COMMODITY MARKET STUDY

Update IV

ULAANBAATAR 2021

“COMMODITY MARKET STUDY”

Update IV

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ULAANBAATAR 2021

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INTRODUCTION

The mining sector plays a crucial role in the development of the Mongolian economy. Due to the significance of the sector, the ERI research team has been collecting and processing information and data regarding the sector since 2016.

The aim of the commodity market updates is to update the baseline assessments conducted in 2016 and to analyze current and future developments in key commodity markets. Within this scope, the analysis includes relevant information and data regarding the demand and supply of major commodities.

Even though Mongolia is a price-taker, information regarding future developments in each commodity should be gathered and major factors influencing the global and regional markets should be considered and analyzed. It should be noted that some commodities may require more focus on global developments while others are significantly influenced by regional developments.

The analyses consider major developments in the world and regional economies which may have significant impacts on the demand of each respective commodities. The economic, political, and other developmental landscape of China has a greater influence on the demand for and supply of coal, iron ore, and copper than other countries. On the other hand, gold and, in some cases, copper, markets are greatly shaped by global economic performance.

In this aspect, the focus of the commodity market updates is on the following:

1. Copper
2. Gold
3. Coal
4. Iron Ore

The structure of the report for each commodity begins with the world market and then the Mongolian, or domestic, market. Each market analysis is broken down to demand and supply. Within the domestic market analysis, in addition to analyzing demand and supply, major developments in projects and policies are also considered.

1. COPPER

1.1. WORLD MARKET

DEMAND SIDE

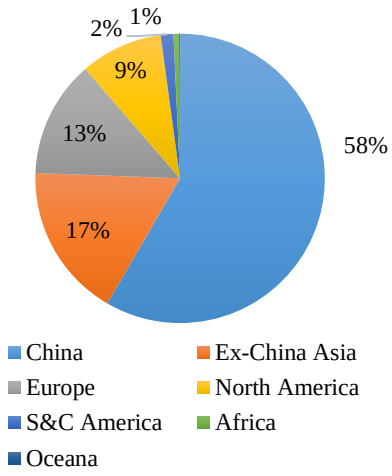
Copper is an important contributor to the national economies of developed and developing countries. Copper mining, processing, and recycling activities are crucial to maintaining the manufacturing and construction sectors and improving investment opportunities. In addition, copper demand is closely tied to the global economic situation, particularly in China.

In 2019, global total refined copper usage was 24.1 million tonnes (Mt), the same as 2018. Meanwhile, global refined copper usage grew 3.6 percent in 2020, reaching 24.9 Mt tonnes. On a regional basis, Asia accounted for 75 percent of total demand. Out of this, China constituted about 58 percent of demand alone, accounting for about 14.5 Mt. Europe, the second-largest refined-copper user, consumed about 3.2 Mt of copper, accounting for 13 percent of global total demand.

Table 1. Global demand for refined copper, thousand tonnes

Year	2019	2020					2021
Quarter	**Full year**	**I**	**II**	**III**	**IV**	**Full year**	**I**
Global Total	24109	5724	6237	6570	6449	24980	5936
North America	2446	605	528	584	570	2286	585
USA	1852	459	423	436	431	1749	440
S & C America	404	112	55	71	114	353	86
Europe	3343	872	801	770	794	3238	808
Germany	976	265	266	261	260	1051	240
Asia	17495	4045	4757	5085	4870	18757	4332
China	12837	2859	3786	4081	3764	14489	3210
Japan	989	230	199	187	242	859	221
India	529	127	70	104	121	421	126
Oceania	31	7	7	7	7	28	7
Africa	149	39	36	38	40	152	40

Figure 1. Copper demand on regional basis as of 2020, percent



Source: Bloomberg

In the first quarter of 2021, global total refined copper usage was 5.9 Mt, increasing 3.7 percent from the same period of the previous year. This increase largely driven by improved demand in Asia as well as African demand.

As reported by International Copper Study Group (ICSG), world refined copper usage is expected to grow by about 1.1 percent in 2021. Due to COVID-19 pandemic related lockdown measures, ex-China global copper demand is forecast to fall in 2021 but be offset by a sharp rise in Chinese refined copper usage.

According to Business Monitor International Research (BMI Research), global refined copper demand is expected to increase an average of 1.8 percent per year until 2030, reaching 29.9 Mt. This steady increase is mainly attributed to demand from the construction sector as well as rising electric vehicle production. In addition, infrastructure development in major countries such as China, the United States and India and the global trend towards cleaner energy will continue to support copper demand in the mid- to long-term.

Chinese demand

China’s consumption of refined copper was 12.8 Mt in 2019, and 14.5 Mt in 2020, growing 13 percent year-on-year. In 2020, demand for household goods increased as many countries imposed lockdowns to reduce the spread of the COVID-19 pandemic. The situation boosted China’s copper demand as appliances made a significant contribution to the country’s copper demand. For instance, in 2020, China’s exports of refrigerators were up 45 percent in December from a year earlier and microwave ovens up 35 percent. China’s demand for refined copper grew 12.3 percent in the first quarter of 2021, reaching 3.2 Mt. According to industry analysts, in 2021, China’s fiscal stimulus will continue to support domestic copper demand. The latest data indicate that Chinese copper import rose 25 percent, as China’s manufacturing expanded faster than anticipated (Mining.com, 2021).

Chinese demand for refined copper is expected to be strong in both the mid- and long-term due to rising demand for electric cars and green energy. The use of electric cars is increasing day by day and China is expanding its electric car industry. In addition, foreign investors are building factories in China. For instance, Zhejiang Geely, owner of Volvo, constructed an enormous new electric car factory in eastern China in April 2021 while Evergrande has built electric car factories in the cities of Shanghai and Guangzhou (Keith Bradsher, 2021).

World demand (excluding China)

Major refined copper users include China, the United States, Germany, Japan, and India. Refined copper consumption of ex-China global was 11.3 Mt in 2019 and 10.5 Mt in 2020, a 6.9 percent decrease from 2019. This was driven by decreased demand from the United States, Japan, and India. In the first quarter of 2021, refined copper demand of ex-China global was declined 4.9 percent, owing to negative impact of COVID-19.

For world copper demand excluding China, the 2020’s are expected to be a significant decade, especially for the United States and India. In 2021, the United States copper consumption is expected to grow by 9 percent in comparison to 2020 due to the country’s economic recovery from the pandemic (BMI research, 2021). Moreover, President Biden’s USD 2 trillion infrastructure plan is expected to increase the demand for and prices of metals such as copper, cobalt, steel, and lithium.

According to industry experts, India's copper demand is as optimistic as the United States. However, as of April and May, India is in an exceedingly difficult situation due to a new wave of COVID-19. This is likely to have a significant negative impact on India's economy and reduce the country's copper consumption in 2021. Despite this, in the mid-term, the country will be a growing driver of global copper demand, supporting by the Make in India campaign. The project supports the manufacturing and industrial sectors. For instance, the Indian government intervened in the market, allowing Suzuki and the PSA Group to move forward with an extension plan in India. As a result, India’s automotive sector is expected to be boosted by an average of 9 percent between 2020 and 2029.

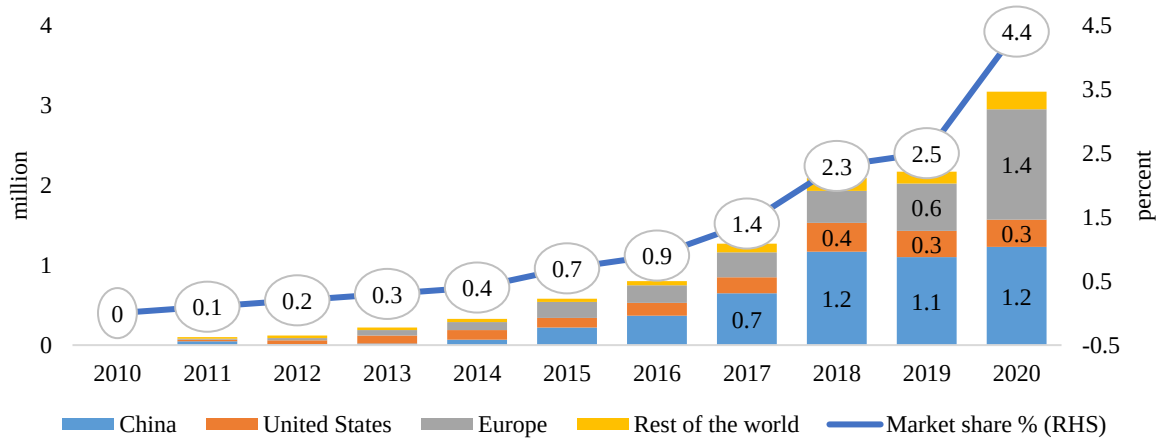
Electric vehicles

Copper is a major component of electric vehicles (EVs), used in electric motors, batteries, inverters, wiring and in charging stations. Internal combustion engines use 23 kg of copper while hybrid electric vehicles (PHEV) and battery electric vehicles (BEVs) contain around 40 kg and 83 kg of copper, respectively. The growth of the EV market will impact the demand for copper (ERI, 2019).

Although the overall global market for all types of cars was significantly affected by the economic effect of the COVID-19 pandemic, electric car sales increased in 2020. In particular, the total number of electric cars in the world reached 10 million in 2020, increasing 43% year-on-year. Approximately 3 million new electric cars were registered in 2020 of which BEVs accounted for two thirds. Although the overall European car market contracted 22 percent in 2020, new EV registration reached 1.4 million, a 2.3-fold increase over 2019. Meanwhile, China followed with 1.2 million registrations and the United States

registered 295 thousand new electric cars. As a result, electric cars had a 4.4 percent market share of the world car market in 2020.

Figure 2. Global electric car sales by key markets, 2010-2020



Source: IEA, Global EV Outlook 2021

As the figure above shows, the electric car market expanded significantly in recent years. This growth is expected to continue as according to a report by Reuters, the European Automobile Manufacturers Association stated that the European Union has an objective to have one million charging points for electric vehicles by 2024 and three million by 2029 to support the electrification of the car industry in Europe. Meanwhile, in the United States, Biden's proposals include supporting the electric vehicle sector with subsidies for cars, adding 500,000 new charging stations, and converting 500,000 school buses to zero emissions. Under the stated policies scenario that reflects all existing policies, the International Energy Agency (IEA) predicts that EVs will account for about 7 percent of total road vehicles by 2030. The number of new EVs sales is expected to reach almost 15 million in 2025 and over 25 million in 2030, representing 10 percent and 15 percent of all road vehicle sales, respectively. Meanwhile, under the sustainable development scenario in which countries work to meet global climate goals in line with the Paris Agreement, the number of global EVs is forecasted to reach almost 70 million in 2025 and 230 million in 2030 (IEA, 2021). As the production of EVs increase, the demand for copper will rise in tandem. Additionally, the more advanced EV technology becomes, the more copper the industry is likely to require.

SUPPLY SIDE

Mine production

In 2019, the total global mine production of copper was 20.6 Mt, dropping 0.7 percent in compared to the 2018. Reduced output in major copper mine producing country such as Chile and Indonesia offset growth in other countries. On the other hand, global copper production remained unchanged in 2020. Furthermore, a recovery in production in Chile and Indonesia from the constrained output in 2019 and additional output from new projects helped balance the negative impact the COVID-19 pandemic had on global copper mine output. In the first quarter of 2021, the total global mine production of copper was 5.1 Mt, increasing 3.4 percent from the first quarter of 2020. Countries around the world have started to adapt to the COVID-19 epidemic and mining operations have resumed. In addition, strong increases have occurred in the DRC, Mongolia, Panama, and Russia

Table 2. Global mine production, quarterly, thousand tonnes

2019	2020	2021

	Full year	I	II	III	IV	Full year	I
Global	20573	4974	4984	5225	5430	20613	5144
N. America	2619	632	614	648	663	2557	631
S & C America	8651	2003	1948	2083	2194	8228	1975
Chile	5821	1403	1430	1429	1471	5733	1373
Peru	2466	515	434	564	635	2149	531
Others	364	86	83	90	87	346	71
Europe	1655	418	441	436	458	1754	433
Asia	3749	940	977	1010	1084	4011	1051
Oceania	1042	236	242	235	238	952	245
Africa	2230	564	618	630	607	2418	605

**To highlight impact of top producers, we divided South & Central America into Chile, Peru, and others*
Source: Bloomberg

Chilean production

Chile is the world's largest copper producer, regularly accounting for more than a quarter of the world's annual copper mine production. In 2019, Chile mined 5.8 Mt of copper as production remained stable year-on-year. However, in 2020, copper mine production in Chile dropped 1.5 percent, reaching 5.7 Mt. In June 2020, the Chilean government imposed COVID-19 related measures, impacting the operational workforces of mines, and ultimately negatively affecting operations. In line with this, Chilean copper mine production dropped 2.1 percent in the first quarter of 2021 compared to the same period of 2021. Copper mine production may continue to be disrupted in 2021. Additionally, Chilean port workers called for a strike on 26 April 2021 in response to President Sebastian Pinera's move to block a bill allowing people to make the third round of early withdrawals from their pension funds. This may disrupt Chilean exports moving forward.

The following sections provide information on the production of major mines in Chile.

Escondida: BHP Billiton, a leading resources company, owns 57.5 percent of the Escondida mine, a leading producer of copper concentrate and cathodes located in northern Chile. Due to an expected 12 percent decline in ore grades, Escondida copper production in 2019 fell by 6 percent, reaching 1,135 thousand tonnes. The potential decrease in copper production was partially offset by a record level of ore milled reflecting a full year of operation with three concentrators (BHP, Annual report 2019, 2020). In 2020, Escondida produced 1,185 thousand tonnes of copper, a 4 percent year-on-year increase. This was supported by a record average concentrator throughput of 371 thousand tonnes per day, which mitigated the expected grade decline, stoppages associated with social unrest, and the impact of COVID-19.

BHP Billiton forecasts that Escondida will produce between 940 and 1,030 thousand tonnes of copper in 2021 along with an estimated 4 percent decline in the copper grade of concentrator feed. It is also expected that the reduction in labor and material resources due to the COVID-19 pandemic will likely affect production levels in 2021 and 2022. However, the company maintains that the return of workers will boost copper output back to normal levels and the guidance of an annual average of 1200 thousand tonnes of copper production over the next five years remains unchanged (BHP, 2021).

Spence Growth Option (SGO) located in northern Chile is a key project for BHP. According to BHP Billiton, SGO will extend the useful life of Spence for another 50 years. The project involves a new concentrator plant that will produce an average of 185 thousand tonnes of copper per annum in its first 10 years of operation. As a result of measures put in place to control the spread of COVID-19, first production was delayed and is now expected in 2021.

