document, stipulating new size of trucks and ordering that trucks' weight shouldn't exceed 49 tons, effective from September 21, 2016. With the new regulation, truck freight cost of coal rose by 30-50 yuan/t on the whole, prompting shippers to tap rail cars that have been relatively cheaper but generally beyond the easy reach of small-sized miners and traders. This further led to increase in demand for rail shipments for coal in September 2016. China's leading coal-dedicated Daqin line, mentioned above, transported 29.71 million tons of coal in September, up by 2.2% on a month.

As further price hikes became more costly for power companies, China decided not to increase rail freight rate for coal in the foreseeable future to reduce the burden on power companies. Multiple local railway administrations have recently increased freight rate for coal, and no further upward adjustment will be made, said Zhang Manying, one price inspector of the National Development and Reform Commission (NDRC), on November 9, 2016. Recent tightness in rail wagons resulted mainly from increased pre-winter restocking activities, coupled with newly implemented truck transport rules that strictly restrict overloading with heavy fines. This has prompted China's rail operator – China Railway Corporation (CRC) – to halt or limit rail transport of non-coal cargoes and spare transport capacity to deliver coal from the main production bases of Shanxi, Shaanxi and Inner Mongolia. The price increase in coal and increase in freight charges were, therefore, very closely related in China.

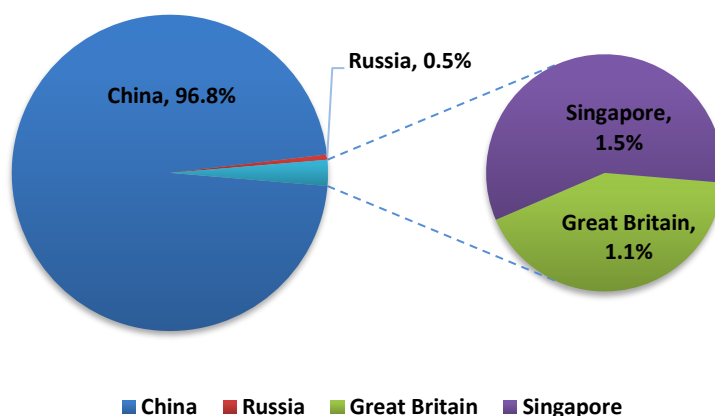
### **1.5 Demand impacting policies**

China is the export market for Mongolian coking coal, however, its demand is very much influenced by the state of its steel industry and economy. The Chinese economy continues to be hit by a number



of economic problems in recent years. Serious problems in the Chinese economy will affect negatively the demand for coal in the country.

**FIGURE 16. THE MONGOLIAN COAL EXPORTS, BY COUNTRIES, 2015**



Source: (Mongolian Customs General Administration, 2016)

### 1.5.1 Economic growth slowdown in China

It is viewed<sup>11</sup> that China’s economy in the recent years has been gradually slowing down<sup>12</sup>. Financial times noted that China’s annual GDP growth of 6.9% for 2015 has been lowest since 1990 but in 2016, GDP grew even by lower 6.7%. Capital outflow<sup>13</sup> from China has also increased in 2016<sup>14</sup>.

Excessive industrial capacity and slowing private investment continue to pose challenges to economic growth, while growth in production of cars and crude steel indicate some stabilization in 2016. The Swiss bank UBS noted<sup>15</sup> that government has unveiled a number of infrastructure projects to support domestic demand in late 2015, with The National Development and Reform Commission approving eight railway construction projects in November 2015, with total investment of 483 billion yuan (\$70 billion). In the first ten months of 2015, China's fixed asset investment in railway sector stood at 623.45 billion yuan, up by 9.8% year on year. Total investment in the sector may exceed 800 billion yuan in 2016, involving 45 projects with newly-added railway length at over 3,200 kilometers.

In addition to starting a large number of infrastructure projects, money pumping into economy continued throughout 2016. The creation of new loans surged in the first quarter of 2016, hitting a

<sup>11</sup> <https://www.ft.com/content/e6b04734-bdbb-11e5-a8c6-deeeb63d6d4b>

<sup>12</sup> The recent data of summer 2016 shows manufacturing industry is still contracting, with employment falling every month for the past two years, and the growth of private sector investment (which drives 65% of the economy) has fallen sharply to 3.9% in the first five months of 2016, compared to 10% growth in 2015. “There’s no chance that China has bottomed out. The idea that China has bottomed out should be stricken from the lexicon, because China is on a long-term slowdown. The question is whether they can engineer this the way they want or whether the circumstances are dictated to them,” Leland Miller who produces the China Beige Book.

<sup>13</sup> Bloomberg estimates that China suffered a net outflow of US\$1 trillion in 2015 – almost 10% of GDP. This represents a historic reversal after years of net inflows. Brexit and capital outflow cost to the Chinese state has been astronomical with its foreign exchange reserves cut to US\$3.19 trillion in May 2016 from a peak of US\$4 trillion two years earlier.

<sup>14</sup> Theoretically, the capital outflow may force Beijing into a drastic devaluation of the yuan in parallels with the 1997 Asian Crisis.

<sup>15</sup> [http://news.xinhuanet.com/english/2016-06/19/c\\_135449116.htm](http://news.xinhuanet.com/english/2016-06/19/c_135449116.htm)

new record<sup>16</sup>. The build-up of debt<sup>17</sup>, which is the inevitable result of these policies, is increasing the risk of a financial collapse so the People's Daily published a front-page editorial (9 May 2016), in which an unnamed 'authoritative source' criticized the government's policies. Rather than an economy in recovery mode, the source said, the trajectory was L-shaped. "I need to stress, that the L-shape will last for a certain period of time, and it's certainly longer than one or two years," he warned. Stimulating growth by increasing debt was like "growing a tree in the air<sup>18</sup>", he said, warning that this could "trigger a systemic financial crisis".

The credit increase may also lead to the debt crisis. Economist Charlene Chu, an expert on China's banks, believes an "aggressive bailout" of the banking system will soon be needed. She estimates the real extent of bad loans – officially just 1.75% – is around 22% of total banking assets. This is not far from the estimates of Hong Kong-based brokerage CLSA, published in a May 2016 report, which puts non-performing loans (NPLs) at the "crisis level" of 19%. With total assets (i.e. loans) worth US\$28 trillion, this means a staggering US\$5 to 6 trillion in NPLs. As China's economy has slowed to its weakest growth in 25 years, probably substantially below the 6.9% that is claimed by Beijing in 2015, the debt mountain has continued to grow. A report by Goldman Sachs (2 July 2016) says China's debt-to-GDP level rose from 154 to 249% between 2008 and 2015 – a result that "ranks in the 98th%ile of debt buildups in modern history." According to this report, only countries that have been at war have experienced anything close and the further weakening of yuan is just a matter of time.

One of the problems which arose due to massive credit increase is the issue of shadow banking. Recent economic boom led to excessive growth in investment in stocks and growth in wealth management products<sup>19</sup>. The shadow banking is estimated to be an \$8 trillion industry in the country. It involves far greater financial risks because it is outside government regulation and spreads its financial tentacles in ways that even insiders don't understand. Shadow finance is especially popular with regional and local governments and the state-owned banks which in reality are dictating the growth of shadow banking, using this as a "hidden second balance sheet" to conceal the full extent of their assets and liabilities. At the same time, much of the corporate debt accumulated from the giant stimulus package of 2008 is turning bad.<sup>20</sup>

A large amount of credit also went to urbanization and property market in the country. With the government credit easing policies, China's property market has shown signs of stabilization after turmoil on property markets earlier. The People's Bank of China (PBOC) has also cut interest rates repeatedly since November 2014. Indeed, China's top-30 cities' full-year property sales hit a historical high in 2015. A China analyst Churchouse, who specializes in real estate in Asia, said the Chinese property market was in its "second bull market since the Global Financial Crisis in 2008." Although there were concerns of a bubble in some cities, the rise in property prices also reflects a real demand, he said. "It's important for China as it moves from an export-led and investment-led economy to a

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<sup>16</sup> Total social financing (TSF), a broad measure of new credit, soared 41% from the same quarter a year earlier to 6.59 trillion yuan (US\$1 trillion) in first quarter 2016.

<sup>17</sup> George Soros, the billionaire speculator, warned recently that China's dependence on debt bears an "eerie resemblance" to the conditions leading up to the 2008 financial crisis in USA. The explosive growth of shadow banking in particular betrays many similarities with the US. This is an area of the economy where, by definition, state control doesn't exist.

<sup>18</sup> Beijing-based economist Anne Stevenson-Yang says the economy has experienced a "dead panda bounce" rather than a real recovery. "Behind what looks like recovery in the Chinese economy are massive new injections of liquidity and unrelenting jawboning from the top about the strength of the economy".

<sup>19</sup> According to Moody's, China's shadow banking sector grew 30% in 2015, to US\$8 trillion (around 80% of GDP). Furthermore, the fastest growth sector has been for Wealth Management Products (WMPs) which are sold as 'investments' but are mostly just bundles of 'junk' debt repackaged and sold with promises of a higher-than-average payout.

<sup>20</sup> Official figures for non-performing loans (NPLs), i.e. loans that are in default or close to default, currently given as 1.75% but several recent reports indicate the real level is 10 to 20 times higher. Reporting from Xi Jinping's former power base, Zhejiang province, where the official NPL ratio stands at 2.39%, the Financial Times (30 May 2016) found that "local bankers estimated that the province's real NPL ratio is likely in the region of 20-30%."

domestic consumption-led economy that the property market is a big part of that domestic-led growth," Churchouse explained.

### **1.5.2 Environmental issues and increase in renewable energy**

A major policy that can potentially and significantly decrease China's demand for thermal coal is its increasing shift to clean energy. The share renewables in the total energy consumption will increase to 15% by 2020 from 12% in the 12th Five-Year Plan period, while at least 150 GW of coal-fired power projects will be canceled or delayed during the period. The plan indicates the nation's resolve in shifting from fossil fuels to clean energies, which is expected to put the economy on a more sustainable track.

Following the widespread environmental issues, coal, steel, and concrete production in China faces tighter restrictions in 2016. New rules to combat air pollution came into effect on 1 January 2016 while courts are likely to continue using a revised Environmental Protection Law to enforce change. The Environment Protection Law is one option of imposing uncapped penalties on the country's dirtiest companies. Introduced at the start of 2015, the EPL imposed over US \$50 million in fines in its first eight months of 2015.

Moving to non-fossil energy is accelerating. It is estimated that the installed capacity of non-fossil energies will reach some 770 GW or 39% of total installed capacity by 2020, compared to 250 GW in 2015, and clean energies will contribute 31% of total power output by 2020. By 2020, the installed capacity of gas-based power may stand at over 110 GW or 5% of the total, while that of coal-fired electricity will be controlled below 1.1 TW or 55% of the total.

China's installed capacity of nuclear power is targeted to grow by 16.5% annually to 58 GW over the next five years, while that of the wind and solar power will amount to 210 GW and 110 GW, with annual increases of 9.9% and 21.2%, respectively. By the end of 2015, the country's installed capacity for power generation stood at 1.53 TW, with hydropower, coal-fired and nuclear power accounting for 21.1%, 65.56% and 1.7% respectively. The first batch of solar thermal power projects in China was publicized by NEA on September 14 in 2016, and the country's total installed capacity of solar power generation is expected to reach 10 GW by 2020<sup>21</sup>.

At the United Nation Climate Change Conference (COP22), China declared that it would continue to wean the economy from coal-fired to more sustainable one. China had just released a five-year plan on November 4, 2015 for cutting carbon emissions levels which is aiming to cut greenhouse gas emissions per unit of GDP by 18% compared to its level in 2015 by the end of 2020. It is assumed that the country is moving faster than expected along the path to de-carbonize its economy to meet the target set in the Paris Agreement. The nation pledged to cut emissions per unit of GDP by 40-45%, compared to the level in 2005, by 2020, which is suggesting that CO<sub>2</sub> emissions would peak in 2030. By the end of 2015, China cut its carbon intensity by 5.6%, far better than the proposed 3.6% target outlined in the 12th Five-Year Plan.

As a part of a move away from coal, the country planned to build more than 60 nuclear power plants over the next 10 years<sup>22</sup>, as declared at the World Nuclear Association Symposium in London on September 16, 2016. The country's three major nuclear companies -- State Nuclear Power Technology Corporation (SNPTC), China National Nuclear Corporation, and China General Nuclear Power Corporation will each build at least two nuclear power plants annually. Among the 60 plants, SNPTC vice president Zheng Guangming said six to ten will use Chinese-developed CAP1400 technology.

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<sup>21</sup> Source: China Coal Resource

<sup>22</sup> Orient Securities, a securities trading and financing services provider, estimated that China's nuclear facilities will have a 20 billion yuan (\$3 billion) market in the next five years. China now has 30 nuclear reactors in operation and another 21 under construction. According to the plan, China will allocate \$570 billion to set up new nuclear plants, aiming to derive 10% of its energy from nuclear power by 2030.

Simultaneously, the State Power Investment Corporation (SDIC), a giant energy company in China, aims to close 1.353 GW coal-fired power capacity involving 23 generating units during the 13th Five-Year Plan period (2016-2020), in response to the government-led supply-side reform and de-capacity drive.

According to the UN's annual environment report, China invested a total of \$103 billion in renewable energy in 2015 which constitutes 36% of total world investment in renewable energy. The country also has 26 nuclear reactors currently under construction, another 40 in the planning stage and more than 100 being proposed which would require a five-fold increase in the country's uranium requirements. Also, the country is planning to increase its wind and solar power capacity by more than 21% and have at least 20 gigawatts of new wind power installations and 15 gigawatts of additional photovoltaic capacity next year, according to the NEA.

Falling renewable energy cost would also help this trend. According to a report published by IRENA, by 2025, average electricity costs for solar photovoltaic could fall by 59%, offshore wind power costs could fall by 35%, and onshore wind power costs could see a 26% reduction, compared with the level in 2015<sup>23</sup>. Electricity prices for concentrated solar power could also fall by as much as 43%, depending on the technology used, according to the report, which highlighted the significant cost differences that exist today and signaled the strong potential for future cost reductions for G20 members.