Codelco: Codelco is the world's largest copper producer, engaging primarily in the exploration, development, and extraction of copper ores and by-products as well as the processing of ore into refined

copper and the international sale of refined copper and byproducts. Codelco is 100 percent owned by the Republic of Chile and controls approximately 7 percent of the world's proven and probable copper reserves (ERI, 2018). Codelco produced a total of 1,706 thousand tonnes of copper in 2019, dropping 5.5 percent year-on-year. Additionally, Codelco's own copper production reached 1,588 thousand tonnes in 2019, 5.3 percent lower than 2018. This decrease can be explained by the climatic events that occurred in February in the north, Chuquicamata union strikes in May and operational and maintenance issues at the Chuquicamata and Andina concentrators (Codelco, 2020).

In 2020, Codelco mined 1,727 thousand tonnes of copper ore, improving 1.2 percent in comparison to the previous year. Meanwhile, Codelco's own copper production grew 1.2 percent, reaching 1,618 thousand tonnes with gains at its Chuquicamata, Ministro Hales, Salvador and Andina divisions. However, the suspension of some mines due to the outbreak of COVID-19 reduced potential production. In detail, in June 2020, Codelco announced the temporary suspension of construction on all its northern operation projects, including the Chuquicamata underground mine as well as the temporary suspension of construction work on El Teniente New Mine Level in July 2020. These suspensions aimed to reduce the density of employees and contractors at operations as well as reduce traffic and risk of COVID-19 infection. According to Codelco, the company expects to produce the same level of copper in 2021 and to reduce operational costs.

Table 3. Copper mine productions of mines owned by Codelco, thousand tonnes

Mines	2018	2019	2020	2019/2018 growth %	2020/2019 growth %
Codelco divisions	**1677**	**1588**	**1618**	**-5.3%**	**1.2%**
Chuquicamata	321	385	401	19.9%	4.2%
Ramodiro Tomic	333	266	261	-20.1%	-1.9%
Gabriela Mistral	107	104	102	-2.8%	-1.9%
Ministro Hales	195	152	171	-22.1%	12.5%
Salvador	61	51	56	-16.4%	9.8%
Andina	195	170	184	-12.8%	8.2%
El Teniente	465	460	443	-1.1%	-3.7%
El Abra (20%)	**44**	**40**	**35**	**-9.1%**	**-12.5%**
Anglo American Sur (49%)	**84**	**78**	**74**	**-7.1%**	**-5.1%**
CODELCO total	**1806**	**1706**	**1727**	**-5.5%**	**1.2%**

Source: Codelco

Chile has some expansion and development projects underway and in the pipeline, including the expansion of Antofagasta Minerals' Los Pelambres mine, Teck's QB2 development, BHP Billiton's SGO development, Codelco's Rajo Inca development, and Capstone Mining' Santo Domingo project. Cochillo, the Chilean state copper agency, reported that due to expansions Chile's copper production is forecast to grow 22.6 percent through 2031, reaching 7.1 Mt and peaking at 7.35 Mt in 2028 (Harris, 2021).

Peruvian production

In 2019, Peru produced 2.5 Mt of copper, decreasing 1.2 percent year-on-year. Likewise, in 2020, copper production dropped an estimated 13 percent year-on-year, reaching 2.1 Mt. This significant decline was mainly due to the outbreak of the COVID-19 pandemic as key operating mines faced temporary suspensions in line with the national and provincial COVID-19 restrictions. These include the Antamina and Cerro Verde mines which were inactive in April and May 2020. Overall, most copper mining activities in Peru resumed at the end of second quarter of 2020, but a reduced workforce and other restrictions continued to hamper production levels in the subsequent quarters. Moreover, before COVID-19's impact, copper production growth in Peru has been limited due to protests and strikes. Such events have also disrupted the development timelines of several copper projects such as the Tia Maria, Rio Blanco, and Conga. As of the first quarter of 2021, Peruvian copper production increased 3.1 percent, reaching 0.5 Mt.

Cerro Verde: Cerro Verde, 53.6 percent owned by Freeport-McMoran, produces copper, molybdenum concentrate and silver. The Cerro Verde concentrator extracted an average of 393.1 thousand tonnes of ore per day in 2019, a 1.4 percent increase from the previous year. However, due to the spread of COVID-19, the company's operations were suspended for a while in 2020. In particular, in March 17, Freeport-McMoRan announced that Cerro Verde will suspend operations and enter a 15-day care and maintenance period following the Peruvian government's declaration of a national state of emergency. In connection with this suspension, the company changed its production plan and adjusted its production.

During the fourth quarter of 2020, Cerro Verde continued to increase milling rates to an average of 373.2 thousand tonnes of ore per day while operating in line with its April 2020 revised operating plans and under strict COVID-19 restrictions and protocols. Freeport-McMoRan expects Cerro Verde's mill rates to average about 360 thousand tons of ore per day in 2021, with the potential to ramp up to pre-COVID-19 levels approximating 400 thousand tons of ore per day as COVID-19 restrictions are lifted (Freeport-McMoran, 2021). Additionally, industrial analysts predict that Peru's copper production will grow 10.4 percent in 2021, reaching 2.4 Mt and continue to grow an average of 9.2 percent per annum between 2021 to 2024, reaching 3.1 Mt in 2024. The growth will be largely supported by production from the existing portfolio of operating mines, including Cerro Verde, Las Bambas, Toromocho, Antapaccay and Constancia as output recovers to pre-COVID-19 production levels (Mining-Technology, 2021).

Asian production

Key copper suppliers in Asia include China (45 percent of total Asian output as of 2020), Kazakhstan (18 percent), Indonesia (12 percent) and Mongolia (7 percent). In 2019 total Asian copper mine production was 3.7 Mt, falling 8.2 percent from 2018. This was mainly attributed to the significant decrease in Indonesian copper mine production. Meanwhile, Asian copper mine production increased 7 percent in 2020 as Indonesian copper mine production recovered and Chinese production increased. In the first quarter of 2021, due to the significantly increased production in Indonesia, Asian copper mine production grew 11.8 percent, reaching 1 Mt.

China: In 2019, copper output reached 1.6 Mt, a 4.8 percent year-on-year increase that accounted for 7.4 percent of total global output. In 2020, Chinese copper production increased a further 9 percent, reaching 1.8 Mt. According to a calculation by BMI research, Chinese copper mine production is expected to grow an average of 1.5 percent per year over 2021-2029, compared with an average growth rate of 4.6 percent over the past decade. This slowdown in production growth will be driven mainly by closures of low-grade copper mines in China coupled with delays in planned capacity expansions.

Indonesia: As reported by Bloomberg, Indonesia's copper production in 2019 reached only 380 thousand tonnes, declining about 47 percent from 2018. The decline in copper production was caused by major mine production transitions to different ore zones. After a sharp fall in copper production in 2019, Indonesia's copper production grew 29 percent in 2020 as output levels recovered and improved. Meanwhile, Indonesian mine production increased about 91 percent in the first quarter of 2021 due to the continued ramp-up of underground production at the Grasberg mine

The following section refers production activity of Indonesian main copper producers.

Grasberg: Grasberg is the world's second largest copper mine. In the fourth quarter of 2019, PT Freeport Indonesia (PT-FI) completed mining the final phase of the Grasberg open pit and started to shift to mining the Grasberg Block Cave (GBC) underground mine. Reserves from the GBC totaled 7.8 Mt of copper and 14.2 million ounces of gold as of December 2019.

In 2019, the Grasberg mine extracted 272.1 thousand tonnes of copper, a 2-fold year-on-year decrease that was caused by the depletion of open-pit resources and the beginning of transitioning to underground mining. On the other hand, the company's copper production grew about 33 percent in 2020, reaching 362.8 thousand tonnes. This was mainly attributed to the start of underground mining production and an increase

in production capacity. Throughout 2020, a total of 206 new draw bells were added at the Grasberg underground mines, bringing cumulative open draw bells to over 370. The successful completion of this upgrade is expected to enable PT-FI to generate an average annual production of 680 thousand tonnes of copper and 1.6 million ounces of gold for the next several years (Freeport-McMoran, 2021). This suggests that Indonesia's copper production will grow in the mid- and long-term.

North American production

North America produced 2.6 Mt of copper in 2019, a 3.6 percent increase from the previous year. This was supported by a 2.7 percent increase in the United States copper production, owing to higher ore grades and higher mining and milling rates at several operations. In contrast, copper production reached 2.55 Mt in 2020, decreasing 2.1 percent in comparison to the 2019. Moreover, in 2020, the United States' copper mine production decreased by an estimated 5 percent, mainly due to reduced output from the Bingham Canyon Mine in Utah and the Chino Mine in New Mexico. In particular, ore grades were lower than in 2019 at Bingham Canyon and operations at the Chino Mine and Pumpkin Hollow Mine were suspended due to restrictions implemented in response to the COVID-19 pandemic. However, United States copper production is expected to recover in 2021 as suspended mines restarted operations in middle of the year (U.S. Geological Survey, 2021). As of the first quarter of 2021, North American copper mine production declined by 0.2 percent, reaching 0.6 Mt. As reported by ICSG, North American copper mine production will grow approximately 6 percent in 2021 (ICSG, 2021).

African production

African copper mine production reached 2.2 Mt in 2019, dropping 1.7 percent versus the prior year. Meanwhile, the country produced 2.4 Mt of copper in 2020, increasing 10.4 percent from 2019. . In the first quarter of 2021, African copper mine production grew 7.3 percent due to the expanded operation of DRC's copper producers.

The Democratic Republic of the Congo (DRC) is the top copper producer in Africa and the fourth largest copper producer in the world. In 2019, the DRC's copper mine production totaled 1.3 Mt. Katanga, a major mining company in the DRC, produced 235 thousand tonnes of copper in 2019, boasting a 1.5-fold growth from 2018. This increase was attributed to the restart and upgrade of the Katanga mine (Glencore, 2020).

Zambia, Africa's second biggest copper producer, produced 790 thousand tonnes of copper in 2019, a 7.5 percent decrease from 2018 due to changes in its tax regime. In September 2019, the Government of Zambia implemented a 1.5 percentage-point increase in mineral royalties, with the current tax rates ranging from 4-6 percent depending on the price of copper, with a 10 percent ceiling when copper prices go above USD 7500 per tonne. Copper concentrate imports suffered an additional 5 percent levy. Despite the tax increase and the negative effect of the COVID-19 pandemic, the country's copper production increased 10.8 percent year-on-year in 2020. This increase was caused by surges in world copper prices and the easing some tax conditions. Zambia aims to produce more than 900 thousand tonnes of copper in 2021 and has a long-term goal of exceeding 1 Mt in annual production (Reuters, 2021).

Overall, Africa's copper production is expected to grow in the mid-term due to some mine upgrades and the start of new mine operations. Furthermore, a high-grade copper discovery, called the Kamoa-Kakula copper project, was made in the DRC in 2019. The project is expected to average 284 thousand tonnes of copper per year for the first 10 years. The expanded Kamoa-Kakula will have a run rate of just over half a million tonnes of copper in the first decade and with a peak production of 805 thousand tonnes of copper per year (Fric Els, 2020).

Short-term outlook of global copper mine production

As reported by ICSG, global copper production is forecasted to recover by 4.5 percent in 2021. However, this prediction will be dependent on how the COVID-19 pandemic develops. Production in 2021 is expected

to benefit from recovery from the constrained operating levels of 2020 and increased supply resulting from the ramp-up of recently commissioned mines and expansions as well as from the planned start-up of larger projects including Kamoa-Kakula, the Spence Sulphide Project, and Lone Star (ICSG, 2021). Similarly, BMI research predicts that global copper output will increase about 4 percent in 2021. In addition, world copper production is forecasted to grow an average of 2.1 percent per annum between 2021 and 2030 due to new mining projects (BMI research, 2021).

Refinery production

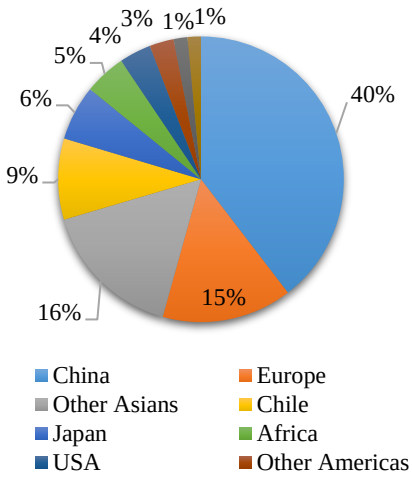
Global copper refinery production was 24 Mt in 2019, remaining stable year-on-year. Chilean refined copper production decreased about 8 percent in 2019, owing temporary smelter shutdowns whilst undergoing upgrades to comply with new environmental regulations. Meanwhile, Zambian refined copper output fell approximately 20 percent due to the power supply interruption, smelter disruption, temporary shutdowns, and newly imposed customs duties on copper concentrate imports that inhibited smelter feed. Similarly, India experienced a 28 percent decrease in refined copper production mainly driven by large copper smelter Vedanta's shutdown of Tuticorin. However, these reductions in output were offset by growth in Chinese output as well as production recovery in countries such as Australia, Brazil, Iran, and Poland (ICSG, 2020).

In 2020, global refinery production grew 0.5 percent year-on-year. On regional basis, Chilean refined copper production (9 percent of total global refined copper production as of 2020) grew 2.7 percent in 2020 due to a 25 percent increase in electrolytic refined output. Chinese refined copper production (40 percent of total global refined copper production) rose only 2.5 percent due to temporary shutdowns related to COVID-19 restrictions, tight scrap supply and constraints linked with concentrate imports. On the other hand, Indian refined coper output declined 20 percent. This was mainly driven by temporary suspension of Birla Copper's operation in March to May following nationwide lockdowns. Overall, COVID-19 related lockdowns and lower copper prices during the first quarter of 2020 negatively impacted world refinery production. In the first quarter of 2021, global total refinery production grew 3.1 percent year-on-year due to the increase in production of China, Chile, Zambia, and DRC.