The IEA predicts that in 2021, more than one-third of global solar photovoltaic and onshore wind capacity will be located in China. However integrating that capacity could be difficult given the slowdown in demand for electricity and the relatively high cost of renewables compared with fossil fuels. The country installed over 160 GW of non-hydro renewables since 2010, mostly supported by the "feed-in tariff", which was aimed at promoting investment in renewables, requiring power companies to purchase green energy at a set cost. But the FIT also caused renewable energy to be costlier than fossil fuels such as coal. The rapid growth in renewables, in turn, also increased the financial burden, with the renewable energy surcharge more than tripling over the last five years since its introduction in 2009, the IEA said.

### **1.5.3 China steel industry issue: oversupply, dumping and sanctions**

Since 2013, the China's steel industry has been in oversupply and experienced a rapid fall in prices as both domestic and international markets experienced fall in demand following the slowdown in Chinese economy<sup>24</sup>. The steel industry is a backbone<sup>25</sup> of the Chinese economy and it creates major demand for Mongolian coking coal as one of the main ingredient.

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<sup>23</sup> G20 energy ministers and officials met in Beijing in June 2016, acknowledging the progress made in scaling up renewable energy. By 2025, the global average cost of electricity from solar PV and onshore wind power sources will be roughly 5 to 6 US cents per kilowatt-hour.

<sup>24</sup> Crude steel apparent consumption – defined as the sum of production, net import and net decline in inventory – has fallen 5.5% year on year to 645 million tons in 2015's first 11 months, after declining 3.3% in 2014. China Coking Industry Planning and Research Institute in December 2015 forecast China's steel output to fall 3.1% in 2015 to 781 million tons, after a 2.1% decline in 2014. A 28% surge in net exports in 2014's first 11 months has cushioned the Chinese steel industry from the full brunt of the demand decline. China Steel association's 300-plus steel mill members recorded a combined net loss of 53.1 billion yuan in 2014's first 11 months as sales shrunk 19.3% to 2.67 trillion yuan on the back of lower steel prices amid a glut. A major reason for the oversupply is continued addition of new production capacity amid falling demand, as projects planned during the boom years were completed and commissioned.

<sup>25</sup> It is estimated that there are 1.8 million workers employed by government owned steelmakers, which exclude private steelmakers. China's steel producers have faced slumping steel prices and the industry lost an estimated \$12 billion in 2015, according to Rajiv Biswas, Asia-Pacific chief economist at IHS Global Insight in Singapore.

**FIGURE 17. PRICES OF STEEL ARE FLUCTUATING, 2014-2016**



Source: Bloomberg

In 2015, in the wake of falling price, China's crude steel output fell last year for the first time since 1981. Crude steel production declined 2.3% year-on-year to 803.8 million tons in 2015, the National Bureau of Statistics (NBS) said. Following facts of China's steel industry in 2015 were stated at the steel association meeting:

1. Both production and consumption<sup>26</sup> of steel reached the peak. The oversupply problem is extremely outstanding.
2. Steel prices declined excessively. The problem cannot be completely solved by reducing costs.
3. Steel exports increased. It became harder to continue the increase.
4. The profitability of the whole steel industry dropped significantly. The operation of enterprises is severely difficult.

In order to avoid oversupply, China has banned new projects in a variety of industries including steel, cement, electrolytic aluminum and flat glass. It also began rounds of cutting<sup>27</sup> excessive capacity in the steel and related coal industry<sup>28</sup>.

But before the capacity cutting, Chinese companies began series of discounts to lower the prices. According to data from China's General Administration of Customs (GAC), China's exports of steel products hit a new high of 112.4 million tons in 2015, up by 19.9% from 2014. The average export price was at \$559/t, down by 26% from the year before. That led to a global<sup>29</sup> decline in the industry,

<sup>26</sup> The apparent consumption of crude steel was 645 million tons, decreased 5.5% y-o-y in first eleven months, comparing with 7.1% growth in 2013 and 3.3% decline in 2014. CISA member steel mills, suffered losses of 53.1 billion yuan (\$8.18 billion) in the first eleven months of 2015, accounting for 50.5% of all members. The total sales revenue stood at 2.67 trillion yuan, down 19.3% y-o-y.

<sup>27</sup> Despite the claimed cuts, in March 2016, analysts warned that some 160 million tons of steelmaking capacity had come back online in Tangshan, a northeast industrial center in Hebei province. But a Goldman Sachs & Co. report warned that China's steel demand will fall 2% in both 2017 and 2018 after rising by 1% in 2016, eventually contracting by as much as 20%, Bloomberg News said. Commerce spokesman Shen Danyang denied that China encourages steel exports, arguing that its output "primarily meets domestic demand" and that the government has raised export tariffs on "some products," the official English-language China Daily reported. But five days later, China's General Administration of Customs reported that steel exports in June 2016 had risen to their second-highest monthly level on record, according to Reuters. First-half steel output of 399.5 million tons edged down 1.1%, but June production of 69.5 million tons rose 1.7%, the National Bureau of Statistics (NBS) said.

<sup>28</sup> Steel production capacity will be cut by 100 million to 150 million tons, China's State Council announced without specifying a time frame. That will translate into as many as 400,000 lost jobs, said Li Xinchuang, head of the China Coking Industry Planning and Research Institute, according to a report by the official Xinhua News Agency Monday. China will raise funds to help dismissed workers, Xinhua said. 216

<sup>29</sup> For example, Mexican steelmaker Altos Horns de Mexico has laid off 600 workers due to the weak market condition of the industry globally. The company operates the 5.2Mtpa Monclova integrated steel plant in Coahuila, Mexico, and it is one of the largest steelmakers in the country. In June 2015, the company had stated its plan to reduce its workforce by 20% in the wake of low prices. Source: AME

with global steel production falling, to its lowest level in the last six years, in 2015. Cheap Chinese steel created big problems in the industry worldwide. Excess supply, particularly from China, has spurred governments across the globe to take steps to protect their home markets. Of the total 71 international steel trade disputes in 2015, 33 were related to Chinese steel exports. There were allegations of illegal subsidies as Chinese steel companies have debts of \$520bn, mainly held by Beijing-backed banks.

Following a 2015 investigation prompted by complaints from European steelmaking association Eurofer, European member states and steel producers accused China of issuing unfair subsidies and flooding global markets with cheap steel at below-market prices. EU Commission President Jean-Claude Juncker said in July 2016 at the EU-China Summit in Beijing that he would vigorously defend Europe's steel industry. Earlier, in March 2016, the United States imposed a prohibitive 266% tariff on certain Chinese steel makers for selling below cost. It was found that the spread between some Chinese raw-steel prices and their equivalents in the U.S. is the widest since at least 2011, according to Bloomberg News<sup>30</sup>. The European Commission announced plans on March 16, 2016, to speed up trade defense cases against cheap imports from China and urged EU member states to end measures that could block higher duties on dumped and subsidized products (Gulf News, 2016).

The case with Chinese steel prices was even used during the election campaign in the USA. The U.S. International Trade Commission said it had found that imports of cold-rolled steel products from China are hurting U.S. producers, paving the way for hefty antidumping duties and increasing trade tensions between the nations. In May 2016, the Commerce Department had recommended slapping Chinese steelmakers<sup>31</sup> with import duties of 522% on the products, and anti-dumping duties of 71.35% on Japanese producers.

In turn, Beijing has criticized new European tariffs on Chinese steel as "unjustifiable" protectionism coming just weeks after commerce ministers from G-20 nations pledged to promote free trade. China's Ministry of Commerce said imports of grain-oriented electrical steel will be charged duties ranging from 37.3% to 46.3% after an investigation by the country's Ministry of Commerce found evidence of dumping that was harming Chinese industry. The trade war led to major wrangle over the status of "market economy", which ultimately was not granted to China because granting it would make it more difficult to impose tariffs<sup>32</sup>.

Now, the final step in this steel industry issue is that ultimately China's steel industry is going to be consolidated and upgraded with some industry cuts to keep prices up. Indeed in June 2016 two of China's largest steelmakers Baoshan Iron and Steel Co and Wuhan Iron and Steel announced that they would undergo strategic restructuring planned by their respective parent companies. Analysts have said a merger could capitalize on Wuhan Iron and Steel's expertise and advanced technology in oriented silicon steel combined with the leading market position of Baosteel, which supplies about

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<sup>30</sup> Shanghai hot-rolled coil futures currently cost about \$387 a metric ton, compared with \$625 a ton on Nymex, Bloomberg.

<sup>31</sup> The original complaint was filed in July 2015 by major U.S. producers United States Steel, AK Steel Corp, ArcelorMittal USA ARCMTR,UL, Nucor Corp and Steel Dynamics Inc. The Chinese companies affected are: Angang Group Hong Kong Holdings Ltd, Benxi Iron and Steel (Group) Special Steel Co Ltd and Qian'an Golden Point Trading Co Ltd. Among Japanese producers are Nippon Steel & Sumitomo Metal Corp and JFE Steel Corp (<http://www.reuters.com/article/us-usa-china-steel-idUSKCN0Z81PC>)

<sup>32</sup> After meeting with officials in Beijing on July 13, 2016 European Commission President Jean-Claude Juncker said the European Union is considering new steps to guard against unfair competition. "The EU will defend its steel industry. We are not defenseless and we will use all the means at our disposal," said Juncker, Agence France-Presse reported. Juncker said the EU could delay granting China "market economy status," which Beijing has been seeking to reduce anti-dumping measures and tariff barriers to trade. At a meeting with German Chancellor Angela Merkel on July 16 2016 during the Asia-Europe Summit in the Mongolian capital Ulan Bator, Premier Li Keqiang urged the EU to approve market economy status for China by December, the date set by the country's accession accord with the World Trade Organization in 2001. "China is not a market economy," EU Trade Commissioner Cecilia Malmstrom said, as quoted by Reuters. "We are not granting it market economy status. If it were a market economy, it wouldn't have the problems we are seeing." Earlier, at a G20 meeting in Shanghai on July 10, 2016 trade ministers of the major economies approved a carefully orchestrated statement that avoided blaming the host country for the world steel glut. "We recognize that excess capacity in steel and other industries is a global issue which requires collective responses," the statement said.

50% of the steel sheet metal used by China's auto industry. Similarly, there is also news of modernization of existing capacity and closing of older inefficient mills<sup>33</sup>.

As China is aiming to decrease its steel production by 150 million tons per annum by 2020, inevitably it will have an adverse impact on demand for coking coal. However, this doesn't mean that imports from Mongolia will be actually reduced. On the contrary, price-efficient Mongolian imports will be more needed as the prices in the industry still fluctuate a lot. As steel prices increased recently, the steel production in China resumed its growth<sup>34</sup>.

#### **1.5.4 Free trade agreements**

Finally, among major recent policy changes, there is an issue of new free trade agreement between China and Australia. The tariff will be exempted on January 1, 2017, under the China-Australia Free Trade Agreement signed recently.

#### **1.5.5 Further policies**

China's government, namely its leading agencies NDRC and NEA have released coal industry 13th five-year plan on Dec 30th, 2016. De-capacity, capacity upgrade, and consolidation remain the key focuses. NDRC targets to cut coal capacity by 800 million tons by 2020. NDRC also targets to encourage production of advanced coal mines by increasing share of output from large-size coal mines' to 80% from 73% in 2015.

In coal industry, de-capacity remains the primary focus. According to NDRC, no new coal mines construction or upgrade will be allowed in the next three years. Coal mines without proper approvals should suspend construction/production. Construction of new mines is only allowed to replace existing capacity. The capacity of new mines should be larger than 1.2million tons per annum. NDRC targets to close 800 million tons capacity in the 13FYP period. This is in line with State Council's coal industry reform plan released in early 2016 where the government set the target to close 500 million tons capacity and to consolidate another 50 million tons by 2020.

In order to ensure coal supply in the long term, NDRC encourages large coal companies to develop advanced coal capacity and also to form large coal groups. It also encourages upstream-downstream consolidation and cross-shareholding of coal mining, power generation, transportation and coal-to-chemical companies. Important for Mongolia, NDRC encourages imports of high-quality thermal coal and coking coal while strictly restricting the import of coal with low heat value and high-sulfur content.

### **1.8. Conclusion for demand side**

World coal demand is strongly related to countries' regulation on energy and steel markets. One reason behind fall in coal markets is due to policies implemented by main consumers which led to excess coal supply. Furthermore, many countries are shifting to alternatives that are environmentally friendly such as natural gas and renewable energy instead of using coal.

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<sup>33</sup> Baotou Iron & Steel Group, one major steel maker in northern China's Inner Mongolia, launched the work in tearing down its #2 iron-making furnace on August 31 2016, with capacity of 1.33 million tons per annum (Mtpa), the Xinhua News Agency reported on September 1 2016. It turns out to be the biggest furnace that have been taken down since the central government enforced capacity cuts in 2016, drawing the country a step closer to its expected de-capacity target. The company is expected to finish the dismantlement by end-November in 2016, which will reduce dust emissions of some 2,800 tons per annum and decrease sulfur dioxide emissions of some 57 tons per year. Baotou Iron & Steel announced it will not increase any steel or iron making capacity in a certain period, and will focus its efforts on the research and development of rare earth resource and rare earth steel products in the future.

<sup>34</sup> Chinese steelmaker Jianlong Iron and Steel has recommissioned its 6Mtpa Shanxi Jianlong integrated steel plant, the old Haixin Steel plant in Shaanxi province, China. The plant was idled in 2014 due to bankruptcy, and was acquired by Jianlong in September 2015. The company is restarting the production of long products, which includes one wire rod mill and one rebar mill and is expecting to produce flat products by 2017.

The US which is one of the world biggest coal exporters and producers is trying to shift to natural gas and other energy sources. However, there are some uncertainties and, Trump administration's CPP policies will have a strong impact on world coal market.

Another major coal consumer is Japan and it cut its nuclear energy production after the Fukushima nuclear disaster following which its coal import increased substantially. Coal will remain essential in the coming years for Japan's market, especially thermal coal import for its energy industry will stay high.

Chinese coal consumption has the considerable impact on the world market. Even though demand for thermal coal is high and its import increased in 2016, the National Energy Administration approved a limit on coal-fired power plants by stopping some projects in the face of environment concerns. China's coking coal import dramatically declined in 2015 because of decline in steel production following its price fall. Australia was the largest coking coal supplier to China and Mongolia was ranked second in 2015. Basically, coking coal prices tend to increase with the increase in steel production which happened after China expanded its steel export.

In most of Europe, consumption of coal is declining, on the other hand in Asia consumption of thermal coal is still significant. However, South Korea, one of major consumer of coal in Asia, is trying to close its coal-fired power plants and to expand its renewable energy capacity by investing large amount of money within coming 5 years.

India is definitely one of the leading consumers. The Indian government claims that it is planning to stall some new planned capacity to reduce thermal coal imports.

Cost of transportation impacts coal prices and vice versa. When coal prices are low, freight companies try to cut their freight rate, while the development of new infrastructure has the benefit of reducing transportation costs. In China, transportation volume declined in 2015 by 10% because of fewer shipments of coal and steel outputs. In order to improve freight, the government had supported in many ways such as through discounts as well as making huge amount of investments for building railway lines. This investments, in turn, increased demand for steel for construction of railway lines which also increased demand for coal.

For Mongolia, the coal demand comprises both local consumption and export. Local consumers, households, enterprises and 17 TPPs, used about 8 million tons of coal in total in 2015; of which TPPs consumed approximately 7 million tons constituting 85% of domestic coal consumption. Only few TPPs are connected with coal mines through railway network. Unfortunately, most TPPs are unable to use railway network in order to bring coal from the mine due to lack of infrastructure. Therefore, they use road tracks. The main foreign consumer of the Mongolian coal is China which constituted 99% of total coal export in 2015. As being the largest importer of coal as well as being the major export destination for Mongolian coal, Chinese coal market directly affects Mongolian coal export and the world coal market.

Public and private sector are planning to build 16 new coal-fired TPPs and PPs within the next 10 year. Coal consumption of these new TPPs and PPs is expected to be at around 12.8 million tons every year. In other words, domestic coal consumption will increase by that amount by 2025.



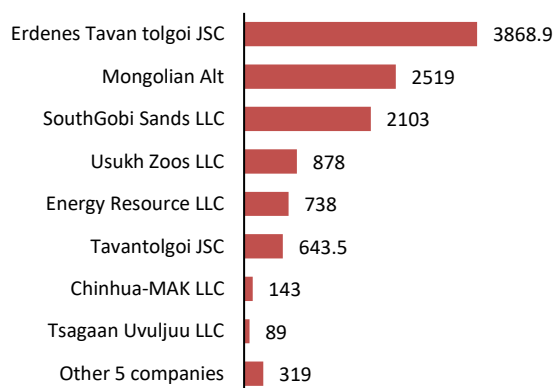
## 2. Supply Side

### 2.1 Analysis of supply

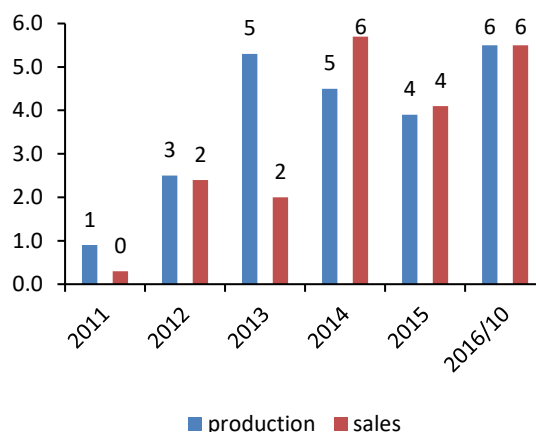
According to a report by the World Bank, the world coal production has dramatically declined due to China and Indonesia. More specifically, Indonesia faced heavy rains in 2016, which reduced coal production in Indonesia considerably. In addition, China approved some regulations and laws related to reducing production of coal. Another factor which affected the decrease of the world coal production is that Australia and Columbia tightened their supplies in 2016. On the other hand, India increased its coal production in an effort to reduce imports in coming years (World Bank, 2016). Price increase in coking coal may lead to increase in coal supply.

Mongolian coal production has increased for the last 10 years, and the total coal production reached 32 million tons in 2011. While in 2015, the Mongolian coal production was 24.2 million ton, up from 25.3 million ton in 2014. In addition, the Mongolian coal exporters such as Energy Resources, MAK and other mines exported coal to Chinese and Japanese markets. Aspire mining LLC of Canada is also exporting coal to Russia through east ports which have occupied two seaports in Russia to supply its coal to European states. (Galsandorj & Tegshjargal, 2013).

**FIGURE 18. MAJOR COMPANIES' EXPORTS, MILLION TONS**



**FIGURE 19. COAL STATISTICS OF ERDENES TAVANTOLGOI, MILLION TONS**



Source: (Mongolian Mining Journal, 2016)

### 2.2 Local supply analysis

Even though the majority of the Mongolian coal production is exported to China, local market for thermal coal is still important. Mongolia has 21 provinces and its capital is Ulaanbaatar city where approximately 50% of total population lives.

There are, currently, over 240 authorized exploration licenses (MV), and approximately 80 registered coal mines (Japan Coal Energy Center, 2013). However, in 2015, only 22 of mines released Annual Report (please see more detailed information from Appendix Table A5). According to the following table, these 3 mines are the main suppliers of coal to the TPPs in the Central Power System (Baganuur, Shivee-Ovoo, and Sharyn Gol mine). Coal consumption by the TPPs' was 6.7 million tons, and approximately 5.4 million tons out of these total coal consumption of TPPs was used by TPPs in the Central Power System.

**TABLE 2. THE MAIN MINES AND THEIR LOCATION AND CAPACITY**

№	Name	Extraction, million tons (2015)	Resources, million tons	Location		Started date
				Province/city	Soum/district	
1	Baganuur	3.73	599.00	Ulaanbaatar	Baganuur	1978
2	Nalaikh	-	-	Ulaanbaatar	Nalaikh	1922
3	Sharyn Gol	0.76	146.30	Darkhan-Uul	Sharyn Gol	1965
4	Shivee-Ovoo	1.74	564.70	Govisumber	Shiveegobi	1990
5	Tavan Tolgoi (Energy Resources LLC)	757.20	Coking coal-141; Steaming Coal-67	Umnugovi	Tsogtsetsii	2005

\*-the Nalaikh mine consists of approximately 200 mine shafts, and only 26 shafts are authorized (Munkhbold, 2016), and that’s why the formal data about its extraction and reserve would not be published;

Source: (Japan Coal Energy Center, 2013) and (Ministry of Energy, 2014)

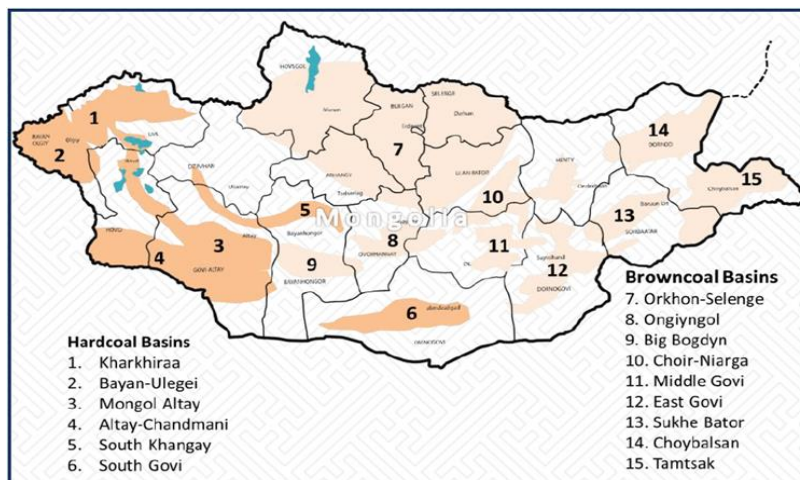
A significant part of demand is created by the coal preparation plants, and currently, two coal preparation plants are operating, placed near Tavan Tolgoi and Sharyn Gol mine. Then, the main supply centers for each consumer are as follows

- TPPs-Baganuur, Shivee-Ovoo, Sharyn Gol;
- Household-Nalaikh, Baganuur, Shivee-Ovoo;
- Coal preparation plants-Tavan Tolgoi, Sharyn Gol.

In addition to these mines, many mines are operating across the country and their operation focus on exports rather than the domestic market. That’s why most of them is located in the South Gobi Desert of Mongolia near the border with China.

The following Figure 20 illustrates coal basin areas in Mongolia, and their estimated resource is approximately 173 billion tons (Ministry of Energy, 7-9 November 2015). As shown here, coal production would increase in the future because there are plenty of coal deposits. In total, the supply of the Mongolian coal for domestic and foreign consumers is expected to increase by 17 million tons in the near future (midterm. 4 years) and by nearly 30 million tons in the long term (10 years).

**FIGURE 20. COAL BASIN AREAS IN MONGOLIA**



\*-please see more detailed information about these basins reserve from Appendix Table A 6; Source: (Ministry of Energy, 7-9 November 2015; Ministry of Energy, 2014)

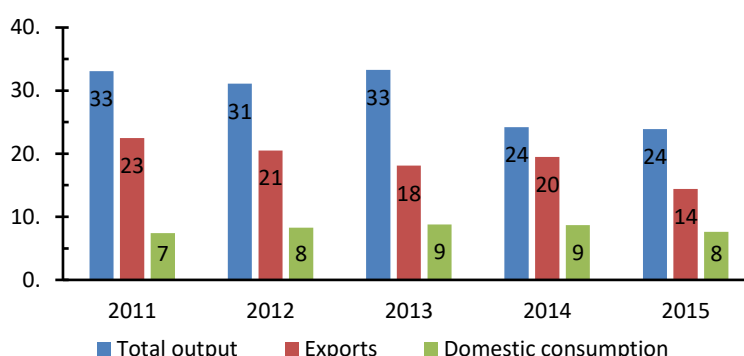
The most internationally discussed coal project in Mongolia is Erdenes Tavan Tolgoi Coal Mine (WEST TSANKHI), extraction of which has been done by national exploration companies-SJS LLC, Khishig Arvin LLC and Monnis LLC since October 2016. By the end of 2016, their extraction would reach approximately 1.1 million tons.

In addition to it, several coal projects are planned, but currently their starting dates are uncertain. On the other hand, planned projects have stopped with the sharp decline in coal prices at the market.

### 2.3 Supply competitiveness

In recent years, Mongolia emerged as a leading supplier of coking coal in Asian, particularly Chinese market, and began to compete with Australia and other coal exporters for the Chinese market. In 2011 Mongolia supplied 45% of China's coking coal while Australia only supplied 23% of it. However, in 2014, these numbers were reversed with 24% of coking coal coming from Mongolia versus 50% from Australia (Dorj, 2015).

**FIGURE 21. TOTAL OUTPUT AND EXPORTS, MILLION TONS**

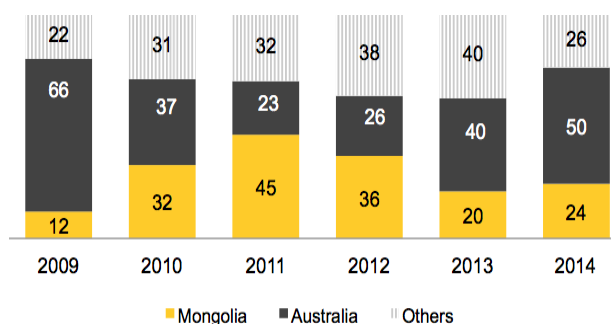


Source: NSO

Exporting coal is a relatively new phenomenon for Mongolia. In order to improve its competitiveness, Mongolia has to offer a price that is below the price offered by its competitors, especially Australia. Even though Mongolia is located next to China, it is currently unable to use its location as an advantage due to logistical problems, especially related to transportation cost which is reducing competitiveness of the Mongolian coal. For instance, Mongolia export coal to China mostly by trucks which are running on gravel or paved roads.

As a result, price of one ton of coal at China border increases substantially reflecting cost of transportation compared to the price at the mineshaft. More specifically, due to transportation cost, the Mongolian coal is sold to China at a discount rate of 41-52%, compared to seaborne Australian coal (Economic Research Institute, 2012). In addition to railways, price of washed coal at Chinese market is 2.2 times higher than unwashed coal. Therefore Mongolia should aim for exporting washed coal instead of unwashed raw coal.

**FIGURE 22. MONGOLIAN SHARE IN THE CHINESE COKING COAL IMPORTS (%)**



Source: (Dorj, 2015)

The fall in the price of both coking coal and thermal coal on international markets had a significant negative impact on Mongolian economy. In 2015, both domestic output and exports of coal fell, reflecting the fact that the low prices depressed growth of exports. However, the situation slightly improved in 2016. In the first months of 2016, exports to China increased by 38.6% from a year ago to 6.91 million tons. May 2016 was the first time for China to import more coking coal from Mongolia than from Australia since 2013, mainly due to price edge of Mongolian coal and tight supply at domestic coal market amid capacity cuts. The popularity of Mongolia coking coal was also benefited from the rebounded spot market for coking coal as well as the continuous rise in coking coal prices in China along with decrease in price of raw coal in Mongolia. Australia lost its advantage due to the increase in its prices<sup>35</sup>. Mongolia supplied 12.78 million tons of coking coal to China in the first eight months of 2016, a jump by 51.7% from the same period in 2015. In contrast, imports from Australia were 18.75 million tons, a gain of only 8.5% which clearly indicates a mounting preference by Chinese steel mills for cheaper Mongolian coal (Russell, 2016).

The two major coal trading posts on the Mongolia-Chinese border were Ganqimaodu Border Crossing and Ceke. China imported 4.04 million tons of raw coal at Ceke Border Crossing by June 14, up by 64.8% from a year ago. The restructuring of coal industry in China presents an opportunity for Mongolia.

The Mongolian coking coal, at present, is mainly sold to major steel producers in China such as Baotou and Wuhai in Inner Mongolia and Tangshan in Hebei province. By August 2016, Mongolian exports to China further increased with numbers reaching a record of the last 7 years. Mongolia exported 13.7 million tons of coal over January to August of 2016, an increase by 42% compared to a year ago<sup>36</sup>. The value of coal exports reached \$421 million during the same period, accounting for 14% of the country's total exports value. Proving the link with the steel industry, over the period between January to August 2016, Mongolia's exports of iron ore increased by 21.3% compared to a year ago reaching 3.7 million tons.

As prices increased, volume of exports further increased. According to data from the Mineral Resources Authority of Mongolia, in 2016, Mongolia experienced a new record by exporting 16.7 million tons of coal over the period between January to September 2016, an increase by 58.8% from 10.51 million tons exported in the same period in 2015. By September 2016, total production was 20.72 million tons, with output in September increased by 12.5% from previous month reaching 3.07 million tons. Prices of Mongolian coking coal traded at border crossing have increased since mid-August 2016, thanks to strong demand and tight supply at China's domestic market. According to data from the Mineral Resources Authority of Mongoli, Mongolia experienced another monthly record of exporting 3.81 million tons of coal in November 2016, which is an increase by 77.97% compared to 2.14 million tons exported in October of 2016. The same data also shows that coal export increased by 80.39% reaching 22.52 million tons over the period between January to November.