Table 4. Global refinery production, thousand tonnes

Year	2019	2020					2021
Quarter	Full year	I	II	III	IV	Full year	I
Global Total	**23892**	**5824**	**5972**	**6093**	**6130**	**24019**	**6002**
North America	1771	408	383	408	412	1611	427
USA	1045	225	212	230	247	914	248
S & C America	2786	700	695	645	685	2726	634
Chile	2284	580	601	555	594	2330	543
Europe	3665	911	935	937	953	3737	927
Asia	13644	3333	3522	3658	3610	14124	3503
China	9635	2289	2527	2615	2608	10040	2487
Japan	1500	405	382	400	395	1582	376
Oceania	433	97	95	95	97	384	106
Africa	1335	313	279	285	319	1195	345

Figure 3. Refinery production on regional basis as of 2020, percent



Source: Bloomberg

Short-term outlook of global refinery production

According to ICSG forecasts, global refined copper production will rise about 1.5 percent in 2021 (ICSG, 2021). Further, planned growth in primary electrolytic production is anticipated to be restricted by the availability of concentrates. However, electrowinning output will benefit from the start-up and expansion of SX-EW plants in the DRC and the United States and world secondary production is expected to recover as a result of the improved availability of scraps.

Refined copper balance

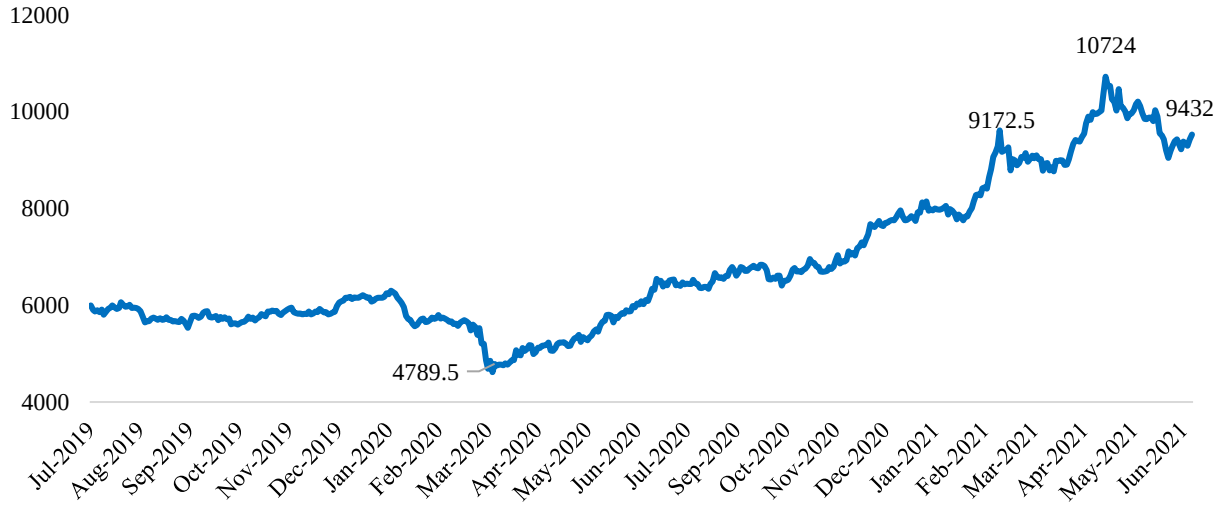
As reported by Bloomberg, the global refined copper deficit was 218 thousand tonnes in 2019 and 961 thousand tonnes in 2020. The increase in the refined copper deficit was caused by disruption among major refined copper suppliers due to the COVID-19 pandemic. According to the calculation by ICSG, the world refined copper balance will have a surplus of about 80 thousand tonnes in 2021 and 110 thousand tonnes in 2022. On the other hand, BMI research predicted the copper market deficit to reach 484 thousand tonnes in 2024 and 510 thousand tonnes in 2027.

PRICE

Copper prices in 2019 were about 8 percent lower than in 2018. This was due to dampened industrial demand exacerbated by increased concerns of a global economic slowdown. Moreover, the United States further hiked tariffs on Chinese exports, which effected the decrease in prices. Manufacturing activity in China, which accounts for half of global copper consumption, experienced a slowdown as metal-intensive sectors remained weak (e.g., construction, electricity, and transport). Weak demand has more than offset recent production disruptions at Chile's Chuquicamata mine (labor strife) and Indonesia's Grasberg mine. However, prices rose in December in anticipation of the trade deal between China and the United States as well as the resolution of Brexit.

After a rebound at the end of 2019, copper prices fell in the first half of 2020. Moreover, in mid-March, prices fell below USD 4700, the lowest since 2016. The COVID-19 pandemic ignited an economic crisis that also dampened global industrial demand for copper. Additionally, mines in Chile and Peru, together accounting for two-fifths of global copper supply, were temporarily closed in accordance with national lockdowns. In the third quarter of 2020, copper prices jumped 22 percent, the highest quarterly growth rate observed since mid-2009, leaping well above pre-COVID-19 levels in September (World Bank, Oct 2020). This increase was driven by strong demand and surging imports in China. Furthermore, major pandemic-induced supply disruptions also boosted prices. Labor shortages and weather issues also limited production in Panama and Peru. Overall, annual copper prices grew by 2.7 percent year-on-year in 2020.

Figure 4. LME copper price, USD per tonne

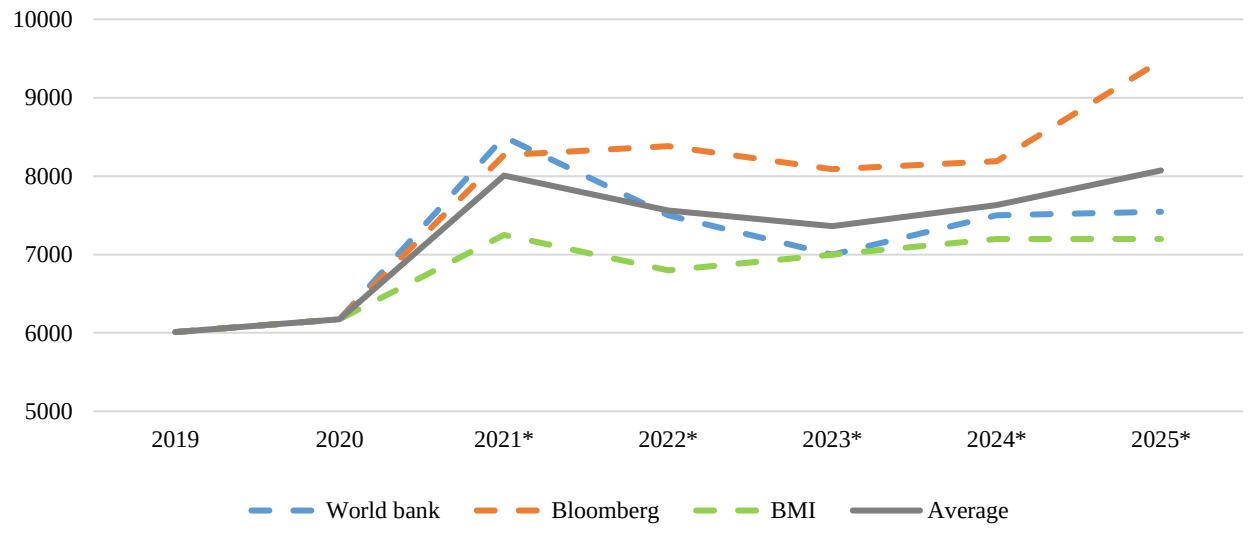


Source: London Metal Exchange Copper

Copper prices jumped 18 percent in the first quarter of 2021, averaging about USD 9,000 per tonne in March. As reported by LME, at the beginning of May 2021, copper prices reached about USD 10,000 per tonne, the highest level in a decade. This increase in prices was attributed to the strong demand in China as well as ongoing global recovery. Copper prices are still relatively high at about USD 9,500 per tonne as of June 2021, despite falling from a high in May. On the supply side, falling inventories and threats of strikes in Chile and Peru elevated mine production risks and boosted prices. The proposed infrastructure bill in the United States and the global energy transition towards decarbonization could increase prices in the near future.

In light of the aforementioned economic circumstances, international organizations have modified their forecasts of copper prices. The figure below shows forecasts for copper prices between 2021 and 2025.

Figure 5. Price projection, USD per tonne



Source: World Bank, BMI Research, Bloomberg

According to forecasts by the World Bank, copper prices will be 38 percent higher in 2021, reaching USD 8500 per tonne. This is then expected to drop 12 percent and reach USD 7500 per tonne in 2022 as supplies expand. New major projects and expansions are expected to come online over the next few years in Chile, DRC, Indonesia, Mongolia, Panama, and Peru (Nagle, 2021). On the other hand, Bloomberg forecasts that copper price will increase to USD 8269 per tonne in 2021, hover around USD 8000 per tonne until 2024 and reach about USD 9400 per tonne in 2025.

Copper prices, as estimated by BMI research, are expected to reach USD 7250 per tonne and USD 6800 per tonne by 2021 and 2022, respectively (BMI research, 2021). A resurgence in industrial activity in China and other advanced economies, coupled with optimism about the United States fiscal stimulus have boosted sentiments toward metals. Strong demand for electric vehicles also pushed up the prices of metals used in their batteries. The IMF base metal price index is projected to increase by 32.1 percent in 2021 and decrease by 4.5 percent in 2022. Uncertainty over the speed of global economic recovery and potential production and trade disruptions due to the pandemic are the main risks to the forecast (IMF, April 2021).

According to international organizations, copper prices are expected to rise steadily in the mid- to long-term. Going forward, copper demand is expected to increase due to the transition to renewable power generation and accompanying demand for electric vehicles. The high demand for copper and the upcoming deficit in supply will drive up the price.

1.2. MONGOLIAN MARKET

DEMAND SIDE

On the domestic side, the demand for Mongolian copper is dependent on the construction and manufacturing sectors; and on the export side, demand is determined by foreign smelters and refineries.

Domestic demand

Mongolian domestic demand for refined copper is supplied by Erdmin LLC and Achit Ikht LLC. Mongolian apparent refined copper usage was approximately 45.8 tonnes in 2019, a 96.7 percent decrease from the amount observed in 2018. This was mainly driven by a decline in production. In 2020, on the other hand, refined copper production, imports and exports all fell. However, apparent refined copper usage was lower as production and imports fell at a higher rate than exports.

Table 5. Mongolian refined copper export, import and production, tonnes

	2018	2019	2020	2019/2018 Growth rate	2020/2019 Growth rate
Export	12,929.9	11,933.0	9,801.8	-7.7%	-17.9%
Import	150.4	221.1	138.2	47.0%	-37.5%
Production	14,174.6	11,757.6	9,479.9	-17.1%	-19.4%
Apparent usage[1]	1395.2	45.8	-183.6	-96.7%	-501%

Source: NSO and Customs Office

In 2019, Mongolia imported 221.1 tonnes of refined copper, a 47 percent year-on-year increase compared to the 2018 (Customs Office of Mongolia, 2019). This increase can be attributed to overall economic growth as GDP grew 5.2 percent in 2019 as well as increased FDI inflow into the construction sector.

In 2020, the Mongolian import of refined copper was 138.2 tonnes, declining 37.5 percent year-on-year. This was largely due to the COVID-19 pandemic and its related government regulations such as border closures. The slowdown in economic growth has also had a significant impact. Real GDP fell 5.3 percent year-on-year in 2020, owing mainly to the negative effects of the COVID-19 pandemic. Moreover, the construction sector also contracted 1.7 percent in 2020.

Copper export

One of Mongolia's key export products is copper. The export of copper constituted about 24 percent of Mongolia's total exports in 2019 and 2020. Most Mongolian copper concentrate is exported to China.

Refined copper: Erdmin LLC and Achit Ikht LLC are the main suppliers of Mongolian refined copper. According to the Mongolian Customs Office, Mongolia exported 11.9 thousand tonnes of refined copper in 2019, dropping 7.7 percent year-on-year. Meanwhile, in 2020, the refined copper exports of these companies fell sharply to 9.8 thousand tonnes. As a result, the volume of refined copper exports dropped 17.8 percent. Refined copper exports were normal in the first half of 2020 but declined significantly in the

[1] According to the ICSG's World Copper Factbook 2014, Apparent usage = Production + Imports - Exports + Beginning stocks - Ending stocks. Unfortunately, Mongolian companies do not publish stock data and the research team calculated apparent refined copper usage using available production, import and export data. As a result, apparent refined copper usage in 2020 was negative.

second half of the year compared to the previous year. According to Mineral Resources and Petroleum Authority of Mongolia (MRPAM), refined copper exports stopped completely in November 2020 as overall economic activity was hampered by lockdown measures. As of May 2021, Mongolia's refined copper export was 5.0 thousand tonnes, increasing 6.1 percent compared to the same period of 2020. The easing of COVID-19 regulations, especially in relation to border closures, have allowed mining companies to resume exports.

Copper concentrate: Mongolian copper exports define foreign demand for Mongolian copper, especially Chinese demand. According to the Mongolian Customs Office, the export of copper concentrate decreased 2.3 percent in 2019, reaching 1403.7 thousand tonnes valued at USD 1.8 billion. In 2020, copper concentrate exports fell by 0.6 percent year-on-year, reaching 1395.1 thousand tonnes. In 2020, due to the decrease in the grade of copper ore in Oyu Tolgoi, Mongolia's copper concentrate export revenue was expected to decrease. However, in the second half of 2020, world copper prices continued to rise and Oyu Tolgoi moved to operate in higher grade areas of its open-pit mine. As a result, copper concentrate exports in 2020 remained at almost the same level as in 2019. Meanwhile, in the first quarter of 2021, Mongolia exported 316.3 thousand tonnes, increasing 3.2 percent from the same period of 2020.

In 2020, China's copper concentrate imports set a record, up a third from 2019. According to China's copper demand analysts, the record 2020 imports were due to state reserve stockpiling as well as China's quick recovery from the COVID-19 pandemic. COVID-19 also transferred some overseas orders of home appliances and medical products to China, which pushed up Chinese imports (Emily Chow, 2021). In the mid-term, Chinese demand for Mongolian copper concentrate is expected to remain strong due to the slowdown in Chinese mine production, owing to the closure of low-grade mines and delayed expansion of some mines.

SUPPLY SIDE

According to the MRPAM, Mongolia's copper reserves as of December 2020 were 61 Mt. The majority of copper reserves are located at the Erdenet Ovoo deposit, the Kharmagtai deposit, and the Oyu Tolgoi deposit.

Refined copper production

Erdmin LLC and Achit Ikht LLC are the largest refined copper producers in Mongolia. Achit Ikht produces copper cathode utilizing SX-EW technology and exports all of its production to Chinese copper refineries. Erdmin produces copper cathode and copper end products such as electrical copper wires and power extension cords and supplies its products to the domestic market.