Overall, in 2016, Mongolia became the second biggest supplier of coking coal to China after Australia. By enjoying pricing power due to being almost the only buyer of Mongolian coking coal, Chinese steelmakers enjoyed a further advantage by buying Mongolian coking coal as it was much cheaper than coal from seaborne markets. Reuters report concluded that availability of Mongolian coal for Chinese steel makers is an advantage: "it seems very likely that Chinese steelmakers, especially those located in the northeast part of China close to both domestic and Mongolian mines, are now enjoying a coking coal cost advantage not available to their competitors, ". As a conclusion, the Reuters think

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<sup>35</sup> Customs data showed that the average price of imported coking coal from the country climbed \$2.1/t on month to \$79.5/t in May, compared to a \$2.8/t drop in Mongolia coking coal to the average \$33.2/t in the month. Source

<sup>36</sup> UB Post reported, citing data from the Statistics Bureau of Mongolia, 2016

that “this means that exports of cheaper Chinese steel product are likely to continue to force their way into global markets” riding on the strength provided by low prices of Mongolian coking coal.

The existing Mongolian coking coal suppliers such as MMC, SGS and Erdenes TT have all enjoyed the expansion of exports in 2016. In November 2016, MMC reported about reaching the production miles of 40 millionth tons of coal since 2009. Similarly, another major Mongolian exporter ETT declared that in October 2016 it shipped 20 millionth ton of coal. However, new potential exporters also arose. One of them is Aspire Mining. Aspire's Ovoot Coking Coal Project is also world class in size and quality, ranked as the second largest coking coal project by reserves in Mongolia. The test work showed that blending relatively low proportions of Ovoot coking Coal (as low as 25% in the blend) resulted in a blended primary coking coal product under the Chinese standard. David Paull, managing director for Aspire, welcomed this positive development to work together with ETT to add material value to Mongolian coking coal<sup>37</sup>. Northern Railways LLC, Aspire’s subsidiary, is raising funding for the 547km-long Ovoot Erdenet railway with a capacity to transport 30 million tons of coal per annum which will connect the Ovoot mine with Erdenet. The project is backed not only by Aspire, as there are also several companies with deposits in the Khuvsgul province pushing to construct a 682 kilometers railroad extension from Erdenet to Ovoot, through Moron.

Another large supplier is Mongolia Energy’s Khushuut Open-Cut Mine located in Western Mongolia<sup>38</sup>, which produced 0.58Million tons of Raw Coal in 2016. Mongolia Energy Corporation (MEC) announced that its Khushuut open-cut coal mine in western Mongolia produced a total of 578.3kt of ROM coal in the fiscal year 2016 (ending the 31st of March 2016). The raw coking coal is transported to Xinjiang in China. MEC has a coal supply contract for the Khushuut coal mine to provide 1Million tons of raw coking coal to customers in Xinjiang from March to December in 2016. However, MEC suspended coal production at the Khushuut coal mine twice due to low coking coal demand.

Tavantolgoi project, which is currently under negotiation, is one of the most promising export projects for Mongolia. The main driver of production will be the development of the massive Tavan Tolgoi coal project. Its main Tsankhi deposit was initially touted as being split into a Government-owned operation (East Tsankhi) and a privately-run operation (West Tsankhi). The new government formed after the Parliament elections in 2016 has held extensive talks with the consortium comprised of MMC, Shenhua, and Sumitomo to decide on the ways to develop the coal field. The consortium won the tender bidding in December 2014. This project is included in both Government Action Plan for 2016-2020 and the Economic Recovery Plan for 2016-2018 as a priority project.

### The export infrastructure perspectives

Infrastructure and high transportation costs were main factors behind the slow increase or decrease in exports of Mongolian coal. While being price-competitive in general, high transportation costs reduced margins for investors. According to table below, transportation cost of the railway is almost twice as low as compared to transportation cost by gravel or paved road.

**TABLE 4. COAL TRANSPORTATION COST**

No	Mode of Transport	Cost USD per km/t
1	Gravel road	0.0700
2	Paved road	0.0550

<sup>37</sup> Aspire and ETT have agreed to: 1. share data and samples for further evaluation; 2. establish a technical and commercial working group to prepare a feasibility study into the blending of Ovoot Coking Coal, Tavan Tolgoi non-coking coals and potentially other suitable Mongolia coals in a coal blending facility. This could have a capacity of 8 to 10 million tons per annum. In the event that the feasibility study is positive, Aspire and ETT will jointly enter into commercial negotiations to establish a blending joint venture and to work together to attract necessary funding. The Ovoot project development is dependent on the construction of the Erdenet to Ovoot railway which is being progressed by Aspire’s subsidiary Northern Railways LLC (Northern Railways). Northern Railways has been granted a rail concession in August 2015 and the project is undergoing a bankable feasibility study. (Proactive Investors, 2016).

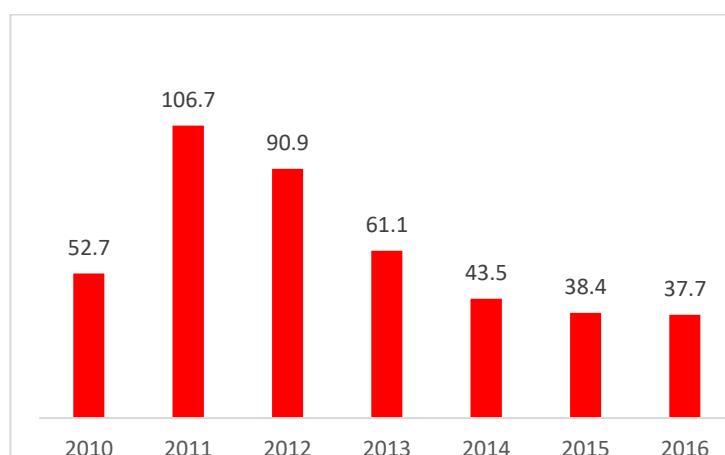
<sup>38</sup> Source: AME

3	Railway (Mongolia)	0.0300
4	Railway (China)	0.0220
5	Railway (Russia)	0.0200

Source: (Economic Research Institute, 2012)

However, this may change as Mongolian Government is planning to build railways through both Gantsmod (Ganqimaodu) and Ceke border crossings on Mongolia-China border. One interesting question is whether Mongolian coal price follows world price. The following figure reveals how Mongolian coal price has fluctuated since 2005. But it is, overall, the average price at local deposits (DAP).

**FIGURE 23. THE AVERAGE COAL PRICE USD PER TON, 2005-2016**



Source: NSO, Mongolbank and the research calculation

Then another one question is whether there is a price difference between Australian and Mongolian coal. In order to determine it, the research team estimates the coal prices of Erdenes Tavan Tolgoi at Tangshan port because Australian coal trade is entirely based on spot price rather than DAP trade term. In other words, Australian coal price at Tangshan port includes mining and processing costs, transportation cost from Australian deposits to China steel industries, costs of exports and import, and other costs. Specifically, on December 31, 2016, East tsankhi coal price was USD59.3 per ton whereas it was USD71.5 per ton at the West Tsankhi. The following table illustrates extra costs and a price when the West Tsankhi's coal would be supplied at Tangshan port.

**TABLE 5. ETT'S ACTUAL PRICE AND ITS ESTIMATION AT THE TANGSHAN PORT**

	USD/ton	Distance (km)	Types of road and transport	Explanation
Price at local deposit	71.5			The West Tsankh made auction in December 2016.
Transportation cost (from ETT to Gashunsukhait port)	13.2	240	truck and paved road	Paved road cost per km is USD0.055/ton (ERI, 2012)
Exports and imports taxes	17.9			China's charges: Import tax 3%; VAT 17% (Pitney Bowes, 2017) and Mongolia royalty 5%. China-USD14.3; Mongolia-USD3.6
Extra fees at Gants mod port	1.3			Gants mod applied new imposed fees from December 1, 2016. The fees contain an 8 RMB tariff per ton, a 10 RMB tariff per truck (1RMB=USD0.15). In fact per truck has a 20 ton of capacity

Transportation cost (from Gantsmod to Urad Zhongqi coal preparation plant)	7.2	130	truck and paved road	Paved road cost per km is USD0.055/ton (ERI, 2012)
Preparation cost per ton	12.2			Preparation cost is approximately USD1.5 per ton. Also ETT's output is 85 per after preparing and washing it.
Transportation cost (from Urad Zhongqi coal preparation plant to Baotou Steel Union Ltd.,	13.3	242	truck and paved road	Paved road cost per km is USD0.055/ton (ERI, 2012)
Gross loading/unloading cost	6.0			Loading: From 1. local deposit, 3. Gants mod port, 5. Urad Zhongqi; Unloading: To 2. Gashuun sukhait port, 4. Urad Zhongqi, 6. Baotou Steel Union Ltd., (Munkhchimeg, 2012)
Transportation cost (to Baotou)	33.7			
Total cost (to Baotou)	71.1			
ETT's coal price at Baotou	142.6			Even though ETT's price at local deposit is USD71.5 per ton, at Baotou Steel Union Ltd., it would reach at USD141.6 per ton
Transportation cost (from Uran Zhongqi coal preparation plant to railway line)	30.8	560	truck and paved road	Paved road cost per km is USD0.055/ton (ERI, 2012)
Transportation cost (to Tangshan port via wagons)	11.7		wagon and railway	Railway cost per km is USD0.022/ton (ERI, 2012)
Entrance fee of Tangshan port	5.3			35 RMB per ton for exporting coal (1 RMB=USD0.15)
Gross loading/unloading cost	8.0			Loading: From 1. local deposit; 3. Gants mod port; 5. Urad Zhongqi, 7. A warehouse near railway line; Unloading: To 2. Gashuun sukhait port, 4. Urad Zhongqi, 6. A warehouse near railway line, 8 Tangshan port; (Munkhchimeg, 2012)
Total transportation cost	62.9			
Total cost	107.5			
ETT's coal price at the Tangshan port	179.0			Even though ETT's price at local deposit is USD71.5 per ton, at the Tangshan port, it would reach at USD179.0 per ton

Source: the research team's calculation, (ERI, 2012), and (Munkhchimeg, 2012)

In December 2016, spot price at the Tangshan port was USD208.5 per ton. According to the estimation based on USD71.5 of price at local deposit, spot price for the West Tsankhi would be approximately USD180 per ton. Then price at local deposit in Mongolia is fairly lower than that in Australia by around at least USD29.5 per ton.

Generally, ETT has to cover additional costs for supplying to the Tangshan port. As shown in the table, extra costs would equal to USD107.5 per ton, of which, USD62.9 per ton would be allocated to only transportation cost.

The seaborne dry bulk shipping market is a major component of the international coal supply chain because approximately 90 percent of internationally traded coal is transported by ship. The main

vessel types are: Handysize, Handymax, Panamax, and Capesize (International Energy Agency, 2016). In fact, Australia commonly uses Panamax and Capesize.

Australian coal export is serviced by nine major coal-loading terminals which are located in Queensland and New South Wales. Its transportation cost is significantly smaller in comparison with USD62.9 per ton. Specifically, freight rates from Western Australia to China were around USD6.0-6.5 per ton whereas from Eastern Australia to China were approximately USD8.5 per ton in December 2016 (Reuters, 2016).

One of the main indexes which generally determine the rates of vessels is Baltic Dry Index, and it was around 1100 in December 2016, but it declined continuously until February 2017 (Bloomberg, 2017). In other words, the price at local deposit in Australia was significantly higher than that in Mongolia because transportation cost has been driven by the index.

The simulation shows that with improved infrastructure, Mongolian coal could be very competitive compared to Australian coal, though mainly for Northern China.

As for volumes, Tavantolgoi railway project length is 280 kilometers. Basically, once the railway is built, the Tavantolgoi coking coal supply alone can reach 30 million tons per annum. China and Mongolia held a talk in April 2016 and agreed on the construction of a cross-border railway connecting Shiveehuren-Ceke border crossing in Inner Mongolia and Cibber Cullen border crossing in Mongolia from late May of 2016. Two sides signed a relevant agreement on May 11, 2016, and cross-border coordinates of Ceke-Cibber Cullen railway were finally determined, which means the construction officially started. A railway from Tavantolgoi to Gantsmod has also started in 2013 but didn't progress much. It is expected that once the Tavantolgoi deal is completed, the railway will be built and transportation costs will further decreased. The total length of the railroad is 47.3 km. It has been reported that after completing the first 47.3 km line, the 6 coal companies operating in the Shiveehuren area will combine forces to build another 250 km of railway to Shinejints in Mongolia. The work on 47 km line between Shiveehuren to Ceke will start in spring 2017. The export potential is estimated to be 32 million tons and the only bottleneck once the railway line is built will become the Ceke crossing's existing capacity of 11 million tons (Press Office, 2016)

**FIGURE 24. SHIVEE KHUREN-CEKE LINE**



Source: (Press Office, 2016)

In the north of Mongolia, the Mongolian Government has awarded a contract to Aspire Mining's rail subsidiary Northern Railways to build, operate and transfer a 547km northern rail corridor from



Erdenet to Aspire's Ovoot coking coal project. The Ovoot project consists of one mining and three contiguous exploration licenses covering more than 430km<sup>2</sup> and includes the JORC-compliant coal resource and coal reserve area. 90% of northern railways is owned by Aspire, while the remaining 10% is held by Noble Group. Aspire Mining's railway capacity is 15 million tons, with the potential to increase to 30 million tons per year.

**FIGURE 25. THE ASPIRE RAILWAY PROJECT**



Source: (Press Office, 2016)

Aspire Mining managing director David Paull said: "It is very significant news that the Erdenet to Ovoot railway is now recognized as a key part of a new rail route between Russia and China through Mongolia". "The Erdenet to Ovoot railway has now officially moved from a rail extension to service a world class coking coal deposit, to a strategic piece of rail infrastructure to facilitate China's Silk Road Initiative and Mongolia's Step Road trade initiative".

On December 27, 2016, Minister for Road and Transport Development submitted draft resolutions on "Ensuring the Implementation of State Railway Transport Policy" and "Annex to approving the List of State-Owned Property to Be Privatized" to Parliament. Zuunbayan-Khangai route railway was viewed as one of the strategically important railways and included in the draft resolution. The draft resolution has underlined to build railway between Zuunbayan and Khangai, to continue construction of railway between Sainshand and Zuunbayan as well as to build 281 km railway between Khangai and Mandal as a base infrastructure. Proposed railway will connect the Sainshand-Zuunbayan-Khangai-Mandal-Bugat railway routes establishing total railway length of 590 km. Iron ores are expected as the main product to be transported through Zuunbayan-Khangai railway route. The transport volume is expected to be 10.4-21.2 million tons per annum from 2018 to 2025 and 21.2 million tons per annum from 2026 to 2046. The initiators are expecting a minimum transport volume of 15 million tons annually, considering the Zuunbayan-Khangai-Mandal-Bugat railway route a strategically important infrastructure.

Transportation cost of coal will decrease once planned railways are built which is expected to coincide with the completion of the repayment of Chalco coal deal. This means, there is a high probability that, in the near future, both the export volume and the price of Mongolian coking coal will increase at the same time. This development will not only benefit Mongolian producers of coking coal but also it will present a huge advantage to Chinese steelmakers. With decreased transportation cost, Mongolian coking coal can be supplied to other steelmakers in China in addition to current Baosteel and Wuhan.

## 2.4 Global supply analysis

International supply of coal consists of both domestic-oriented output and more export oriented output. As the coal prices fluctuated wildly, competition between different suppliers increased greatly, especially in the growing coal market of Asia.

**TABLE 6. COAL PRODUCTION (MINE OUTPUT; MILLION TONS UNLESS OTHERWISE INDICATED)**

	2014	2015	2016	2017	2018
<b>China</b>	3,468	3,347	3,280	3,257	3,245
<b>India</b>	635	665	705	744	778
<b>United</b>	903	808	655	680	691
<b>Australia</b>	495	474	476	479	483
<b>Russia</b>	339	349	364	367	369
<b>Indonesia</b>	472	388	361	351	360
<b>South Africa</b>	261	252	253	254	255
<b>Germany</b>	191	185	184	184	175
<b>Poland</b>	135	134	133	132	131
<b>Kazakhstan</b>	110	103	105	107	109
<b>Others</b>	736	679	689	694	699
<b>World total</b>	<b>7,746</b>	<b>7,384</b>	<b>7,204</b>	<b>7,248</b>	<b>7,295</b>
<b>% change</b>	-1	-4.7	-2.4	0.6	0.6

Source: EIA and EIU

In 2006, the 12 leading coal exporters were Australia, Indonesia, Russia, Colombia, South Africa and so on. Even though there is almost no change (except US becoming the top 4<sup>th</sup> exporter and China becoming a net importer of coal) in the top 5 coal exporters, North Korea and Mongolia made it into the top-12 coal producer list.

**TABLE 7. WORLD'S COAL EXPORTERS IN 2006 AND 2015**

Country	2006		2015		
	Rank	Million tons	Rank	Export in dollars	Share of world market
<b>Australia</b>	I	255.0	I	\$28.4 billion	36%
<b>Indonesia</b>	II	192.2	II	\$16.4 billion	20.8%
<b>Russia</b>	III	103.4	III	\$9.3 billion	11.7%
<b>United States</b>	VII	51.2	IV	\$5.7 billion	7.2%
<b>South Africa</b>	V	75.8	V	\$4.3 billion	5.4%
<b>Colombia</b>	VI	68.3	VI	\$4.3 billion	5.4%
<b>Netherlands</b>	-		VII	\$3 billion	3.8%
<b>Canada</b>	VIII	31.2	VIII	\$2.7 billion	3.4%
<b>North Korea</b>	-	-	IX	\$1.1 billion	1.4%
<b>Poland</b>	IX	25.4	X	\$737.2 million	0.9%
<b>Mongolia</b>	-	-	XI	\$542.6 million	0.7%
<b>China</b>	IV	85.6	XII	\$498.2 million	0.6%
<b>Czech Republic</b>	-	-	XIII	\$327.9 million	0.4%
<b>Vietnam</b>	X	23.5	XIV	\$265.1 million	0.3%
<b>Belgium</b>	-	-	XV	\$232.9 million	0.3%

Source: [www.worldstopexports.com/coal-exports-country/](http://www.worldstopexports.com/coal-exports-country/)

Amid the recent price changes, some countries were able to increase its exports for example some companies benefited by moving to high valued coal mixtures, in other words, by presenting better value for buyers.

### **Australia: a leading supplier**

The price decline resulted in growing competition among coal suppliers. Interestingly, Australia's success in increasing its coking coal exports into Europe by 4 million tons (a rise by 22% year on year) has displaced some US coal exports to the continent. Amid the global slowdown in coal production, Australia emerged as a country, who actually increased its output<sup>39</sup>. Leading Australian companies such as BHP were able to consolidate the production, to cut costs and was ready for price expansion. The price decline led to a resurgence of most competitive suppliers in terms of their cost<sup>40</sup> who were able to provide higher quality coal while at the same time, it led to closure of most inefficient mines located in places with slowing demand.

Rio Tinto, main investor for Oyutolgoi mine in Mongolia, continued to expand its coking coal output in 2015. Rio increased its output of both hard and semi-soft coking coals as well as its thermal coal output in the fourth quarter of 2015 which was standing at 5.18 million tons representing an increase by 8.9% from 4.76 million tons produced a year ago, and or an increase by 12.2% compared to 4.62 million tons produced in the third quarter of 2015 (Rio Tinto, 2015).

Australia, again benefited a lot from increases in the price of coal in 2016. As prices of coking coal used in steelmaking reached \$230/t from \$75/t just a few months ago and price of thermal coal, used in power generation, has doubled to over \$100 /t , showing an increase by 27% since the start of October, Australian companies began to reopen formerly closed mines. Glencore, the world's biggest coal exporter, has reopened its Collinsville mine in Australia's Queensland state with increased demand for their product from Southeast Asia under favorable prices. At least seven other coal mines are expected to resume operations before the end of the year — four in Queensland and three in New South Wales. BHP further increased its coking coal output, focusing on its low cost Caval Ridge mine, expecting its coking coal output to reach 44 million tons per annum till June 2017, up by 10% from projected 40 million tons for the current year.

### **Indonesia**

Production of coal in Indonesia fell by 14% compared to previous year to 392 million tons in 2015 (Wibowo, 2016). Production volume in 2015 was significantly below the initial target of 460 million tons set at the start of 2015 by the Mineral's authority of Indonesia and was still below the revised target of 425 million tons. Indonesia was hit hard by the falling world prices and increased competition<sup>41</sup>. Indonesia's coal exports fell by 23% from a year ago to 295 million tons in 2015 because of decreased demand from several key markets, notably China and India.

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<sup>39</sup> For example, Australian miner Whitehaven Coal's sales over October-December 2015 surged 67% year on year to 4.9 million million tons after the mid-year startup of its tier one Maules Creek operation. Sales over July-December 2015, the first half of the company's fiscal year, were up 57% year on year at 9.4 million mt, the miner said in a quarterly operating report. "Early feedback from those customers [for its Maules Creek coking coal] on the quality of the coal have been positive. Coking coal sales are expected to increase progressively during 2016 as market acceptance for the new coal grows," Whitehaven said in the report. Whitehaven said its share of coal sales from its five managed coal mines was 3.7 million million tons in the December quarter, up 63% year on year. "Early feedback from those customers [for its Maules Creek coking coal] on the quality of the coal have been positive. Coking coal sales are expected to increase progressively during 2016 as market acceptance for the new coal grows," Whitehaven said in the report.

<sup>40</sup> The company said it received an average of \$65/ million tons for its coking coal in the December quarter and forecasts achieving \$62-\$65/ million tons the March 2016 quarter. For its thermal coal exports, Whitehaven received an average of \$54.60/ million tons in the December quarter, which included sales from Maules Creek and its tier one Narrabri mine to markets in Asia. Company CEO Paul Flynn said the company's high calorific value, low ash and low sulfur coal typically attracted **premiums** of up to 5%. Whitehaven has state government approval to expand Narrabri's output capacity to 11 million mt/year from 8 million mt/year.

<sup>41</sup> Indonesia's benchmark thermal coal reference price, i.e. HBA, a monthly rate set by the Energy Ministry, fell 0.58% to a new record low of \$53.2/t FOB in January 2016 from \$53.51 in December 2015

One of the key reasons for the decline in exports in 2015 was due to the increase in China's import tariffs and China's implementation of stricter coal quality regulations. In 2015, China's coal imports fell by 30% compared to 2014 standing at 204 million tons. Deliveries to India – historically another key destination for Indonesian coal – also fell because of rising domestic production in India and weaker-than-expected consumption of coal by Indian coal-fired power plants. India's import of coal between April to December of 2015 fell by 15% compared to same period of previous year standing at 132.3 million tons.

In addition, slower-than-expected demand growth from Indonesian power generation firms has compounded the weaker demand from China and India. To push coal prices up, Indonesia is trying to add new generation capacity domestically that can absorb its excess supply of coal. But capacity additions are not happening as quickly as hoped because of delays to power plant projects, some of which have been stalled due to land acquisition disputes, licensing delays and funding problems. The Indonesian government announced that it is aiming to invest \$16.38 billion in 2016 to support plans to boost the national electrification ratio to just over 90% by the end of the year, up from 88% in 2015, by bringing new generation capacity online and improving the transmission network.

### **Russia**

In 2015, coal production in Russia reached 373 million tons against 358.2 million tons a year earlier. Coal is the fifth main export product of Russia after oil, oil products, gas, and iron. It annually earns for the country foreign exchange earnings equal to \$10 billion. Russia is the 3<sup>rd</sup> biggest coal exporter in the world in terms of export volume and its coal is consumed in 64 countries. In 2015, volume of coal exports stood at 151.42 million tons. According to data from a CBA report in April 2016, Russia is the fourth-largest coking coal exporter in the world and exported 25.2 million tons in 2015, accounting for 8% of the world's coking coal exports.

Now, Russian coking coal producers are increasingly targeting Asian markets, trying to take higher market share from Australian and US competitors in Asia. Russia is reorienting its coal exports more and more to the east. From a cost point of view, Russian producers have distinct advantages over Australian and North American producers since their costs are lower. Weak ruble, which had lost 50% of its value in recent years, has greatly enhanced the attractiveness of Russian products for export. The cost competitiveness helps Russian coal to gain ground in Asia, with the region's share of total exports from the country has risen from 23% in 2009 to 53% in 2015. Russian Yakutia project aims to ship coal to customers in Asia, such as Japan, India and Vietnam.

Kolmar Coal Mining is currently constructing a terminal to handle coal in Muchka Bay, Vanino, and Far East Russia, which would be able to handle Capesize vessels from 2020 and lower logistical costs for moving coal to the East. The Russian Federation has made Kolmar's project in south Yakutia a "priority development," supporting it with the Russian Railways. Russian coal is also of higher quality.

Still, there are difficulties for Russia to increase its coal exports to Asia and Russia is increasingly losing its market in China. According to data from Chinese customs, Russian volume of Russian coal export to China fell for the second consecutive year in 2015, from a peak of 8.4 million tons reached in 2013. In 2015, Russia exported 3.2 million tons of coking coal to China, the data showed<sup>42</sup>.

In 2016, major Russian companies increased output. Russian coal and steel company, Mechel, produced 5.7 million tons of raw coal in the first quarter of 2016, representing a rise by 3% compared to previous year and up by 7% from the fourth quarter in 2015, according to the announcement made in its quarterly operational results. Of this, sales of coking coal climbed by 6% on year compared to previous year and or by 7% from the previous quarter, while thermal coal sales increased by 21% from previous year, an increase by 7% from the last quarter of 2015. The increased output was mostly

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<sup>42</sup> Certain grades of low-vol Russian PCI still incur an import tariff of 6% in China, and Beijing's requirements on trace elements like fluorine will also prove to be a hurdle for Russian coals

exported to Asia particularly South Korea, and Japan. China was also a primary export market for Elga, a large coal mine in Russia, production of which has grown by 18% compared to previous year. SUEK, another large Russian coal company, has announced that it produced 78.9 million tons of coal during the period from January to September 2016, which is representing a 15% increase from a year ago. Sales for the first nine months of the year increased by 5% compared to same period of previous year amounting to 74.1 million tons of coal, of which 36.1 million tons were sold to Russian customers domestically and 38 million tons were exported to China, South Korea, Japan, Netherlands, Taiwan, India, and Germany. In 2016, Russia expects its coal production to increase by 3.2% from a year ago to 385.4 million ton and coal exports in 2016 may probably increase by 5.8% compared to previous year reaching 165 million ton.

## **USA**

The USA remains one of the world leading producers and exporters of coal. A report released by the U.S. Energy Information Administration estimated that 900 million tons of coal were produced in 2015, a drop from about 1 billion tons in 2014 representing the lowest volume of production since 1986. According to preliminary government figures, coal production has fallen to its lowest level in the last 30 years due to availability of cheaper sources of power and implementation of stricter environmental regulations both of which reduced demand for coal.

The American coal industry, especially in Appalachia, has been hit by cheap natural gas replacing coal as a fuel for power plants. Power plants are increasingly relying on cheaper and cleaner-burning natural gas to provide electricity and comply with regulations aimed at reducing pollution that contributes to climate change.

Worldwide demand for coal has also slumped, and new environmental regulations are making many coal mines unprofitable to operate. The Central Appalachian coal price benchmark was \$40/t in 2015 or half its level from five years ago.

Almost all of the biggest coal producers in the U.S. have declared bankruptcy in the past 18 months, including Peabody Energy Corp., Arch Coal Inc., and Alpha Natural Resources Inc. The drop in demand hit the central Appalachian basin the hardest, where production plunged by 40% below its annual average from 2010 through 2014, according to the report. The U.S. exports to the United Kingdom, Italy and China fell by more than 50% in 2015. Overall, U.S. exports of coal dropped by about 21% in 2015.

However, the price increase in late 2016 revived the industry. As the price of coal increased in summer 2016, US coal exports in August jumped by 52.7% from July 2016 reaching 4.5 million tons. In August 2016, its top coking coal export destinations were Brazil, which imported 559,937 million tons compared with 465,346 million tons from a year ago followed by Canada, which imported 392,631 million tons compared with 432,568 million tons, and Japan, which imported 347,338 million tons compared with 408,464 million tons in 2015.