In 2019, Erdmin LLC and Achit Ikht LLC produced 11.7 thousand tonnes of copper cathode, a 17.1 percent decreased compared to the previous year. Meanwhile, in 2020, the two companies produced 9.5 thousand tonnes of cathode copper, a 19.4 percent decrease compared to the previous year. The drop in production was due to the decrease in the copper grade of the Erdenet's deposit dump from which it produces refined copper. In addition, Achit Ikht LLC has been unable to sell its products for some time as it has not renewed its license, opting to store its products outside the factory (S. Munkhbaatar, 2020). However, production is expected to recover in 2021. In detail, as of May 2021, refined copper production of Mongolia grew 2.3 percent from May 2020, reaching 4.1 thousand tonnes.

Copper concentrate production

Oyu Tolgoi and Erdenet Mining Corporation are the main copper concentrate suppliers in Mongolia. As reported by the National Statistics Office, Mongolia's copper concentrate production was 1262.4 thousand tonnes in 2019, a 3.7 percent decrease from 2018, and 1275.7 thousand tonnes in 2020, a 1.1 percent increase from the previous year.

In the first quarter of 2021, Mongolia's copper concentrate production increased 11.4 percent compared to the same quarter of 2020, reaching 342.8 thousand tonnes. This increase was aided by Oyu Tolgoi's production.

Table 6. Copper concentrate production, thousand tonnes

	2019	2020	2020Q1	2021Q1
Total production	**1262.4**	**1275.7**	**307.8**	**342.8**
Of which:				
1. OT mine	674.6	693.1	164.5	201.9
OT- Average concentrate grade	21.7	21.6	21.4	22.5
OT – (Cu)	146.3	149.6	35.2	45.4
2. Erdenet	587.8	582.6	143.3	140.9
(Cu)	132.7	131.5	32.3	31.8
Total export	1403.6	1395.1	306.6	316.3
Of which:				
1. OT mine	724.7	669.6	125.9	186.3
OT- (Cu)	149.9	137.8	25.8	39.0
2. Erdenet	678.9	725.5	180.7	130.0
(Cu)	156.1	166.9	40.8	29.3

Source: Oyu Tolgoi Quarterly report, NSO

Oyu Tolgoi: In 2019, Oyu Tolgoi mined 674.6 thousand tonnes of copper concentrate, a 6.9 percent year-on-year decline, and produced 146.3 thousand tonnes of copper, an 8 percent year-on-year drop. These results were in part due to a strong operational performance in 2018 (Turquoise Hill, 2021). Although economic activity slowed significantly in 2020 due to the COVID-19 pandemic, copper concentrate production resumed. In 2020, Oyu Tolgoi extracted 149.6 tonnes of copper, increasing 2.3 percent from last year. This was aided by accelerated mine development that allowed the company to access higher copper and gold grades faster than initially planned as well as high copper prices on the world market. In the first quarter of 2021, Oyu Tolgoi produced 201.9 thousand tonnes of copper concentrate, a 22.7 percent year-on-year increase. This was largely driven by continuing the high copper grade observed in the second half of 2020.

Oyu Tolgoi is expected to mine 160 thousand tonnes to 180 thousand tonnes of copper in 2021 from the processing of both open pit and underground development ore. Capital expenditure for 2021 on a cash basis is expected to be between USD 110 million to USD 140 million for the open pit and USD 1.1 billion to USD 1.2 billion for the underground mine, including underground sustaining capital expenditure but excluding any power-related expenditure. Capital expenditure for 2021 is expected to be higher than 2020 partly due to the impact of deferrals in spending from 2020 to 2021 resulting from the impact of the COVID-19 pandemic (Turquoise Hill, 2021). In addition, between 2010 and 2020, Oyu Tolgoi paid USD 11.6 billion in the form of purchases to local companies, tax revenue to the budget, and salaries of full-time employees, while it spent USD 3.5 billion on national procurement (Oyu Tolgoi, 2021).

In 2019, Rio Tinto announced that due to changes in ground stability conditions, it was necessary to change the design of the underground mine and update the feasibility study. With the introduction of the revised feasibility study in late 2020, total funding for the underground mining project increased to USD 6.75 billion and production was postponed to October 2022. This means that an additional USD 1.45 billion will be needed, compared to the initial estimate of USD 5.3 billion. With the commissioning of the underground mine, Oyu Tolgoi will produce 480 thousand tonnes of copper (stated as recovered metal) annually from the open pit and underground mines between 2028 and 2036, a 3-fold increase from 2020. The copper content of underground ore is 1.52 percent, three times higher than that of open pit ore. As a result, Oyu Tolgoi is expected to become the world's fourth largest copper mine (Rio Tinto, 2020).

Erdenet: In 2019, Erdenet Mining Corporation produced 587.8 thousand tonnes of copper concentrate as production remained stable year-on-year. Meanwhile, the company extracted 582.6 thousand tonnes of

copper concentrate in 2020, decreasing around 0.8 percent over 2019. Although copper concentrate extraction decreased slightly, the volume of mined ore rose, reaching 32.7 Mt in 2020. As of March 2021, Erdenet mined 140.9 thousand tonnes of copper concentrate, decreasing 1.7 percent compared to the same period of the previous year. In addition, Erdenet Mining Corporation exceeded its planned ore production and reached its economic targets, contributing about MNT 1 trillion to the state and local budgets in 2020. It was the most profitable year in the company's history (Baljinnayam, 2020). Moreover, the company has completed the certification of its geological resources to international standards, which can last for 60-70 years.

Erdenet Mining Corporation has plans to establish a metallurgy-chemical plant complex, including a factory for smelting and processing copper concentrate, processing low-grade copper ore, using SX-EW technology, processing oxidized ore, and manufacturing sulfuric acid and emulsion explosion.

With the commissioning of this complex, the "Erdenetiin Ovoo" strategic deposit will be fully utilized and the factory will be developed as a cluster based on advanced technology. As a result, Mongolia will be able to produce value-added refined copper and export to the international market. It will lead to more opportunities in the mining and industrial sectors and have significant positive impact on economic growth.

Short term outlook of Mongolian copper supply

Mongolian copper concentrate production is expected to increase in the short term. This can be attributed to increased Oyu Tolgoi production as the company moves to operating in higher grade areas of its open pit mine. The move was made possible by the accelerated mine development and production phasing. Moreover, access to higher copper and gold grades was initially planned for the first half of 2021 but is expected to continue throughout the year (Oyu Tolgoi, 2021). In the mid-term, Mongolian copper concentrate production is expected to be boosted by 330 thousand tonnes as Oyu Tolgoi's underground mine development is completed.

According to the Draft Law on the 2021 State Budget, the export of Mongolian copper is expected to reach 1.4 Mt in 2021, higher than the volume exported in 2020 (Ministry of Finance Mongolia, 2020). In addition, according to the Medium Term Fiscal Framework for 2022-2024, Mongolia is forecasted to export 1.2 Mt, 1.5 Mt and 1.6 Mt of copper in 2022, 2023 and 2024, respectively. This optimistic outlook is in large part due to high global copper prices.

1.3. CONCLUSION

As reported by LME, at the beginning of May 2021, copper prices reached about USD 10,000 per tonne, the highest level in a decade. This increase in prices can be attributed to strong Chinese demand as well as ongoing global recovery following the COVID-19 pandemic. On the supply side, falling inventories and threats of strikes in Chile and Peru elevated mine production risks and boosted prices. According to international organizations, copper prices are expected to increase steadily in the mid- and long-term. Going forward, copper demand is expected to rise due to the transition to renewable energy coupled with increased interest in electric vehicles. The high demand for copper and its upcoming deficit in supply is expected to drive up prices.

Global refined copper demand will steadily rise in the mid-term due to increasing demand from the power and construction industry and rising electric vehicle production. In addition, infrastructure development in major countries such as China, United States and India and the global trend towards cleaner energy will continue to support copper demand in the mid- and long-term. BMI research predicts that between 2021 and 2030 world copper production will grow an average of 2.1 percent per annum, supported by new mining projects.

Chinese demand for Mongolian copper concentrate is likely to be strong in 2021 due to state reserve stockpiling, China's quick recovery from the COVID-19 pandemic and an increase in Chinese demand for

home appliances and medical products. Further, Chinese demand for copper concentrate is expected to remain strong in the mid- to long-term due to the ongoing trend towards green energy and increasing global electric vehicle demand. On the supply side, refined copper production is expected to grow in the mid-term due to Oyu Tolgoi's underground mine. In particular, with the commissioning of the underground mine, Oyu Tolgoi will produce 480 thousand tonnes of copper annually from its open pit and underground mines between 2028 and 2036.

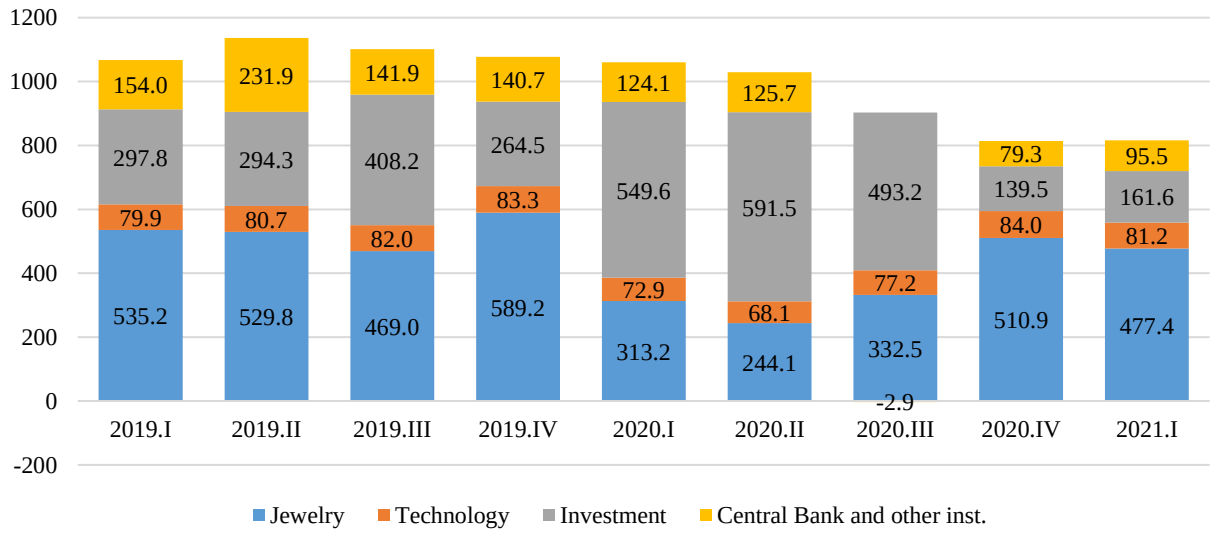
2. GOLD

2.1. WORLD MARKET

DEMAND SIDE

Gold demand can be broken down into gold demand for jewelry, technology, investment, and reserve assets by central banks. Traditionally, world gold demand is dominated by demand for gold jewelry, particularly from India and China. However, as the outbreak of the COVID-19 pandemic continues to affect the global economy and consumer purchasing power, the demand for gold for investment outstripped demand for gold jewelry in early 2020. As a result, total gold demand fell 13 percent year-on-year in 2020.

Figure 6. World Gold Demand, by quarter, 2019-2021, tons



Source: World Gold Council

Jewelry

Jewelry, traditionally the largest subsector of gold demand, is traditionally dominated by Chinese and Indian demand. However, due to the COVID-19 pandemic and the resulting economic slowdown coupled with high world prices of gold, gold jewelry demand reached an all-time low in 2020. For instance, world demand for gold jewelry reached 1411.6 tonnes, displaying a 34 percent year-on-year decrease owing to decreased demand from major players such as India and China.

In 2020, Indian demand for gold jewelry fell 42 percent year-on-year, reaching 315.9 tonnes. This was largely due to a major 73.9 percent year-on-year fall in demand for gold jewelry in the second quarter of 2020. While the magnitude of the fall in demand improved in the third quarter of 2020, falling 40.1 percent year-on-year, recurring lockdowns and high gold prices continued to dampen demand. Moreover, the inauspicious periods of Pitru-Paksha and Adhik Maas in September 2020 also discouraged gold purchases (Jayakumar, 2020). Further improvements were observed in the final quarter of 2020 where gold jewelry demand fell a modest 7.9 percent, reaching 137 tonnes. This upturn was supported optimism about global economic recovery as well as a fall in the number of recorded cases of COVID-19. However, in March 2021, India reported a devastating resurgence of COVID-19 cases that continue to ravage the country (Farzan & Parker, 2021). As such, Indian demand is expected to remain low moving forward and further economic recovery is unlikely in the near future. Interestingly, Indian jewelry demand increased 39 percent

year-on-year in the first quarter of 2021. While this is a significant increased from the low point in 2020, it is still 18 percent lower than pre-COVID-19 times in the first quarter of 2019.

Table 7. Chinese and Indian gold jewelry demand, tonnes

	2019	2020	Y-o-Y Δ%
World	2,123.2	1,400.8	-34%
India	544.6	315.9	-42%
China	638.0	413.8	-35%

Source: World Gold Council

Similarly, Chinese gold jewelry demand fell 35 percent year-on-year in 2020 owing to the COVID-19 pandemic and high prices. In particular, demand fell sharply in the first quarter of 2020, falling 66.1 percent year-on-year. Owing to the spread of the COVID-19 pandemic, the brunt of the fall in consumer demand was in early 2020 before steadily recovering with demand for gold jewelry falling 11.6 percent year-on-year in the final quarter of 2020.

This positive trend is expected to continue into 2021 with gold jewelers in China maintaining an optimistic look on the market. In particular, gold demand is forecasted to increase due to expectations of continued economic recovery in China, the Chinese government's prioritization of domestic consumption, industry consolidation in 2020 as weaker jewelers were unable to survive the pandemic as well as the expectation that the pandemic will be controlled within China (WGC, 2021). As such, Chinese gold jewelry demand may reach pre-COVID-19 times and even surpass 2019 levels when China was still in the midst of a trade war with the US (Reuters, 2021). In fact, Chinese jewelry demand reached 191 tonnes in the first quarter of 2021, more than doubling year-on-year.

As in India and China, demand for gold jewelry in the Middle East, the West and other Asian countries sharply fell in early 2020 but have been slowly recovering throughout 2020 (WGC, 2021). Moving forward, global gold demand for jewelry is expected to recover somewhat in 2021, largely spearheaded by increased demand from China. However, as many countries deal will the repercussions of the COVID-19 pandemic, particularly India, and the price of gold remains high, gold jewelry demand is expected to remain well below pre-pandemic times. To support this, world jewelry demand increased 52 percent year-on-year in the first quarter of 2021 but was still 11 percent lower than levels observed in 2019.