The US also exported coal products to India, Germany, Netherlands, Chile, and Mexico. The US thermal and coking (met) coal producer, Arch Coal, has successfully completed its financial restructuring and emerged from Chapter 11 bankruptcy protection. Notably, it emerged from the US federal court-supervised process as the largest US producer of coking coal. Alpha Natural Resources, which had held that productive claim in recent years, also emerged from the Chapter 11 process earlier in 2016, but as a smaller, privately held company that sold off its core mining assets and shut down many operations, including its coking coal production. Arch had continued to mine and sell coal during the bankruptcy process. The company also emerged as the second largest US producer of thermal coal.

## **China**

According to the National Energy Administration, coal consumption amounted to 64.4% of China's total energy mix in 2015. China aims to cut the share to 62.6% in 2016. Prices fell by about a third

during in 2015, causing heavy<sup>43</sup> losses<sup>44</sup> in the industry<sup>45</sup> and international exports also fell<sup>46</sup>. In order to save the industry, China tried to manipulate the prices and the output in the coal industry in different ways in the last three years. Initial reaction to an oversupply<sup>47</sup> of coal output in the country was a reduction in supply achieved through less working days, closure of some mines and a general cut in production. According to official data, total raw coal output fell by 3.5% to 3.68 billion tons in 2015, representing the second annual decline in a row<sup>48</sup>.

Furthermore, China is planning to allocate 30 billion yuan (\$4.56 billion) in funds over the next three years to support the closure of small and inefficient coal mines<sup>49</sup> and redeploy around 1 million workers, state media reported on 19<sup>th</sup> of January 2016. The plan is to close 4,300 mines and cut annual production capacity by 700 million tons over the next three years. The central government will also ban approvals for new mine for the next three years and cut workday in the coal production industry from 330 days to 267 days per year in 2016.

In the past five years, output share of large mines of the total increased<sup>50</sup> to 68% from 2010's 58% while that of small mines decreased to 10% from 21.6%. The production cuts took place in many main producing regions. Shandong province aims to pare back coal production capacity by 42.82 million tons per annum over 2016-2020, accounting for nearly 25% of the province's total capacity (in 2015, the province had a combined coal capacity of 172 million tons per annum). Shanxi province, a major coal production base in northern China, is banning the mining of coal seams with high sulfur or high ash, to further improve commercial coal quality. All newly-built coal mines should have corresponding coal sorting and washing facilities. However, after the reorganization, restructuring efforts and cuts in production, in summer 2016, prices of both coking coal and thermal coal increased. Demand for both coking and thermal coal also increased<sup>51</sup> as electricity output and steel industry both rebounded.

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<sup>43</sup> China Shenhua Energy Co., Ltd., the listed arm of coal giant Shenhua Group, saw its coal sales in the whole year of 2015 slide 17.9% on year to 370.5 million tons, the second straight year-on-year decline, the company announced on January 23 2016.

<sup>44</sup> China Coal Energy Co., Ltd, the country's second largest coal producer, predicted a net loss of 2.3-2.8 billion yuan (\$349.6-425.68 million) in 2015, the first annual loss since its listing in 2008, according to the latest announcement of the company. It was the fourth straight yearly decline after reaching a record high of 9.67 billion yuan in net profit in 2011, and it slumped 399.87% from 2014's net profit of 767 million yuan.

<sup>45</sup> A total 90 large coal producing companies under the China National Coal Association suffered a 91% year-on-year slump in profits at 5.13 billion yuan (\$782 million) in 2015, the association said at a press conference on January 20. Their combined output accounted for 69.4% of the national total of 3.7 billion tons, the CNCA said. Prolonged oversupply and sliding prices were considered the main reasons behind the thin profits, analysts said.

<sup>46</sup> China exported a total 5.33 million tons of coal in the whole year of 2015, decreasing 7.1% on year, showed data from the General Administration of Customs (GAC) on January 13 2016. Total value during the same period saw a year-on-year decline of 28.3% to \$498.75 million, the data showed. The continuous decline in China's coal exports since 2003 was mainly because the government cancelled the export tax rebates in 2006 and started to levy tariffs in 2008. Though the export tariff was cut from 10% to 3% on January 1, 2015, the falling trend in export volumes did not reverse.

<sup>47</sup> China still had around 11,000 coal mines in operation by the end of 2015, with a total capacity of 5.7 billion tons.

<sup>48</sup> China has reduced coal capacity by 150 million tons in the first eight months of the year, completing 60% of its 2016 target for capacity cuts, Xinhua News Agency said on September 9 2016.

<sup>49</sup> China eliminated 560 million tons of backward coal production capacity and 7,250 outdated coal mines in the 12th Five-Year plan period (2010-2015), said Chen Yangcai, one senior official with the China National Coal Association (CNCA) on January 20 2016. Of that, 1,340 mines were shut in 2015, with combined capacity of 90 million tons.

<sup>50</sup> By end-2015, China's total coal mine capacity reached 5.7 Btpa, including 3.9 Btpa in normal operation or under transformation, 1.496 Btpa of newly-built or expansion reconstruction and 800 Mtpa of coal mine projects newly built or in capacity expansion illegally. Given the nation's coal consumption volume of 3.5 billion tons in 2015, the excess capacity was 2.2 billion tons. China Coal Resource.

<sup>51</sup> Electricity output from China's thermal power plants – mainly coal-fired – rose 7.5% on year and 6.4% on month to 413.8 TWh in August, showed data from the National Bureau of Statistics (NBS) on September 12 2016. Total electricity output in China reached 561.7 TWh in August, rising 7.8% from a year ago and 2.0% from the previous month, the NBS data showed. Over the period, thermal power generation accounted for 73.86% of the total power generation, while hydropower output accounted for 18.46%.

**FIGURE 26. INCREASE IN CHINA'S STEEL PRODUCTION IN SUMMER 2016**



Source: National Bureau of Statistics; data combines Jan-Feb 2016

China's steel output grew in August 2016 after prices rallied and crude steel production in the top supplier rose to 68.57 million metric tons in August, up by 3% from a year earlier. This led to increase in profits for mines and expansion of production. Data released by the National Bureau of Statistics (NBS) on December 27, 2016 shows that China's coal mining and washing industry profits soared by 156.9% from the year-ago level reaching 85.0 billion yuan (\$12.23 billion) during the first eleven months of 2016. China Coal Energy Company, China's second-largest coal producer, made a net profit of 616 million yuan (\$92.26 million) in the first half of 2016, after suffering a loss of 965 million yuan in the same period of 2015. Yanzhou Coal Mining company posted a profit of 375 million yuan (\$56 million) in the first half of 2016, compared with a loss of 50.6 million yuan a year ago.

On the other hand, increased price especially of thermal coal, increased costs of heating. China's government before the winter of 2016-2017 decided to actually increase the output of coal in preparation for the winter season. China's government authorities have summoned major coal producers to meet on September 8, 2016, to discuss measures to boost output of thermal coal used primarily for power generation to prevent sharp increase in the price increase recently observed in China's domestic market.

Consequently, China's coal giant Shenhua Group is allowed to increase their production from September 2016 onwards, in a bid to curb the fast rise in the domestic coal prices caused mainly by persisting supply shortages. 14 coal mines of the company were allowed to boost output by 2.79 million tons in a month in total. The move followed a meeting held earlier September 2016 to draw up a draft proposal that would allow miners to raise daily output up to 500,000 tons, or 15 million tons a month, if prices hit 500 yuan/t (\$74.94/t) for two consecutive weeks. Some mines under Inner Mongolia Yitai Group and Huadian Group were also given the green light to increase coal output as the latest coal price increased to 537 yuan per tons from 515 yuan two weeks ago.

The China Iron and Steel Association has recently proposed the National Development and Reform Commission to ask miners to boost supply and honor contracts so as to guarantee normal steel production. An urgent meeting at NDRC was called on September 23, 2016, to discuss the latest outlook in coal production, transportation, demand, price, as well as problems in the coal industry in an effort to curb rapid price increases.

### Other notable changes

A rapid economic growth in India led to the expansion of coal production. The state-run miner Coal India has achieved its record high production of 550 million tons in 2015<sup>52</sup>. Coal India is the single

<sup>52</sup> Coal Secretary Anil Swarup interview, PTI, 2015. Coal India Limited (CIL) is an Indian [state-controlled coal mining company headquartered in Kolkata, West Bengal, India. It is the largest coal producer company in the world and contributes around 82% of the coal production in India. It produced 494.24 million tons of coal during FY2014 and earned a revenue of ₹954.35 billion \(US\\$14 billion\) from sale of coal in the](#)

largest producer of dry fuel in the world and the government has set a target of doubling its production to 1 billion tons by 2020. India had imported 212.103 million tons of coal in 2014 but it is continuing to replace its import domestic production in an increasing rate. India's coal output increased by 31 million tons between 2010 and 2014, but recorded an increase of about 32 million tons in 2015.

The increase in coking coal prices also revived plans for huge Mozambique mine. World number one iron ore producer Vale announced on 30<sup>th</sup> September 2016 that it has reworked on a deal first signed in December 2014 with Japanese industrial and commodity trading giant Mitsui for a giant Mozambican coal mine and infrastructure project. The cost for the expansion of the Moatize complex and the building of a rail corridor to the port of Nacala, some 900km east of the mine, could be as high as \$4.4 billion, with \$2 billion already spent by the Brazilian company. Moatize has the potential to increase output at the mine to nearly 20 million tons per year. Mozambique's central Tete province is believed to hold one of the world's largest untapped coal reserves that have been compared with Australia's coal-rich Bowen Basin.

## **2.5 Conclusion for supply side**

Major coal producing countries are China, India, United States and Australia. Australia which accounted 36% of the world coal export in 2015, is the largest exporter country since 2006. However, coal production and export in Indonesia declined in 2015 following reduction in coal import by China as well as increase in domestic coal production by India. The government of Indonesia, however, is planning to invest in domestic coal-fired power generation capacity in an effort to support its coal production.

Russian coal production slightly increased in 2015 compared to previous year. In particular, major Russian coal companies increased their outputs of both thermal and coking coal, and exported it to the targeted Asian countries such as China, Korea, and Japan. One opportunity for Russia to enhance its market share in Asia is by cost competitiveness, such as lower logistic costs.

The US coal production as well as exports dropped in 2015 and it was at its lowest point since 1986. Markedly, some of biggest US coal companies closed and laid off their workers. For example, Arch, one of the major coal producers, has emerged with huge amounts of debt. Hence, Arch has planned to double their coking coal output compared to 2016 in 2017.

Air pollution is one of the biggest issues in China and in order to cut smog, China is trying to reduce their production and consumption of coal. Therefore over the next three years, China has planned to close over 4000 mines and cut productions by 700 million tons. Recently, some major coal producer provinces such as Shanxi and Shandong cut their productions and stopped investments.

Mongolia is one of the largest suppliers of coking coal in Asia, which constituted 45% of China's coking coal import in 2011, the peak year for the coal market. Even though Mongolia lost its rank to Australia in 2015, China is more likely to import coking coal from Mongolia due to its lower prices. Generally, the Mongolian coking coal is exported to China's major steel factories such as Baotou and Wuhai through two main borders which are Ganqimaodu and Ceke borders. With regards to infrastructure and especially transportation, Mongolia transports its coal to the local and global consumers using trucks and railway. Currently, Mongolian government is planning to construct a new railway from Tavantolgoi to Gantsmod — Mongolia China' border — with an estimated length of 280 km. If this railway is built, transportation costs will decrease in the future, as well as it will increase export volume of coking coal.

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[same financial year. As on 14 October 2015, Union Government of India owns CIL and controls the operations of CIL through Ministry of Coal.](#)



### 3. Coal price

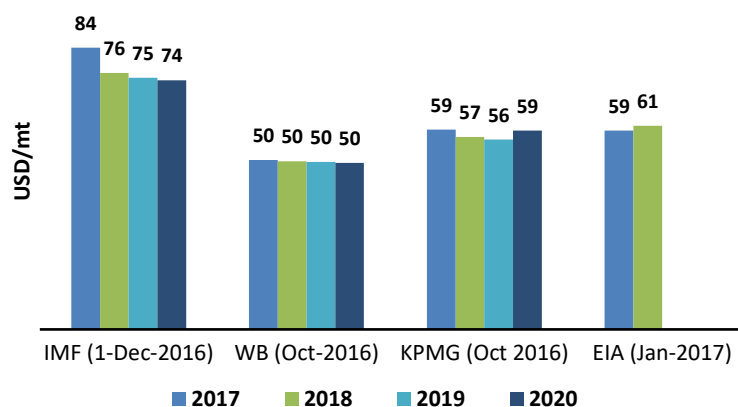
#### 3.1 Analysis of Price

Globally, coal prices are generally expressed in USD, and prices vary according to qualities, quantities, transportation costs, and other conditions. CIF (costs, insurance, and freight) prices are used for coal imports and FOB (free on board) prices for coal exports. The CIF price includes, in addition to the FOB price, all the costs for international transportation up to a receiving terminal in the importing country. The US uses a term “free at shipside” or “FAS”, instead of FOB. The difference is that FOB includes the cost of loading but FAS does not. (Energy Charter Secretariat, 2010)

By the end of 2016, thermal coal prices increased by 38% due to government policy of China which aimed to cut domestic coal production. Prices reached the peak in November 2016 standing at \$100 per ton after which it started to fall because of new regulation allowing higher production. Coal prices are expected to average \$70 per ton in 2017 due to oversupply and weakening demand for import (World Bank, 2016)

There are very few organizations forecasting coal prices, especially thermal coal, and their forecasts consider only Australian thermal (Newcastle) coal. The following figure shows coal price forecasts by major organizations until 2020. With their forecast, coal price will decrease slightly until 2020. The IMF forecast, which was done in December 2016, is much higher compared to the World Bank, KPMG and EIA forecast.

**FIGURE 34. AUSTRALIAN THERMAL COAL PRICE FORECASTS, 2017-2020**



Source: Commodity market outlook, World Bank; Coal Price and FX consensus forecasts, KPMG; Commodity price forecast, IMF; Short-Term Energy Outlook, U.D. Energy Information Administration (EIA)

According to these forecasts, thermal coal price is expected to be higher in 2017 compared to period between 2018 and 2020, and is expected to be driven more by demand instead of the supply. In other words, policy changes and volatility in the Chinese market is expected to determine the price of coal at the international market since China is the number 1 importer of thermal and coking coal, followed by Japan and India, and imported approximately 20% of the total in 2014 (UNCTAD, 2015).

China announced some major policies which can significantly decline its imports of thermal coal. One of which is related to clean energy policy that is aiming to increase share of renewable energy in the total energy to 15% by 2020.

Transition of Japan, the 3<sup>rd</sup> biggest importer of coal, from nuclear power will positively affect price of coal by increasing demand for coal by Japan.

The global outlook for thermal coal remains positive despite recent fall in prices. The alternatives to coal such as gas and LNG are yet to fully replace coal; increase in their prices following the decrease in demand for coal actually slowed down the replacement process.

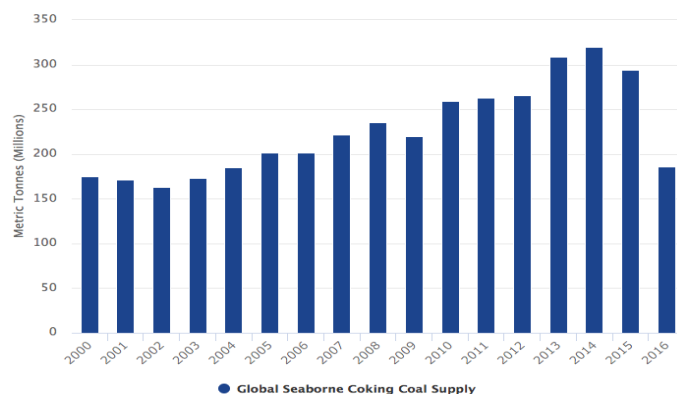
In Europe, the coal will be used widely in Germany and Eastern Europe. Only after 2025 or so, when large coal based power stations will be gradually phased out, coal consumption may decrease in those countries. The fall in demand from Europe may actually very well replaced by increasing demand from developing countries, such as India or Vietnam. According to data from Vietnamese customs authority, in May 2016, Vietnam’s coal imports increased by 151.8% within a year to an all-time high of 1.3 million tons in May.

For coking coal, the price recovered in 2016. As it is used as a raw material for steel manufacturing, in addition to demand from China, major economies, the USA, China, India and so forth, announced that they will focus more to develop infrastructure and construction sectors in the upcoming years. These infrastructure plans can boost demand for coking coal with increasing use of steel.

On the other hand, in market economies, such as Australia and USA, the fall in prices led to a restructuring in the coal industry, with weaker and costlier suppliers leaving the market or deciding not to invest in coal anymore, especially in Africa. A number of large world suppliers such as Arch or Peabody entered bankruptcy or negotiation procedures (same happened in Mongolia with a leading coal producer MMC). This led to fall in world supply of coal. The supply cutting measures, taken by China’s government had same impact. After 3 years of low coal prices, which were low enough to subsidize its steel industry, that was expanding its exports worldwide, China’s government turned its attention to the coal industry. It administered a number of organizational measures such as cutting the capacity of coal mines, decreasing lending to coal industries as well as directly negotiating with its leading state-owned companies to reduce supply.

Coking coal prices, which were less than \$US80 a ton between September and March 2015, have shot higher as Chinese steel demand continued to grow. According to Metal Bulletin, the premium hard coking coal price (FOB, Australia) has jumped by 41% in August to nearly \$140 a ton. Those administrative measures were implemented during 2015 and were quite successful. From the beginning of 2016, excess supply diminished<sup>53</sup> and the price of coal began to recover slowly.

**FIGURE 27. THE REDUCTION IN COKING COAL SEABORNE SUPPLY**



Source: <https://www.vaneck.com/blogs/natural.../coking-coal-rally-driven-supply-constraints/>

By summer of 2016 and especially before the winter season of 2016-2017, prices of both coking coal and thermal coal recovered significantly. The coal companies worldwide recovered, but China’s

<sup>53</sup> Raw coal output in May 2016 was about 15% below its level a year earlier, and fell by about 121 million tons in the first five months of the year compared with the same period of 2015 in China.

capacity remained somewhat reduced, which led to increasing imports. Nowadays, China's coal companies regained profits and are less likely to increase domestic output.

As expected, with the strong administrative apparatus both in steel and coal industry, China has an upper hand in dealing with market prices as it wishes. After stabilizing its steel industry and subsidizing it through lower coal prices, in 2015-2016 it also began restructuring its steel industry. Instead of resuming more costly domestic coal production, Chinese companies are now searching for cheaper imports, in which Mongolia may have an important offer to make from Tavantolgoi coal mine, one of the largest coking coal deposit in the world.

It is assumed that China, with its coal production much larger than the seaborne market, will largely guide the future coal prices worldwide. Its capacity cut policy has driven domestic utilities to international markets to replace supplies, lifting domestic prices and increasing imports. As coal prices increased in autumn 2016, driving costs of electricity and heating in China's energy market, China's government decided to allow increase in coal output<sup>54</sup>. This was done through a combination of measures such as giving more permissions to reopen mines, operate longer days and invest more in domestic mining as well as increase imports. China's National Development and Reform Commission recently allowed 865 "advanced mines<sup>55</sup>" to operate between longer days (276-330 days) to boost coal supply and curb prices, which is expected to reduce China's import need and seaborne prices.

It is estimated that seaborne coal supply may remain tight in the near term. Therefore, the current rise in the coal prices may actually have been triggered more by seasonal and weather factors, rather than long-term demand trends. On the other hand, the recent price recovery triggered worldwide increase in output of coal.<sup>56</sup> The largest increase may come from Africa. World number one iron ore producer Vale announced it has reworked a deal first signed in December 2014 with Japanese industrial and commodity trading giant Mitsui for a giant Mozambican coal mine Moatize and its related [infrastructure projects](#). The price tag for the expansion of the complex and the building of a rail corridor to the port of Nacala, some 900km east of the mine, could be as high as \$4.4 billion, with \$2 billion already spent by the Vale. The expansion project has the potential to increase output at the mine and the railroad to nearly 20 million tons per year. Mozambique's central Tete province is believed to hold one of the world's largest untapped coal reserves that have been compared with Australia's coal-rich Bowen Basin (Els, 2016).

Chinese steel demand picked up in the second quarter 2016, ultimately winning the competition, which triggered an increase in coking coal prices<sup>57</sup>. In August 2016 report, Macquarie analysts said they expected the price of coking coal to hold up for the next couple of months. Macquarie<sup>58</sup> said. It is estimated that "much of the capacity that has been shut down in the US and Canada in the past couple of years is not coming back any time soon." The coking coal output is now priced off at the spot market as monthly or quarterly averages. The amount of material readily available to buy — even

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<sup>54</sup> 74 mines were given the green light to increase output, to ensure supply for winter heating and power generation in China in 2016

<sup>55</sup> Identified by China National Coal Association as "advanced capacity" coal mines are those that listed as Level I safety mines in 2015 by the State Administration of Coal Mine Safety and whose safe and high-efficiency mines recommended by local governments (NDRC, September 29 2016). Data published by the State Administration of Coal Mine Safety showed that there were 791 coalmines meeting the Level I safety standard in 2015. Therefore, it expected that more than 900 coalmines could be allowed to produce within 276-330 operating days. Source: China Coal Resource

<sup>56</sup> For example, Stanmore Coal 2015 paid \$1 for the Isaac Plains coking coalmine in Queensland valued at \$860m, in 2016 decided to restart output. Its shares have surged 50%, giving it a market value of \$100m.

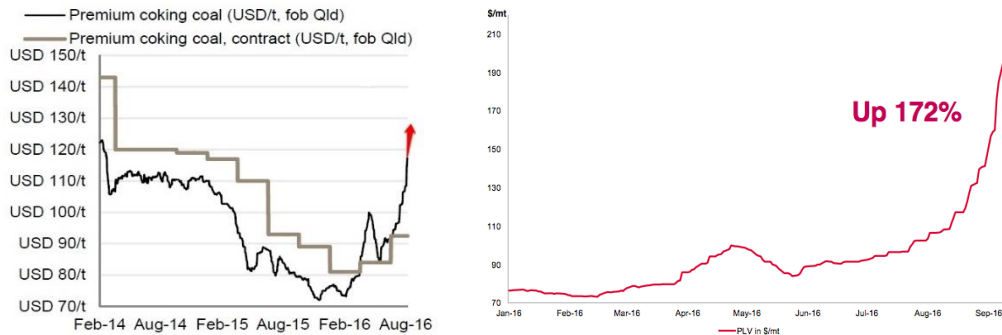
Mongolia-focused junior Aspire Mining was up 1.2c, or 67%, to 3c, after a well-timed announcement that it had received an expression of interest from the China Development Bank to fund its Erdenet to Ovoot rail project in Mongolia.

<sup>57</sup> A coking coal shortage in China has emerged as highways in the coal-producing province of Shanxi were under heavy rains in summer 2016, resulting in disruption of supply.

<sup>58</sup><http://www.theaustralian.com.au/business/mining-energy/coking-coals-on-a-high-but-how-long-will-it-last/news-story/51d7f1935d54a2ade929ebf199512604>

when the market is not grappling with supply side issues, is estimated to be very small (less than 10m tons). Therefore, when the coking coal market has some disruptions in supply, its price may fluctuate wildly. When price increases, buyers have to ensure they have sufficient supply and it may greatly increase spot prices. Many of these contracts have options to buy an extra 10% of agreed volumes.

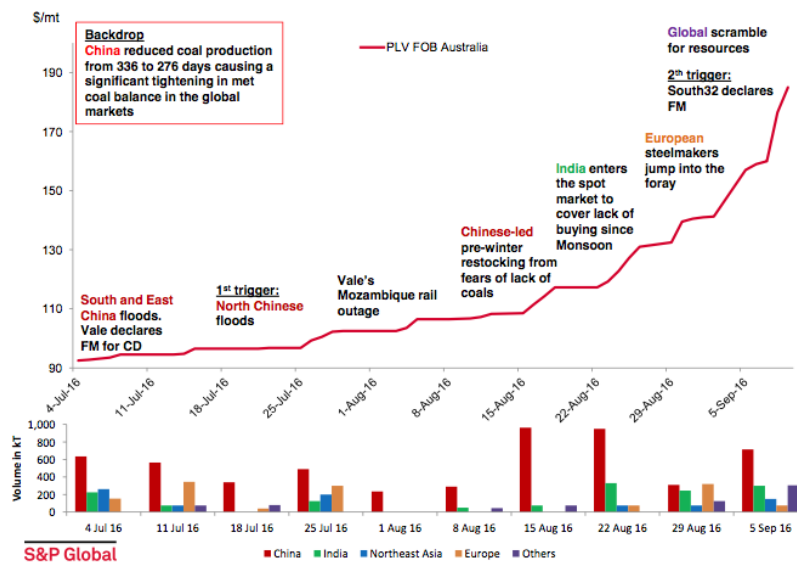
**FIGURE 28. COKING COAL PRICES SURGE IN APRIL 2016 (LEFT) AND LATE 2016**



Source: Platts, CBA estimates

The rise in coking coal prices continued in late 2016, rising to more than \$US150 a ton as China cut back on production and demand for steel remained strong. In August 2016, premium coking coal prices reached a 3½-year high of \$US152.20, continuing a run up from below \$US80 in March.

**FIGURE 29. EXPLANATION OF COKING COAL PRICE FLUCTUATIONS**



Source: Platts PLV+HCC data

BHP Billiton viewed the price increase as a supply side shock<sup>59</sup>. The shock led to rise in coking coal prices to above \$200 a ton and the Steel Index's premium hard coking coal index advanced by \$8.20 or 4.1% , to \$205.9 a ton in 16<sup>th</sup> of September 2016, as flooding in China's key coal producing regions during August and moves by the government to cut surplus capacity reduced supply<sup>60</sup>. With these

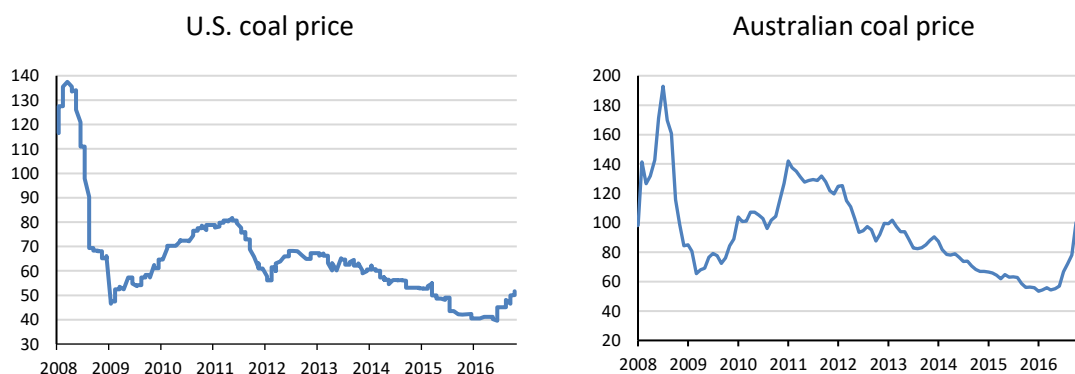
<sup>59</sup> In coking coal, most trading is still done on quarterly contracts, directly between buyer and seller. Only a third of deals are done in the spot market. This makes coking coal highly sensitive to changes in supply and demand. BHP Billiton is the world's biggest supplier of seaborne coking coal. However, it sells most of its output at prices linked the spot market. Other big producers include Anglo American, South 32, Rio Tinto and Whitehaven. They do most of their business on contracts.

<sup>60</sup> September typically sees construction and manufacturing activity pick up in China. This lifts demand for key ingredients like iron ore and coking coal. At the same time, a train derailment in Queensland and ground problems at a major mine in New South Wales have impacted output from Australia in 2016, leading to the supply constraints.

developments, coking coal prices increased by 163%, making it the best performing commodity of 2016.

The price increase for coking coal has negatively affected international steel makers. It was reported that Japanese steel-makers and Australian suppliers are progressing slowly. The miners are said to be asking for a price of \$200 against the month to date average of \$172.5. The increase in coking coal prices is somewhat similar to 2011 when floods in the key export region in Queensland caused the price to reach \$335 a ton.