Investment

Gold for investment can be broken down into bar and coin demand and exchange traded fund products (ETFs). In 2020, bar and coin demand rose 3.5 percent year-on-year as an 7.7 percent drop in physical bar demand, the largest component of total bar and coin demand, was mitigated by a 32.7 percent increase in official coin demand. This was further offset by an unprecedented 120 percent increase in demand for gold ETFs with overall demand investment boasting a 40.2 percent year-on-year increase (WGC, 2021).

As an investment, gold is seen as a profile diversifier that carries little to no credit risk and is a source of long-term returns. The value of gold as an investment is dependent on people's perception of geopolitical stability, interest rates, the value of the USD and ultimately, the global economic outlook. As such, the value of gold as an investment increases with perceived global instability. While demand for gold as an investment was high with the trade war between China and the US in 2019, it was further boosted with the outbreak of the COVID-19 pandemic in 2020.

In particular, demand for gold ETFs continued to grow in the first three quarters of 2020, reaching 1007 tonnes in added global gold holdings at the end of the third quarter of 2020. This was somewhat offset by an outflow of 130 tonnes in the fourth quarter of 2020 as overall global instability seemed to diminish slightly. This perception can be attributed to the results of the US elections as well as the successful production of COVID-19 vaccines (WGC, 2021). As a result, investors were more inclined to pull back

from gold for other riskier assets such as stocks. Overall, 877.1 tonnes in gold ETFs were added in 2020 with global holdings reaching 3,751.5 tonnes at the end of the year (WGC, 2021).

In addition to robust ETF performances in Europe and the US fueled by the challenging economic environment created by the COVID-19 pandemic, there was a notable increase in gold as an investment from Chinese and Indian investors. For instance, inflows into Indian gold ETFs increased from 14.8 tonnes in 2019 to 28.3 tonnes by the end of 2020. Likewise, the Chinese market for gold ETFs also grew steadily, introducing seven new gold ETFs in 2020 (WGC, 2021). Continuing into 2021, China has added 11.5 tonnes in gold ETFs in the first quarter of 2021 according to the China Gold Association. This was fueled by lower domestic prices of gold as well as stock market volatility (Xinhua, 2021).

Overall, gold ETFs may experience outflows in 2021 owing to unprecedented high inflows in 2020. For instance, there was a gold ETF outflow of 178 tonnes in the first quarter of 2021. Additionally, more stability in the US and more optimism about the COVID-19 pandemic may lead to more risky investing practices. This optimism is echoed in various economic outlook forecasts. For instance, the IMF projected a global economic growth rate of 6 percent in 2021 and 4.4 percent in 2022 in its April 2021 World Economic Outlook, more optimistic than the 5.5 percent and 4.2 percent growth rates for 2021 and 2022 initially put forth in their January World Economic Outlook Update (IMF, 2021).

However, it is worth noting that many central banks, such as the European Central Bank, the Reserve Bank of India as well as the US Federal Reserve have indicated plans to keep policy rates low for the foreseeable future to promote economic recovery (Gold Hub, 2021). As mentioned in the previous report, low interest rates decrease the attractiveness of other investment options. Thus, while demand for gold ETFs is unlikely as high in 2021, they will still be an appealing investment option amidst ongoing global instability. Supported by demand for ETFs, demand for gold as an investment overall is likely to remain robust in the near future (WGC, 2021).

Technology

Gold demand for technology fell 7.3 percent in 2020 compared to 2019 as demand for gold in all 3 subsectors of technology (electronics, other industrial needs, and dentistry) dropped. In particular, gold demand for other industrial needs fell 15.6 percent, gold demand for dentistry fell 14.9 percent and gold demand for electronics fell 5.4 percent (WGC, 2021). However, it is worth noting that gold demand for electronics accounts for the bulk of the total gold demand for technology and that gold demand for other industrial needs and dentistry are negligible.

The fall in gold demand for technology can be attributed to the COVID-19 pandemic as consumer demand for electronics were dampened and many manufacturing factories stopped operations in order to comply with pandemic related restrictions and lockdowns (WGC, 2021). However, this downturn was mainly felt in the first half of 2020 with gold demand for technology recovering in the third and final quarters of 2020, in part due to demand for items such as laptops surged due to work from home restrictions imposed in most countries. Overall, the global electronics sector seems to be quite robust with one estimate by the World Semiconductor Trade Statistics Organization anticipating a 5 percent growth in the semiconductor[2] market in 2020 and an optimistic growth rate of 8.4 percent in 2021 (WSTS, 2020).

Within the electronics sector, gold is used in bonding wiring, printed circuit boards, the smartphone sector and the wireless 5G sector. According to the World Gold Council, the volume of gold used in wireless 5G technology increased an estimated 2 to 4 percent while the volume of gold used in printed circuit boards increased an estimated 4 to 7 percent. The notable increase in the volume of gold used in the printed circuit board sector was due to recovering consumer demand as well as the strengthening automotive sector as gold is used for some components of electric cars. Moreover, the number of 5G enabled smartphones are

[2] Semiconductors are a component of electrical circuits and an integral part of the overall electronics sector.

expected to grow from 240 million shipped units in 2020 to 500 million shipped units in 2021, further supporting gold demand (WGC, 2021).

In addition to the uses mentioned above, gold nanoparticles (colloidal gold) are an important component of the COVID-19 diagnostic rapid test kits (Hinkel, 2021). While it is currently difficult to measure how much gold has been used in the production of rapid test kits, it is worth noting their importance as millions of rapid test kits are used to diagnose and mitigate the spread of the pandemic (Keel, 2020).

Moving forward, as the global economy slowly recovers and vaccination efforts instill more consumer confidence, gold demand for technology is also expected to recover as the robust electronics sector continues to grow.

Reserves

In 2020, central banks added 326.3 tonnes of gold to reserves and reserves accounted for 8.6 percent of world gold demand. As in recent years, central bank purchases were led by Turkey, India, and Russia. Additionally, United Arab Emirates, Qatar and Cambodia also made sizeable purchases and bolstered world gold demand for reserves.

Many central banks buy gold as a way to bolster reserves in a stable commodity, however, while the positive trend of net buying continued in the first half of 2020, purchases dwindled while sales increased in the third quarter of 2020 before purchases recovered again in the final quarter of 2020. As a result, gold purchased by central banks decreased an almost 60 percent year-on-year compared to 2019. This decrease is in part due to a normalization of purchases after extremely high central bank demand in 2019. Moreover, in times of crisis, many banks are pressured to sell their gold reserves, particularly if there is a lack of foreign exchange reserves, in order cover losses (King & Mendez-Barreira, 2020). This is an especially attractive option when gold prices are high. In fact, there seems to be a trend of central banks that buy gold from domestic sources selling gold to utilize high gold prices (Spence, 2020).

In 2020, Turkey was the largest net purchaser of gold, adding 134.5 tonnes of gold to its central bank reserves. The central bank of Turkey seems to be turning to purchasing gold as a way to bolster its reserves while its foreign currency reserves have been falling steadily (Ersoy, 2020). However, it is important to note that Turkey did not indiscriminately buy gold throughout gold, instead opting to sell 36.3 tonnes of gold in the second half of 2020. This decision was largely influenced by increased domestic demand for gold and was due to transactions between commercials banks and the central bank (WGC, 2021). However, it is likely that the Turkish central bank will still continue buying gold in the near future as its domestic gold market settles. In fact, the head of Turkey's Gold Miners Association mentioned in an interview that Turkey's production of gold is expected to increase further and the central bank is likely to buy most of it in accordance with legislation passed in 2017 that gave the central bank the right of first refusal to purchase gold produced in Turkey (Ersoy, 2020).

Similarly, while Russia purchased 27.4 tonnes of gold in the first quarter of 2020, marking it as the third largest purchaser of gold in 2020, the Russian central bank made the decision to stop buying gold in the near future in March 2020 (Mazneva, 2020). This is a shock as Russia has traditionally been the world's largest buyer of gold, spending an estimated USD 40 billion on gold purchases in the past 5 years. However, these purchases were largely done as a buffer against economic shocks and threats of US sanctions. As these issues lose their relevance, many analysts believe that the Russian central bank has reached the proportion gold relative to other assets it wants to keep in reserve (Fedorinova & Biryukov, 2020). Moving forward, gold purchases by the central bank are expected to be minimal as Russian producers must find other buyers for their gold.

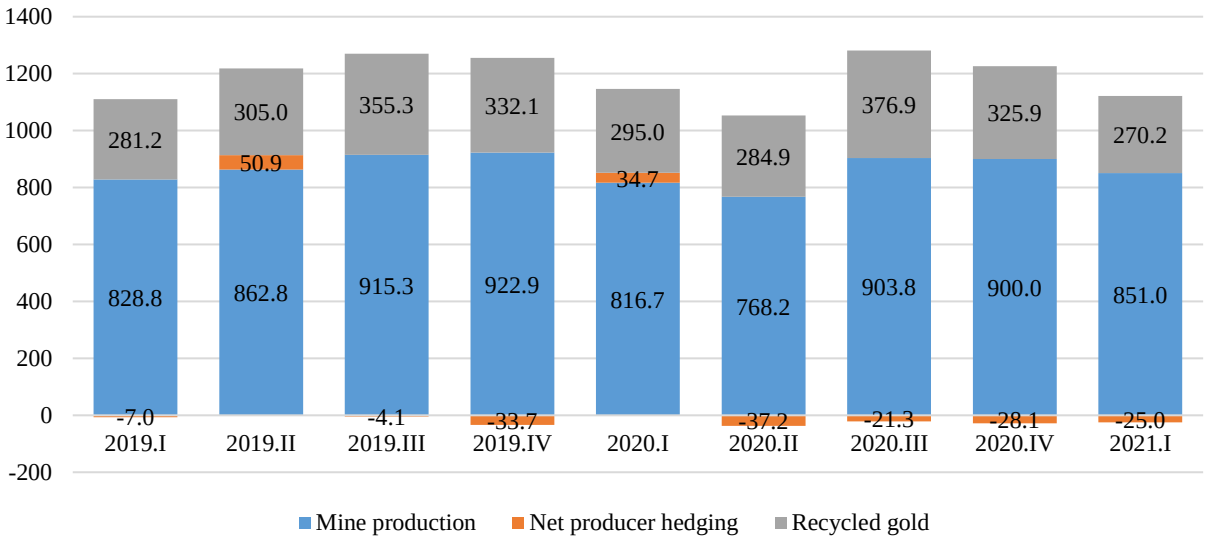
In 2021, gold purchases by central banks are expected to continue amidst ongoing global uncertainty caused by the pandemic. However, as key buyers such as Russia are expected to reduce purchases, additions to

central bank reserves will not reach the record levels experienced in 2018 and 2019. This seems to be the case as central bank reserves decreased 23.1 percent year-on-year in the first quarter of 2021.

SUPPLY SIDE

On the supply side, gold is determined by mine production, gold recycling and net producer hedging. In 2020, total gold supply fell 4 percent year-on-year, reaching 4,633.1 tonnes. This decrease can be attributed to a 4 percent year-on-year decrease in mine production, the largest component of total gold supply, as well as a shift towards net de-hedging in the last three quarters of 2020. While these drops were somewhat mitigated by a 1 percent year-on-year increase in recycled gold, it was not enough to offset the aforementioned falls.

Figure 7. World Gold Supply, by quarter, 2019-2021, tons



Source: World Gold Council

Mining Production

In 2020, gold mine production reached 3,400 tonnes, a 4 percent year-on-year decrease and the second consecutive decline in annual production (WGC, 2021). Gold production was dominated by Chinese, Australian and Russian production as the aforementioned countries accounted for a little over 30 percent of total world gold production (Scott, 2021). Overall, the slight fall in gold mine production, despite record high gold prices, was due to disruptions in operations due to the COVID-19 pandemic. The pandemic did not affect gold production uniformly as Asian production was largely affected in the first quarter of 2021 while African and American production was affected in the second quarter before overall production recovered in the second half of 2020 (WGC, 2021).

While still the world's largest gold producer, Chinese gold production has been steadily falling since 2014 owing to a mixture of policy changes, depleting ore reserves and a push towards environmental stability (GlobalData Energy, 2021). In 2020, COVID-19 related restrictions halted gold production in China in the first quarter of 2020. However, production quickly resumed due to effective government handling of the pandemic with companies eager to capitalize on record high gold prices. As a result, according to estimates by the Unites States Geological Survey (USGS), Chinese gold production remained stable year-on-year at 380 tonnes in 2020 (Scott, 2021). However, China's push towards more environmentally friendly gold mining is expected to impact future production. For instance, stricter environmental regulations on solid

waste from gold prospecting have led to several gold mine closures in Shandong, Jiangxi, and Hunan while intensive mining in Qinghai and Gansu have caused production halts and a fall in reserves (Mining.com, 2020). In light of these long-term trends, future Chinese production is suspected to be sluggish. In particular, according to a report by Fitch Solutions, Chinese gold production is expected to remain stagnant from 2020 to 2029, displaying an average annual growth rate of 0.2 percent (Mining.com, 2020).

According to USGS estimates, Australia produced 320 tonnes of gold in 2020, a 1.5 percent year-on-year decrease (Scott, 2021). This negligible decrease was in part due to Australia's stringent COVID-19 measures to contain the outbreak so as to minimally disrupt mining activities. For instance, state governments in Western Australia, South Australia, Tasmania, and the Northern Territory closed their borders from late March 2020, allowing only exceptions for essential service workers (GlobalData Energy, 2021). Moving forward, Australian gold production is expected to grow in the near future, driven by OZ Minerals' development of the Carrapateena copper-gold project, one of the largest mines in the country. Australia also ranks as the country with the highest gold reserves at an estimated 10,000 tonnes (Scott, 2021) with an annual production growth average of 2.2 percent from 2020 to 2029 (Mining.com, 2020).

In 2020, Russia produced an estimated 300 tonnes of gold. This is a 1.6 percent year-on-year decrease from 2019 and accounted for roughly 9.4 percent of the world market share, marking Russia as the third largest gold producer (Scott, 2021). This marginal decrease can be attributed to COVID-19 related disruptions. For instance, there was a 900-case COVID-19 outbreak at the Olympiada mine in Siberia, one of the largest mining operations in the world (Leotaud, 2020). However, despite this setback, most mines in Russia have remained operational and scares of US sanctions continue to boost Russia's interests in gold. As such, according to Fitch Solutions, Russia is slated to be the world's top gold producer by 2029, beating out China. In particular, Russia is expected to achieve an average annual growth rate of 3.7 percent between 2020 and 2029 (Mining.com, 2020).

Among other top producers, gold production in Indonesia, Peru and South Africa fell sharply. For instance, according to one estimate, Indonesia gold production fell 6.9 percent year-on-year while Peruvian and South African production fell 6.6 percent and 16.6 percent, respectively. Indonesian production was negatively affected by the ongoing underground expansions of its Grasberg mine in Papua. As a result, its annual sales dropped significantly as did production, reaching 23 tonnes in 2020. According to the company, production will ramp up to 40 tonnes in 2021 before reaching 45 tonnes in 2022 when expansions are complete (Els, 2020).

In Peru, gold production fell 34.7 percent in the first half of 2020, according to a statement by the Peruvian Ministry of Energy and Mines. This was attributed to a government decreed that put restriction on mining activities in mid-March. Normal operations began in May and in June, gold production recovered almost 50 percent compared to May (Aquino, 2020).

Similarly, South African mining operations were completely halted from March 26th to April 30th after which underground operations, which account for the majority of South Africa's gold production, were only allowed to work at half capacity until June (Metals Focus, 2020). The COVID-19 pandemic also affected operations in other African countries, including the Obuasi mine in Ghana, the Hounde mine in Burkina Faso, and the Fekola mine in Mali (GlobalData Energy, 2021).

As mining operations adjust to pandemic restrictions and lockdowns ease around the world, gold production is expected to recover and grow in the near future. According to one estimate, gold production is forecasted to have a compounded annual growth rate of 2.9 percent, reaching production levels of 3518 tonnes in 2024. According to these calculations, near-term gold production is expected to be led by Indonesia, Peru as well as the North America region (GlobalData Energy, 2021). While estimates differ, overall gold production will likely benefit from high gold prices and fewer operational disruptions in 2021 (WGC, 2021). In line with this, mine production grew 4.2 percent year-on-year in the first quarter of 2021.

Net producer hedging

Gold hedging is a method employed by mining companies to lock in a price for gold produced in the future. It is a preventative measure against gold price falls and thus is more popular when gold priced are high and expected to fall in the near future. In 2020, mining companies de-hedged 65.1 tonnes of gold with the net hedging observed in the first quarter of 2020 offset by steady de-hedging in the follow three quarters. While this may seem contradictory in light of high world gold prices, hedging is ultimately a decision made by companies based on their operations and expected cashflows.

In many cases, hedging may also lead to losses. For instance, Canada's New Gold hedged 12,000 ounces of gold a month at USD 1,355 per ounce for the first half of 2020 and 16,000 ounces of gold per month at USD 1,415 per ounce for the second half of 2020 (Zernov, 2020). This decision was aimed at locking in revenue as the company deals with repositioning its Rainy River mine but led to unforeseen losses as much of its gold production is locked while world prices reach closer to USD 2000 per ounce.

Likewise, Australia's Gold Fields reported a loss of USD 114.6 million on previous gold hedges in 2020. Despite this, the company renewed its hedging program, hedging 1 million ounces of expected gold production in 2021 in light of anticipated heavy capital expenditures (Ryan, 2021). Other Australian companies have also hedged future production, highlighting the sporadic nature of hedging decisions in general (Yeo, 2020). Moving forward, while there seems to be a general trend toward net de-hedging with many producers content to wait and see how gold prices develop, some hedging will still persist as companies manage their cashflows. In the first quarter of 2021, mining companies further de-hedged 25 tonnes of gold.

Recycled gold

In 2020, recycled gold increased 0.7 percent year-on-year, reaching 1,287.8 tonnes in total. In particular, recycled gold grew almost 5 percent year-on-year in the first quarter before falling 6.6 percent year-on-year in the second quarter. This can largely be attributed to COVID-19 related lockdowns and the closure of retail outlets (WGC, 2021). Following the easing of restrictions in the second half of 2020, recycled gold rose 6.1 percent year-on-year in the third quarter of 2020 before falling 1.9 percent year-on-year in the final quarter of 2020.

The supply of recycled gold is largely dependent on the state of the economy, with people more inclined to sell gold in times of financial crises. Moreover, changed in the price of gold are also important with one estimate by the World Gold Council stating that price changes account for about 75 percent of changes in the supply of recycled gold (WGC, 2018). Thus, while the volume of recycled gold increased 0.7 percent year-on-year in 2020, this amount is smaller than anticipated in light of how high world gold prices have been throughout 2020 in addition to economic uncertainty brought forth by the COVID-19 pandemic. Further, the drop in recycled gold in the final quarter of 2020 is also noteworthy and seems to point to economic recovery in major gold recycling countries such as China, India, and Thailand (WGC, 2021). Moving forward, recycled gold is likely to remain stable as the consistent high price of gold will promote gold recycling but while it is in turn, dampened by the anticipated global economic recovery. Currently, 270 tonnes of gold were recycled in the first quarter of 2021, an 8.4 percent year-on-year decrease.

PRICE

As with any other mineral commodity, the price of gold is determined by the interplay between global supply and demand. However, as gold can also be used for investment purposes, its price is influenced by factors such as global uncertainty and perceptions of risk factors.

On the demand side, overall gold demand is likely to remain positive as slight decreases in jewelry and technology demand are expected to be offset by increases in investment and central bank reserves. In

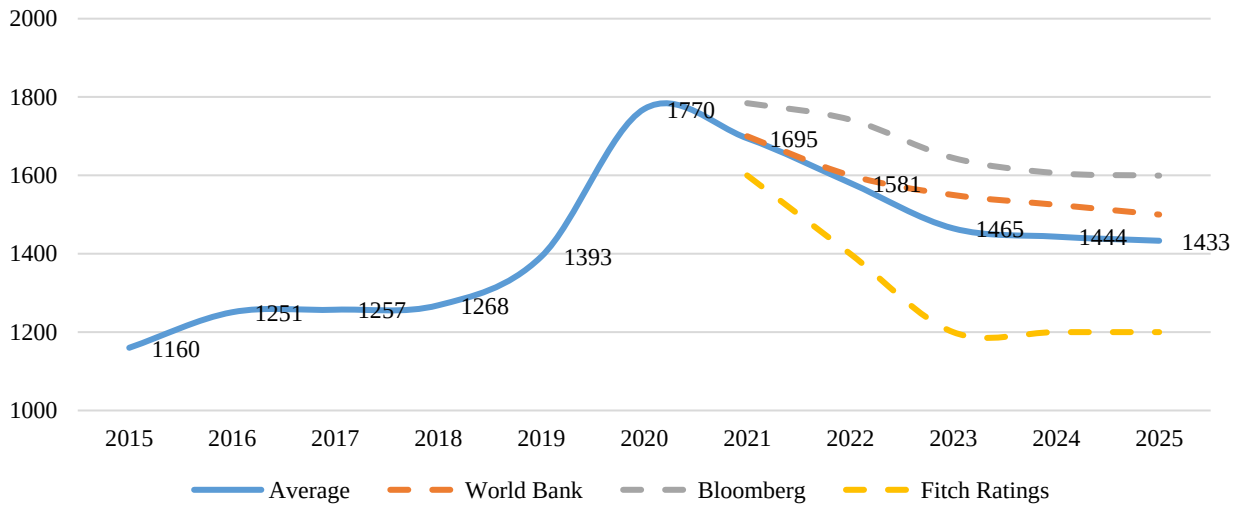
particular, geopolitical instability and trading difficulties are expected to keep investment and central bank purchases up.

As for supply, though the sector was negatively affected by COVID-19 related restrictions and lockdowns, there were no major disruptions in mine production. Thus, as operational disruptions become even fewer, production is expected to increase spearheaded by Indonesian and Peruvian production. Production outlooks for major producers such as Russia and Australia also remain positive.

In terms of price, the price of gold has been steadily increasing since early 2020, owing to increased global instability exacerbated by the COVID-19 pandemic. For instance, the average price of gold in reached USD 1908.56 per ounce in the third quarter of 2020 according to the LBMA. This record high fell marginally in the final quarter of 2020 as vaccination efforts around the world ramped up, reaching an annual average of USD 1770 per ounce. Overall, this sharp persistent increase in gold prices is expected to somewhat normalize in 2021 as vaccination against the COVID-19 pandemic continues.

With these near-term outlooks in mind, gold prices are expected to hover under USD 1700 per ounce in 2021, according to an average of forecasts by the World Bank, Bloomberg, and Fitch Ratings. Near and long-term price forecasts are shown below.

Figure 8. World gold price forecasts, USD per ounce



Source: World Bank, Fitch Ratings, Bloomberg

The World Bank expects gold prices to steadily normalize after a high of USD 1700 per ounce in 2021, eventually reaching USD 1500 per ounce in 2025. Bloomberg estimates are more optimistic, with gold prices expected to remain above USD 1700 per ounce throughout 2022 before steadily dropping to USD 1600 per ounce in 2025. On the other hand, Fitch Ratings forecast gold prices to drop to USD 1400 per ounce in 2021 before falling further to USD 1200 per ounce in the long-term. While this is the most pessimistic outlook of the three, this is a raise from Fitch Rating's previous forecasts. In February 2021, Fitch Ratings changed its metals and mine pricing assumptions, increasing near-term gold prices from USD 1400 per ounce to USD 1600 per ounce due to increased investment demands and central bank purchases (Fitch Ratings, 2021). Overall, while there are differences in magnitude, near-term gold prices are expected to fall slightly but remain bolstered by investment demand and global uncertainty due to the COVID-19 pandemic. As vaccination efforts continue and the global economy recovers, long-term gold prices are expected to normalize further before stabilizing in 2023.

Mongolian gold prices are directly affected by world gold prices as the Bank of Mongolia's gold purchasing prices are determined by the prices set by the London Bullion Market Association. This set price is then further affected by the exchange rate. While it is unclear how the exchange rate will affect Mongolian gold prices, we can expect domestic prices to follow international price trends by normalizing and falling marginally in the near-term but remain high overall.

2.2. MONGOLIAN MARKET

DEMAND SIDE

Mongolian gold demand consists of local consumption and gold exports. Moreover, the Bank of Mongolia purchases all domestically produced gold that is not directly exported.

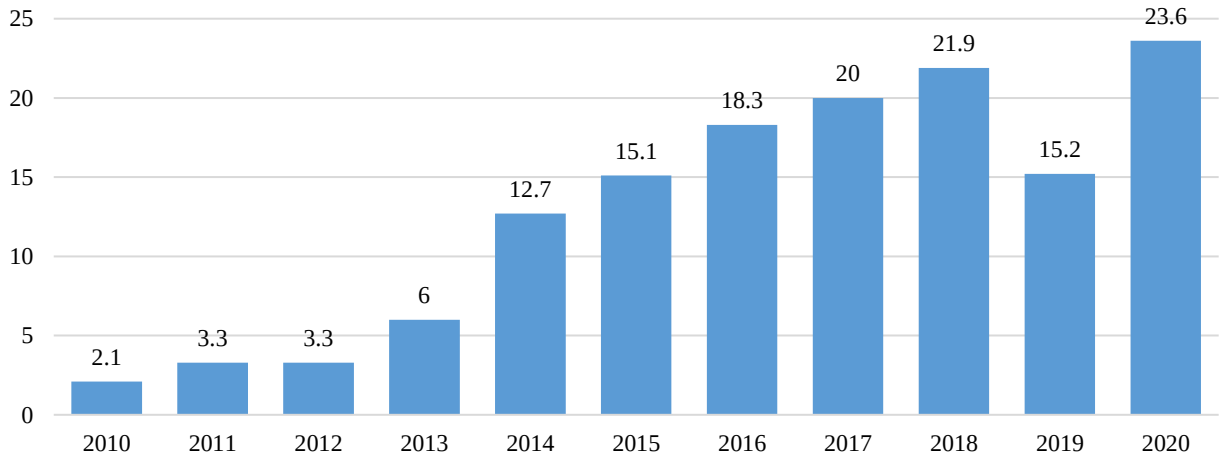
Table 8. Local gold export

	2019			2020			Change (2020/2019)	
	Volume (tonnes)	Value (mln USD)	%*	Volume (tonnes)	Value (mln USD)	%*	Change	%*
Non-monetary gold	9.1	418	5%	30.5	1788	24%	327%	18%

Note: % - Contribution to total growth; Source: Bank of Mongolia*

As shown in the table above, Mongolia exported a little over 30 tonnes of gold in 2020, valued at USD 1.7 billion. This is a more than 3-fold increase from the 9 tonnes of gold exported in 2019 and valued at USD 418 million. Due to this significant surge, the export of gold's contribution to total growth increased from 5 percent to 18 percent. This was supported by increased gold purchases by the Bank of Mongolia. In particular, the Bank of Mongolia purchased 23.6 tonnes of precious metals, of which was almost all gold, in 2020, an 8.3 tonne increase from 2019 (Bank of Mongolia, 2020).

Figure 9. Precious metal purchased by the Bank of Mongolia, 2010-2020, tonnes



Source: Bank of Mongolia

According to an interview with the Head of the Treasury Department of the Bank of Mongolia, gold purchases increased due to a variety of factors. In particular, the Bank of Mongolia offered gold producers the option to get payments in advance of gold expected to be produced as well as offered long-term loans to mining companies that can be paid back in gold. They also worked to help citizens who engaged in gold trading licenses issues by the Financial Regulatory Commission to formalize their activities. Moreover, gold could be sold to the Bank of Mongolia branches in Darkhan-Uul and Bayankhongor provinces to

promote local gold mining and increase rural purchases (Nomintsetseg, 2021). As Mongolia shifted to a state of high alert preparedness due to the COVID-19 pandemic, changes were made to relevant gold purchasing regulations, allowing business entities, individuals and commercial banks to keep their gold stored at the Bank of Mongolia while waiting for paperwork and test results for up to a month as opposed to the normal 3 days (Bank of Mongolia, 2020).

In addition to these efforts, many gold mining companies made efforts to increase production and sell to the Bank of Mongolia to capitalize on high gold prices. Many producers also dampened production in 2019 as a result of the change in gold royalty rates from 2.5 percent to 5 percent in January 2019, waiting to see if any changes would be made. As producers got used to the new royalty rate and the price of gold steadily increased throughout 2020, production ramped up. About 60 percent of all the gold sold to the Bank of Mongolia in 2020 were sold directly from gold mining companies (Nomintsetseg, 2021). Additionally, it is worth noting that pandemic related border restrictions limited gold smuggling, an ongoing problem in Mongolia.

As the Bank of Mongolia continues to purchase 20 to 25 tonnes of gold each year as a part of the national Gold-2 program, this has the added benefit of helping Mongolia's foreign exchange reserves. For instance, the Bank of Mongolia's Treasury regularly refines its purchased gold at refineries registered by the London Metals Exchange and monetizes it, increasing the country's foreign exchange reserves by USD 700 to 800 million annually (Nomintsetseg, 2021). As a result, Mongolia's foreign exchange reserves reached a historical high of USD 4.5 billion at the end of 2020 (Bank of Mongolia, 2020).