**FIGURE 30. COAL PRICES IN USD**



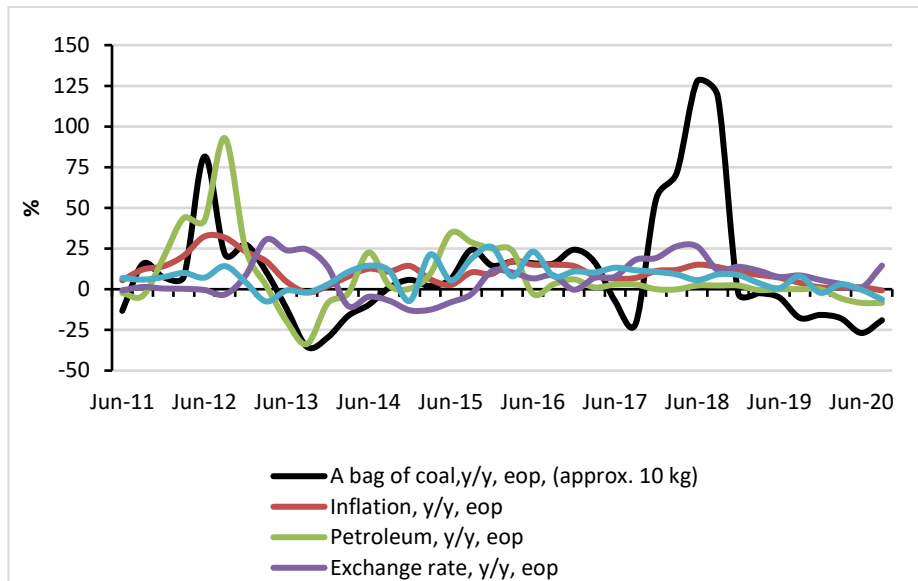
Source: Platts

In many countries, the decline in coal prices led to sharp cuts in supply, especially from costlier suppliers, while as can be seen above, some low cost, high-quality suppliers from Australia, have actually benefitted from the falling prices as many of their competitors were removed from the market.

### 3.2 Conclusion of coal price and Mongolia’s local pricing projections

Local pricing in Mongolia is a more stable, compared to world markets. Domestically, households, enterprises, coal preparation plants and TPPs pay different prices for thermal coal. For example, coal preparation plants pay less price to buy coal because its location is next to mines. In addition, TPPs create more than half of total domestic demand, each one having different prices and contract with mines to buy coal. In other words, they purchase coal directly from the mines. Therefore, contracting price is not much higher than one at a mineshaft, since in Mongolia, most of TPPs and mines are under state ownership, and price of coal for domestic consumption is almost entirely regulated by the state. The highest price in Mongolia is paid by households and enterprises because of their purchasing model which includes an intermediary seller.

**FIGURE 31. DOMESTIC PRICING OF COAL AND SOME FACTORS AFFECTING IT, 2007.II-2016.III**



Note: eop – end of period, y/y – year-to-year; Source: The Central of Mongolia, NSO, Ulaanbaatar Statistical Office, and the research team’s calculation

As for coking coal, under the agreement with Chalco, Mongolia was selling coal at \$33 a metric ton, significantly lower than international average selling prices, according to Nick Cousyn, chief operating officer BDSec Joint Stock Company, a Mongolian brokerage. With ETT representing a majority of Mongolia's current coal production, private companies have to compete with these low coal prices. Once the debt is repaid, the new operating model would increase its production level and sell at a higher price.

Even without Chalco’s contract limits, however, the direct government control and transportation issues will continue to limit the Mongolian coal prices and in foreseeable future, Mongolian coal will be priced quite competitively. With railway development, the volume and prices of Mongolia coal may recover quite significantly but it will be only after 5-6 years needed to build infrastructure. The financing of railways also may have strong impact on pricing.

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## 5. Appendix

**TABLE A 1. WORLD RANK, COAL PRODUCTION**

<i>Coal Production (million metric tons oil equivalent)</i>		<i>1981</i>	<i>1990</i>	<i>2000</i>	<i>2005</i>	<i>2010</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>	<i>2015</i>
<b>1</b>	CHINA	311	540	707	1242	1665	1874	1895	1864	1827
<b>2</b>	UNITED STATES	463	566	570	580	551	518	501	508	455
<b>3</b>	INDIA	64	106	152	190	252	255	256	271	284
<b>4</b>	AUSTRALIA	65	109	167	206	241	250	268	287	275
<b>5</b>	INDONESIA	0	7	47	94	169	237	276	282	241
<b>6</b>	RUSSIAN FEDERATION	n/a	186	121	136	151	168	173	177	184
<b>7</b>	SOUTH AFRICA	75	100	127	138	144	147	145	148	143
<b>8</b>	COLOMBIA	3	13	25	39	48	58	56	58	56
<b>9</b>	POLAND	103	100	72	69	55	58	57	54	54
<b>10</b>	KAZAKHSTAN	n/a	57	32	37	47	52	51	49	46
<b>11</b>	GERMANY	149	125	61	57	46	48	45	44	43
<b>12</b>	CANADA	23	40	39	35	35	36	37	36	32
<b>13</b>	VIETNAM	3	3	7	19	25	24	23	23	23
<b>14</b>	CZECH REPUBLIC	43	36	25	24	21	20	18	17	16
<b>15</b>	UKRAINE	n/a	76	36	35	32	38	37	26	16
<b>16</b>	MONGOLIA	2	3	2	4	15	18	18	15	15
<b>17</b>	TURKEY	7	12	12	11	18	17	15	16	12
<b>18</b>	SERBIA	n/a	n/a	n/a	n/a	7	7	8	6	7
<b>19</b>	MEXICO	2	3	5	6	7	7	7	7	7
<b>20</b>	GREECE	3	7	8	9	7	8	7	6	6
<b>21</b>	BULGARIA	5	5	4	4	5	6	5	5	6
<b>22</b>	UNITED KINGDOM	78	56	20	13	11	11	8	7	5
<b>23</b>	ROMANIA	8	9	6	7	6	6	5	4	5
<b>24</b>	OTHERS	n/a	115	79	80	67	68	77	78	72
	<b>WORLD</b>	<b>1863</b>	<b>2274</b>	<b>2326</b>	<b>3034</b>	<b>3628</b>	<b>3930</b>	<b>3986</b>	<b>3989</b>	<b>3830</b>

Source: (World Bank, 2016)

**TABLE A 2. MONGOLIAN COAL EXPORT BY COUNTRY**

<b>COUNTRY</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>CHINA</b>	16,497,287	21,001,256	20,520,066	18,193,265	19,461,343	13,965,737
<b>RUSSIA</b>	5,323	8,517	2,737	584	19,937	76,761
<b>JAPAN</b>	0	25,142				
<b>KOREA</b>	0	10			36	1,093
<b>GREAT BRITAIN</b>	147,465	61,690				161,502
<b>SINGAPORE</b>						221,220
<b>INDIA</b>	35	4,806	23,303			
<b>HONG KONG</b>		39,408	1,299			
<b>OTHER</b>	21	3,179	7		1	
<b>TOTAL</b>	16,650,130	21,144,007	20,547,412	18,193,849	19,481,318	14,426,313

Source: (Mongolian Customs General Administration, 2016)

**TABLE A 3. COAL EXPORTING COMPANY NEWS**

<b>Erdenes Tavantolgoi JSC</b>	<p>Erdenes Tavantolgoi produced 3.9 million tons of coal in 2015 and 5.5 million tons coal by the end of October 2016. Exports rose by 1.8 million tons over 2015. East Tsankhi mine exported 5.9 million tons of coal since 2011. Amount of west Tsankhi coal export accounted 1.2, 3.6, 3.4 million tons in 2013, 2014 and 2015 respectively. Meanwhile, west side of Tsanhki mine exported overall 8.1 million tons. (Erdenes Tavantolgoi JSC, 2016)</p>
<b>Mongolian Alt Corporation (MAK)</b>	<p>As October 2016, MAK sold of 3.6 million tons coal through Shivee Khuren border from Nariinsukhait mine. Currently, MAK is selling 350-500 thousand tons per month for export, and three mines are operating which are Dornod-MAK, Nariinsukhait and Eldev coalmine. Dornod-MAK project coal reserve is 287 million tons. Nariinsukhait coal deposit- capacity is 10 million tons, and it has been working since 2007. Eldev coalmine produces 1 million tons per annum, which is used domestically. MAK has also joint venture with Chinese company Chinhua-MAK LLC (MAK, 2016).</p>
<b>Tavantolgoi JSC</b>	<p>In 2014, Tavantolgoi produced 0.6 million tons and its sales reached 30.8 billion MNT. During that time, Mongolia accounted 24% in Chinese coke coal import, and Tavantolgoi accounted 4% of Mongolian coal export. (Tavantolgoi Shareholding Company, 2015)</p> <p>Tavantolgoi produced 2.2 million tons of coal by the end of October 2016, of which 2.17 million tons was exported, and the remaining 22,300 tons went to the local market. Their monthly export figures are between 450,000 and 600,000 tons of coal from mine. Both production and sales have tripled from what they were in 2015 and are 4 times more than in 2014.</p>
<b>Usukh Zoos LLC</b>	<p>Usukh Zoos' mine is located Gurvantes soum of Uvurkhangai province since 2008, and it produced 1.1 million tons and exported 1.2 million tons of coal as at the end of the September 2016, less 42.4% and 30% relatively than previous year. (Mongolian Mining Journal, 2016)</p>
<b>Energy Resources LLC</b>	<p>Energy Resources' Ukhaa Khudag deposit located in Tsogtsetsii soum of Umnugovi province. The first and second modules of Coal Handling and Preparation Plant (CHPP) commenced commercial operations in 2011 and 2012 respectively. In addition, their total annual coal processing capacity reached 15 million tons by the successful commissioning of the plants third module in 2013. Therefore, Energy Resource is the only enterprise of raw coal to enrich and export development.</p> <p>Mongolian first washed coalmines produced 40 million tons coal by the end of November 2016 from 2009. In October 2016, the company wrote an agreement with Sumitomo Corporation. From the agreement, Energy Resources is going to export to the third country through China from Tavantolgoi mine. Therefore, it may give opportunity to enter other countries such as Japanese and Korean market. (Energy Resources, 2016)</p>

**TABLE A 4. THE RELATIONSHIP BETWEEN TPPS AND MINES**

1	Darkhan TPP	Pub	Sharyn Gol	Baganuur
2	Erdenet TPP	Pub	Sharyn Gol	Baganuur
3	IV TPP	Pub	Baganuur	Shivee-Ovoo
4	Amgalan TP	Pub	Shivee-Ovoo	Baganuur
5	III TPP	Pub	Baganuur	-
6	II TPP	Pub	Baganuur	-
7	Choibalsan TPP	Pub	Aduun Chuluu	-
8	Dalanzadgad TPP	Pub	-	-
9	Uvs TP	Priv	Khartarvagatai	-
10	Bayan-Ulgii TP	Priv	Nuurst Khotgor	-
11	Khovd TP	Priv	Khartarvagatai	-
12	Selenge TP	Priv	Sharyn Gol	Ulaan-Ovoo
13	Sharyn Gol TP	Pub	Sharyn Gol	-
14	Dornogovi TP	Priv	Shivee-Ovoo	-
15	Sukhbaatar TP	Priv	Talbulan	-
16	Khuvsgul TP	Pub	Mogoin Gol	-
17	Baganuur TP	Pub	Baganuur	-

**TABLE A 5. THE MONGOLIAN COAL MINES OPERATING IN 2015**

No	Register No	Name of mine	License No	Extraction, thous.tons	Sell, thous.tons
1	2008572	Baganuur	MV-00001371	3,731.20	3,747.00
2	2007126	Bayalag-Ord	MV-00000222	42.81	42.81
3	2014491	Bayanteeg	MV-00000367	111.55	111.55
4	2643928	Berkh Uul	MV-00004590	33.03	33.03
5	2862468	Gobi coal and Energy	MV-00000905	3.60	3.60
6	5522935	Ikh Gobi Energy	MV-00017196	0.00	19.40
7	2034859	Mogoin Gol	MV-00000384	60.80	46.48
8	2095025	Mongolyn Alt MAK	MV-00002545	3,204.72	3,205.53
9	5141583	MoEnko	MV-00001414	769.10	389.00
10	5314577	Munkhnoyon Suvarga	MV-00016872	19.00	19.00
11	5261198	COAL	MV-00016865	268.91	224.72
12	2016656	Tavantolgoi	MV-00000287	757.20	757.20
13	2001454	Khartarvagatai	MV-00001366	79.20	79.20
14	2661128	Khotgor	MV-00001441	74.82	74.82
15	2662647	Khotgor Shanaga	MV-00003508	0.00	5.53
16	5352827	Tsagaan Uvuljuu	MV-00017162	498.26	393.07
17	5031869	Chingisiin Khar Alt	MV-00012435	32.78	32.78
18	2697947	Chinhua MAK Nariin Sukhait	MV-00005459	330.91	330.91
19	2050374	Sharyn Gol	MV-00001498	758.50	758.40
20	2004879	Shivee-Ovoo	MV-00000901	1,736.52	1,817.76
21	2887746	Energy Resource	MV-00011952	795.59	567.72
22	2003821	Erchimbayan Ulgii	MV-00005696	0.001000	0.001000

Source: Extractive Industries Transparency Initiative of Mongolia (<http://eitimongolia.mn/>)

**TABLE A 6. COAL BASINS IN MONGOLIA**

№	Coal basin and area	Geological resources, mln.tons		
		Proven	Geological	Total
1	Kharkhiraa	172.5	4592.7	4765.2
2	Bayan-Ulegei	-	-	-
3	Mongol Altay	49	10040.6	10089.6
4	Altay Chandmani	3.1	12300	12303.1
5	South Khangay	4.2	1221.9	1226.1
6	South Govi	2960	10070	13030
7	Orkhon-Selenge	408.8	7295.3	7704.1
8	Ongiyngol	42.6	1471.1	1513.7
9	Big Bogdyn	5.2	3450	3455.2
10	Choir-Niarga	5932	14401.1	20333.1
11	Middle Govi	104.1	13117.2	13221.3
12	EastGovi	-	23534	23534
13	Sukhe Bator	68	4190.2	4258.2
14	Choybalsan	213.2	14700.7	14913.9
15	Tamillion tonssak	190	31803	31993
	<b>Total</b>	<b>10152.7</b>	<b>152187.8</b>	<b>162340.5</b>

Source: (Mineral Resources Authority, 2011)