While gold price normalizations may dampen gold demand slightly, the Bank of Mongolia remains committed to the Gold-2 national program and will continue its loan program to gold producers in 2021. As a result, gold demand is expected to remain stable in the near future.

Currently, Mongolia has exported 2.7 tonnes of gold, valued at USD 163 million in the first 5 months of 2021. While this is only about half of the amount exported in the same period in 2020, it is only 39 percent lower in value owing to the high price of gold. Additionally, the Bank of Mongolia has purchased 9.3 tonnes of precious metals in the first half of 2021, 1.5 tonnes lower than the amount purchased in the same period in 2020 (Bank of Mongolia, 2021).

SUPPLY SIDE

According to the National Statistical Office, Mongolia produced 20.2 tonnes of gold in 2020, excluding gold production from Oyu Tolgoi. This is a 24.5 percent year-on-year increase compared to the 16.3 tonnes of gold produced in 2019. Overall, domestic gold production was supported by high world gold prices as well as new production streams.

Table 9. Mongolian gold production, tonnes

	2019	2020	Y-o-y Δ %
Gold production /except OT /	16.3	20.2	24.5
Oyu Tolgoi production	6.8	5.2	-23.5

Source: NSO, OT website

Oyu Tolgoi gold production, on the other hand, fell to 5.2 tonnes in 2020, displaying a 23.5 percent year-on-year decrease. However, this was beyond its anticipated production of 3.4 to 4.25 tonnes of gold as the company had access to higher copper and gold grades in the final quarter of 2020. In 2021, Oyu Tolgoi expects to produce 14.2 to 15.6 tonnes of gold in concentrates from processing materials from its open pit and underground development. This increase in gold production can be attributed to the transition to higher ore grade that began towards the end of 2020 and is expected to continue into 2021 (Turquoise Hill, 2021).

Work on Oyu Tolgoi's underground mine project continued in 2020 despite the COVID-19 pandemic and related travel restrictions. This was in part due to consistent shipments across the Chinese border amidst COVID-19 measures. However, as Oyu Tolgoi begins working on load testing and verifications in preparation for shaft sinking in early 2021, travel and flight restrictions will negatively impact productivity and the ability to perform specialized maintenance activities (Turquoise Hill, 2020).

In addition to uncertainty brought on by the ongoing COVID-19 pandemic, Oyu Tolgoi's future will be affected by its ongoing talks with the Government of Mongolia. In particular, the government aims to increase its benefits from the ongoing underground expansions expected to begin production in October 2022 and cost USD 6.75 billion in capital expenditure. Should the negotiation process take longer than the first half of 2021, the project may be delayed further, and value leakages may occur (Jamasmie, Rio Tinto looming talks with Mongolia to decide Oyu Tolgoi's fate, 2021).

In addition to these profit-sharing decisions, Oyu Tolgoi and the Mongolia government need to work towards finding a permanent power supply solution for the mine. While both sides signed the Power Source Framework Agreement (PSFA) in 2018, in which Oyu Tolgoi was to build its own 300 MW coal power plant, this agreement was revised further in June 2020. According to the new agreement, both parties will work towards finalizing a Power Purchase Agreement by the end of March 2021, the Mongolian government will begin construction of a coal power plant no later than July 2021 to be completed in 4 years. Until the coal power plant is completed, Oyu Tolgoi will continue getting power from China (Rio Tinto, 2020). While this decision reduces the company's financing requirements as the original 300 MW coal power plant was expected to cost Oyu Tolgoi USD 924 million, it also increases operational risks as the process is no longer under its control (Jamasmie, 2020). The successful navigation of these decisions between Oyu Tolgoi and the Mongolian government is essential as the company's underground expansion, its most important growth project, will make it one of the world's largest copper-gold mines.

In addition to Oyu Tolgoi, several new project streams bode well for Mongolia's future gold production. Mentioned in the previous report, development of the Bayan Khundii gold mine by Erdene Resource Development (ERD) continued in 2020. For instance, a feasibility study of the open-pit Bayan Khundii mine was completed on 31 August 2020 and filed on SEDAR, a mandatory document filing system for public companies in Canada (Erdene Resource Development , 2019). Further, in July 2020, ERD announced the private placement of approximately CAD 20 million with a CAD 15 million investment by Eric Sprott, a Canadian businessman (Erdene Resource Development, 2020). More recently, ERD acquired a 100 percent interest in the Ulaan exploration license via purchase of Leader Exploration LLC, a private Mongolian company. The Ulaan license includes the area immediately west of the Bayan Khundii gold mine increasing the company's holdings in the area to 170 m^2. While there has not been major exploration into the area yet, some surface sampling was completed and drilling is planned in 2021 (Erdene Resource Development, 2020). Overall, Mongolian gold production is expected to be positively affected in the near future as first production is expected in early 2022 (Erdene Resource Development , 2019).

Similarly, there have been developments in Xanadu Mines' Kharmagtai copper and gold project. The Kharmagtai exploration strategy consists of two phases. Phase 1 involves extensional drilling from known zones in order to get a better understanding of the mineralized system. Phase 2 involves designing a more precise drill program based on the results of Phase 1. Phase 1 began in August 2020 and, as of December 2020, of the 23,000 meters of planned drilling, 17,000 meters have been completed. The company also began drilling efforts in nearby deposits, including Zaraa, Stockwork Hill and Pechko. According to Xanadu's CEO, this is in line with the company's exploration strategy to define higher grade zones while increasing available mineral resources through extensions to known and new deposits. According to the Kharmagtai Mineral Resource report published in October 2018, the mine is estimated to contain 1.9 Mt of copper and 120 tonnes of gold. Following the aforementioned drilling efforts, Xanadu plans to update the Mineral Resource Estimate in the first half of 2021 (Xanadu Mines, 2020). Moreover, Xanadu has received

commitments for a USD 10.2 million placement to be used for Phase 2 exploration, boding well for Mongolia's future gold production (Xanadu Mines, 2021).

In addition to exploration and drilling prospects, gold production began at the Altan Tsagaan Ovoo, a gold and silver mine located in Dornod province in eastern Mongolia. Altan Tsagaan Ovoo is owned by Steppe Gold and was built in 14 months with around USD 20 million in capital expenditure. Gold production commenced in March 2020 and the company aims to produce 1.4 tonnes of gold per annum in 2021 and 2020. There also plans for the company to expand production through a Phase 2 sulphide project that involves the development of underlying fresh rock ores. Following this expansion, gold production is expected to ramp up to 4.25 tonnes from 2023 (Harmantas, 2021).

In addition to the aforementioned project streams, additional work has been done on the Kazakhstan-Mongolia gold and silver refinery. Based on an agreement made in 2019, the refinery will have the annual capacity to process 25 tonnes of gold and 50 tonnes of silver. An estimated investment of USD 81.7 million is needed while the patent costs of USD 30 million will be paid by the Kazakhstan side. Following this decision, the Mongolian government held a regular session in February 2020 to assign relevant ministers, heads of agencies and other officials to study and report back on possibilities to build a gold refinery with foreign and domestic investment (Baljmaa T. , 2020). In an interview with Erdenes Alt Resources, the signatory of the agreement on behalf of Mongolia and sister company of Erdenes Mongol, the company asserted that its key goal was to build a gold refinery in Mongolia. Plans to construct a gold refinery were in the Gold-2 national program and it is a way to improve economic capacity and ensure sustainable growth included in numerous policy documents. As of March 2020, the environmental impact assessment was nearly completed, and the feasibility study was discussed at an extended session of the Professional Mineral Council. According to the feasibility study, regular production is expected to begin within a year of construction and the refinery is slated to be built in the Songinokhairkhan district of Ulaanbaatar (Iderkhangai, 2020).

As for reserves, Mongolian gold reserves increased in 2020. In particular, while reserves of quartz vein gold increased substantially, reaching 80.9 tonnes as compared to 63.9 tonnes in 2019, reserves of placer gold fell 0.7 tonnes, reaching 2.9 tonnes in 2020. Amidst these changes however, the number of active mining licenses given for gold deposits as compiled by the Mineral Resources and Petroleum Authority of Mongolia remained consistent at 531 licenses from 2019 to 2020 (MRPAM, 2021).

Table 10. Local gold reserves

Gold reserves	Unit	2019	2020
Quartz vein gold	tonnes	63.9	80.9
Placer gold	tonnes	3.6	2.9

Source: Mineral Resource and Petroleum Authority of Mongolia

Overall, Mongolia's gold production in the near future is slated to grow. Stable reserves and licenses are supported by new project streams. With the eventual completion of the Oyu Tolgoi underground project, gold production will likely peak in a couple of years. In line with this, Mongolia is expected to export 20 tonnes of gold at USD 1950 per ounce according to the Draft Law on the 2021 State Budget ratified in November 2020. While this is lower than the export levels observed in 2020, it is much higher than 2019 export levels and the projected selling price shows overall optimism about Mongolia's gold sector. Similarly, in the Medium-Term Fiscal Framework for 2022-2024, the Mongolian Government expects to export 16 tonnes of gold purchased by the Bank of Mongolia, not including Oyu Tolgoi production, from 2022 to 2024 at an average price of USD 1730 per ounce in 2022 and USD 1750 per ounce in 2023-2024 (GoM, 2021).

In line with this, Mongolia produced 6.1 tonnes of gold in the first 5 months of 2021, displaying a 9.2 percent year-on-year increase. Similarly, Oyu Tolgoi produced 4.1 tonnes of gold in the first quarter of

2021 alone, almost reaching the full year production of 5.2 tonnes of gold in 2020 (Turquoise Hill, 2021). As for gold reserves, according to the monthly report published by the Mineral Resources and Petroleum Authority of Mongolia, there is 55.8 tonnes of quartz vein gold in reserve as of May, 2021 (MRPAM, 2021).

2.3. CONCLUSION

World gold demand fell 14 percent year-on-year in 2020, reaching 3,760 tonnes, as demand in all categories except for investment fell. It was most notably dampened by a 34 percent decrease in gold demand for jewelry, the largest component of world demand, as both Chinese and Indian jewelry consumption fell significantly. High gold prices as well as the outbreak of the COVID-19 pandemic negatively affected consumer demand and consumption. Similarly, technology demand was hurt by lower consumer demand for electronics as consumers were reluctant to make large purchases in light of the pandemic. Due to global uncertainty brought on by the pandemic, central banks made gold purchases to add to their reserves. However, this was well below the levels observed in 2019 as many countries faced financial strains. These drops in demand were somewhat mitigated by increased demand for gold investments. In particular, there was an unprecedented 120 percent year-on-year increase in demand for gold ETFs as investors looked for a stable investment option during uncertain times. Looking forward, jewelry demand, particularly in China, is expected to recover somewhat as vaccination efforts and perceptions of global economic recovery boost consumer confidence. Similarly, demand for technology will likely be positively affected. On the other hand, ongoing global instability is likely to keep demand for investments and central bank purchases robust. However, it is unlikely either will reach record levels observed in 2019 and 2020 in the near future.

World supply, made up of mine production, net producer hedging, and recycled gold fell a marginal 4 percent year-on-year, owing to a 4 percent fall in mine production. While there were no major disruptions in mine production, the overall fall can be attributed to minor stops in operations due to COVID-19 related restrictions and lockdowns. There was also net de-hedging as the hedging position of many mining companies closed and most seemed willing to wait and see how the price of gold develops before entering into another hedged position. Gold recycling grew 1 percent year-on-year in 2020, owing to high gold prices. However, this is less than expected considering how high world prices were. Moving forward, global supply is expected to grow as COVID-19 related operational disruptions become less of a risk and producers are incentivized by high gold prices.

In particular, the price of gold is forecasted to fall slightly in 2021 but remain high in general, hovering under USD 1700 per ounce. This is supported by lingering global uncertainty due to the COVID-19 pandemic as well as continued gold investment demand. While forecasts differ, gold prices are expected to normalize to around USD 1400 per ounce in the long-term.

Mongolian gold prices are also expected to fall marginally in 2021 as Mongolia is a world price taker. It is important to note that Mongolian prices will also be affected by the exchange rate. In terms of supply and demand, Mongolian demand is expected to be robust as the Bank of Mongolia remains committed to the Gold-2 national program and continues to implement initiatives to support domestic producers and boost gold purchases. As for supply, additional production streams, plans of a gold refinery and growing reserves are expected to support future supply. The eventual completion of Oyu Tolgoi's underground mine project will also increase future supply.

3. COAL

3.1. WORLD MARKET

The COVID-19 pandemic is an unprecedented global health crisis which has caused partial and total lockdowns all around the world throughout 2020 and 2021. Even among developed countries in the best-case scenario, the social and economic consequences have been overwhelming. Following the outbreak of COVID-19 in March 2020, global commodity prices experienced a widespread decline. The pandemic posed a unique shock on both demand and supply.

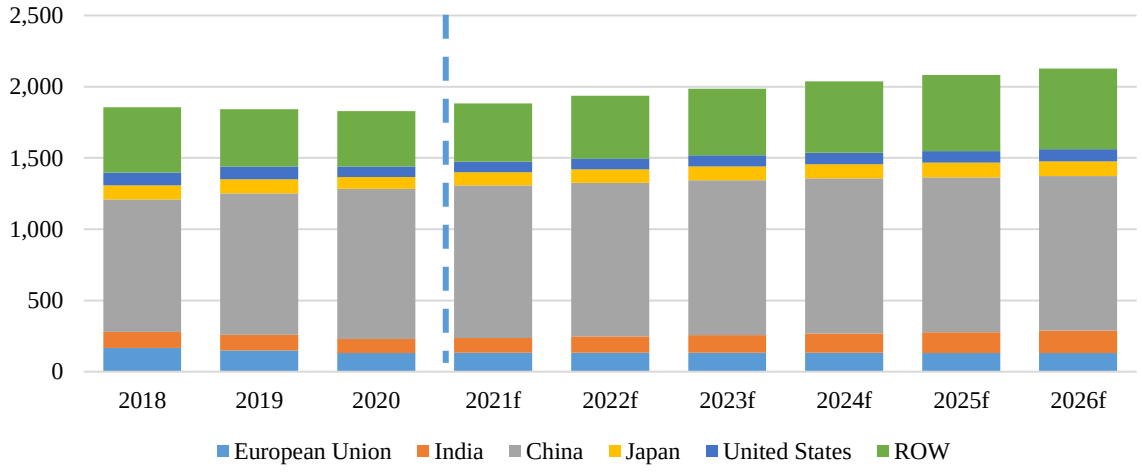
DEMAND SIDE

Metallurgical coal is the primary ingredient in the steel making process. Steel is then utilized in construction, such as building, bridges and infrastructure; transport, such as ships, planes, and trains; and household appliances, such as ovens, fridges, and cutlery. Therefore, the main demand for metallurgical coal is derived from crude steel production and the largest producer of crude steel is China.

Global crude steel production reached 1,869 Mt in 2019, an increase of 3.4 percent year-on-year (worldsteel, 2020). In 2020, global crude steel production levels were 1,854 Mt, a decline of 0.9 percent year-on-year (worldsteel, 2021). The World Steel Association forecasts that steel demand will grow by 5.8 percent in 2021 to reach 1,874 Mt and by 2.7 percent in 2022 to 1,925 Mt (worldsteel, 2021). This is assuming that the ongoing second and third waves of COVID-19 infections will be stabilized in the second quarter and that steady progress on vaccinations will be made, allowing a gradual return to normality in major steel-using countries.

Despite the pandemic, there was only a minor contraction in global steel demand in 2020. This was largely due to a robust recovery in China which negated most of the contractions around the world. Fitch Ratings forecasts that the steel industry will likely improve as key end-markets such as the automotive, manufacturing, construction and infrastructure sectors increase capacity utilization and support margins in 2021 (Schuh & Buchneva, 2020). In the coming years, steel demand is expected to recover supported by pent-up demand and government recovery programs. However, this also poses a risk. The withdrawal of supportive fiscal and monetary policies could undermine the recovery in addition to the uncertainty of the virus and vaccination progresses and trade tensions.

Figure 10. Crude steel production, Mt



Source: World Steel Association, Bloomberg, DISER

China

In 2019, China's crude steel output production reached 996.3 Mt, an increase of 8.3 percent year-on-year. China's share of global crude steel production increased from 50.9 percent in 2018 to 53.3 percent in 2019. Considering the Chinese government's repeated commitments to restructuring the steel industry and to eliminating overcapacity, these repeated annual productions records may be confounding. Between 2016 and 2018, China shut down around 290 Mt of annual capacity from "older" facilities. It is assumed that these facilities were either idle or operating at very low levels. Authorities have also authorized the building of new steel facilities provided that these new facilities replace the same tonnage as the old ones. In other words, net capacity would remain the same despite new facilities. In addition to this, new furnaces are more efficient than older ones, so a few new furnaces with higher utilization rate will replace more older furnaces. Another contributor to higher utilization rates is recycling of scraps and usage of higher-grade iron ore. Roskill forecasts that the Chinese steel production will peak at 1,040 Mt in 2022 assuming that steel production capacity is capped at around 1.2 billion tonnes per year and a utilization rate of 80-90 percent is possible (Sardain, 2020).

The increase in crude steel production in 2019 may have also been due to slowing economic growth, which in turn prompted the Chinese government to keep infrastructure spending high in order to stabilize the property market. Additionally, the prolonged trade war with the United States did not contributed positively to China's domestic growth.

In 2020, crude steel production exceeded 1 billion tonnes to reach 1,053 Mt, an increase of 5.2 percent year-on-year. However, according to revised data from the Chinese National Bureau of Statistics, 2020 steel output was 1,065 Mt (National Bureau of Statistics, 2021). Government policies to promote investment and steady growth have played a vital role in increasing crude steel output, which is a key driver of economic recovery. Additionally, infrastructure and property sectors account for more than half of China's total steel consumption. Therefore, policies to promote investment in these sectors have been crucial to staving of economic slowdown.

In February 2020, there were some logistics bottlenecks of raw material supplies for most steelmakers due to restrictions on transportation; however, these bottlenecks were gradually eased in mid-March and resumed normal operations by April (Zhong, 2020). Therefore, the impact of COVID-19 on steel production was only slight. On the other hand, there have been contractions in steel demand as the construction sector experienced suspensions. Although construction and industrial sectors resumed normal operations by April 2020 in China, the reduced demand from outside China have led to high steel inventories.

According to the World Steel Association, China's steel demand is expected to grow by 3 percent in 2021 (worldsteel, 2021). The growth in infrastructure investments is expected to pick up in 2021 as the new projects kicked off by the Chinese government to support the economy remain in place. Therefore, it is expected that the stimulus measures introduced in 2020 will largely remain in place to ensure continued reasonable growth in the economy. Then, later in 2022, steel demand growth is expected to decelerate to 1 percent as the effects of 2020 stimulus wane and the government focuses more on sustainable growth. Additionally, the trade tensions with the United States and intensified environmental push add additional uncertainty.

Rest of the World

In all economies except China, steel demand experienced a contraction. According to the World Streel Association, the rest of the world steel demand contracted by 10 percent in 2020 (worldsteel, 2021).

Despite high infection levels, the US economy was able to rebound due to substantial fiscal stimulus. Although this helped durable goods manufacturing, overall US steel demand fell by 18 percent in 2020. The Biden administration recently announced a large fiscal proposal containing provisions for substantial

infrastructure investment over a multi-year period. Depending on how long it takes for the plan to be implemented, steel demand may not rebound in the short-term.

Similarly, the European Union steel-using sectors was severely affected by the first lockdown measures in 2020, but experienced a stronger-than expected post-lockdown rebound in manufacturing due to supportive government measures and pent-up demand. Although the EU steel market is on the rebound, this recovery remains fragile especially during the ongoing new waves of infection.

While the COVID-19 cases were relatively fewer and better managed in Japan and South Korea, these economies were still affected by the pandemic. The automotive sector in both countries experienced a substantial decline. The recovery is expected to be moderate but may take a while before steel demand returns to pre-pandemic levels.

For developing economies, the effects of the pandemic were more prominent due to inadequate medical capacity, collapse in tourism and commodity prices, and insufficient fiscal support. Steel demand in these countries declined by 7.8 percent in 2020. Although the rebound is expected in 2021 and 2022, the recovery may be slightly hindered due to accumulation of debt, no recovery in international tourism, and slow vaccination.

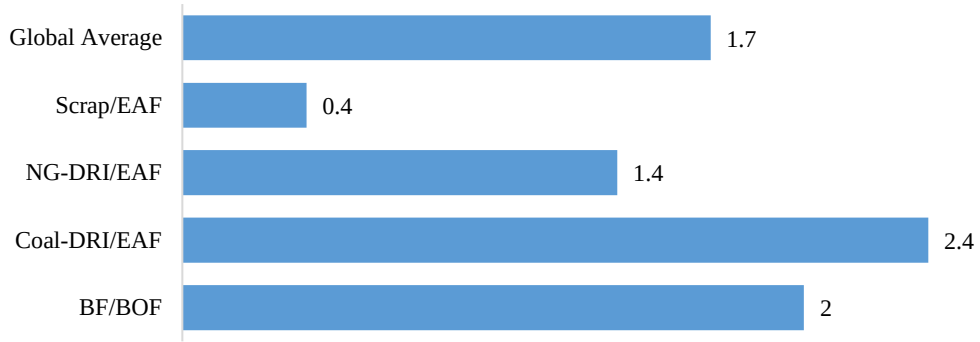
Steel Industry Challenges

There have been a number of shifts in the steel industry in recent years, which could affect the demand for metallurgical coal. Currently, around 70 percent of steel is produced by blast furnace-basic oxygen furnace (BF-BOF). BF-BOF utilizes metallurgical coal to produce coke, which is then used to heat up the pig iron for production of steel.

Electric Arc Furnace

The other method of producing steel is electric arc furnace. Instead producing and utilizing coal and coke, the EAF uses scrap steel and electricity to produce molten steel. In recent years, EAFs have been increasing used as it is smaller, more flexible and emits a fraction of the CO2 produced by BFs (Sardain, 2021). Besides the increasing emergence of EAFs, BFs have been getting upgrades in their technology. Some steel mills have been replacing coal with hydrogen or other forms of energy to cut down carbon emissions.

Figure 11. Carbon emission per ton by process



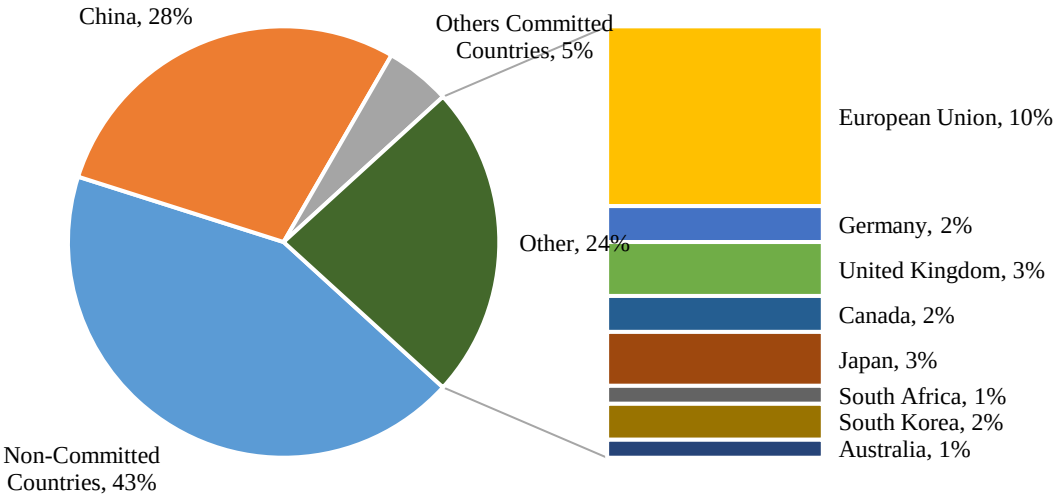
Source: BHP

Environmental Regulations

The steel industry is one of the largest producers of carbon dioxide. In 2015, the global response to the threat of climate change took a step forward when 197 nations adopted the Paris Agreement (United

Nations, 2015). In 2019, the United Nations announced that over 60 countries had committed to carbon neutrality by 2050 (Sengupta & Popovich, 2019). In 2020, China joined the pledge to be carbon neutral by 2060, which was a monumental pledge considering China is one of the largest contributors of carbon emissions (Myers, 2020). These agreements have led to growing pressure to pursue decarbonization across all industrial sectors.

Figure 12. Global CO2 Emissions by Country (2019)



Source: BP Statistics Review of World Energy 2020, Bloomberg Intelligence

The keys developments in decarbonization are changing consumer requirements and growing demand for carbon-friendly product. For instance, manufacturers such as Volkswagen or Toyota are aiming to eliminate carbon emissions completely from their value chains (Hoffman, Hoey, & Zeumer, 2020). Another is tightening carbon emission regulations which provide carbon dioxide reduction targets. There is also a growing investor and public interest in sustainability with more investment firms committing to environmentally responsible business development and sustainable investing. According to recent studies, it is estimated that the global steel industry may find approximately 14 percent of steel companies' potential value is at risk if they are unable to decrease their environmental impact.

Overcapacity

Overcapacity is a challenge faced by the steel industry in many developed economies. For instance, the Japanese steel industry has a total capacity of 130 Mt per year. Japan's crude steel production fell from 99 Mt in 2019 to 83 Mt in 2020, implying a 64 percent capacity utilization. To deal with this issue, large steel producers have been suspending their BF operations. Nippon Steel plans to halt operation of some of its blast furnaces, cutting down its domestic capacity by 20 percent and reducing the number of operating blast furnaces from 14 to 10 (Decena, 2021).

Table 11. Japan Blast Furnace Announcements

Company	Mill Name	Capacity	Annual output (80% utilization)	Met coal demand
Nippon	Kashima No.1	3.58	3.04	2.05
Nippon	Wakayama No.1	2.15	1.83	1.23
Nippon	Kimitsu No.2	4.00	3.40	2.30
Nippon	Setouchi No.2	1.2	0.66	0.45
Nippon	Kyushu No.2	1.18	1.83	1.23

JFE	Kurashiki No.4	3.50	3.98	2.01
JFE	Fukuyama No.4	3.50	2.98	2.01

Source: Bloomberg

Global coal consumption may rebound slightly in the short-term from the lows observed during the pandemic. However, the political and public pressure to cut emissions and coal-use over the next 5-10 years may affect this demand in a downward manner. Almost 50 percent of Europe's coal demand is from countries that have enacted plans to eliminate its use. Germany, for example, consumes the most coal in Europe, and plans to curb its emissions 55 percent by 2030 and completely phase out the use of coal by 2038. This anti-coal movement is also increasing in Asia where China's nascent cap-and-trade program could drive structural declines in coal's use over the next 5 years.

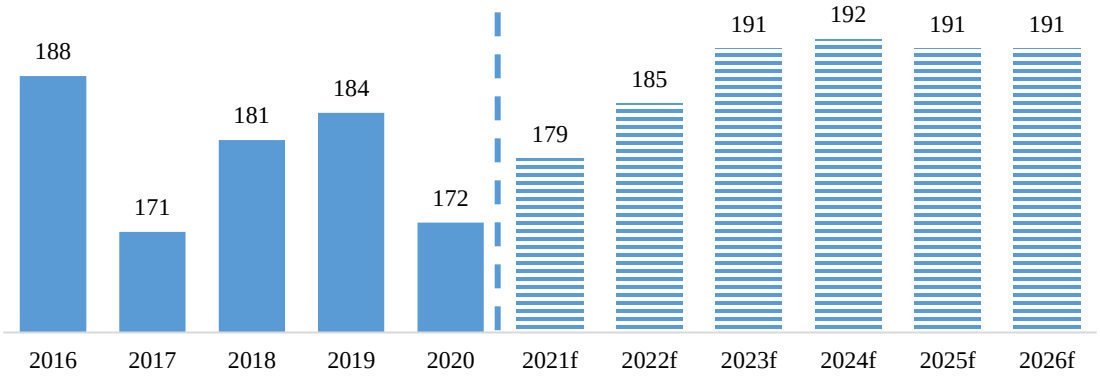
SUPPLY SIDE

As noted in previous studies, in terms of production, China is the largest producer of metallurgical coal. Although China consumes most of its metallurgical coal domestically, China is also the largest importer. In terms of exporters of metallurgical coal, the top 5 are: Australia, United States, Canada, Russia, and Mongolia.

Australia

Australia exported 172 Mt of metallurgical coal in 2020, a decrease of 6.5 percent year-on-year (Gibbons, 2021). This was largely due to China's informal restrictions on imports of Australian coal persisting into 2021. Some of the loss was offset by increased exports to India, Bangladesh, Pakistan, and the Middle East with the emergence of new supply chains. During the first half of 2020, Australia was the largest exporter to China as China closed its border with Mongolia due to COVID-19. However, this dynamic was reversed during the second half of the year as China imposed an informal import restriction on Australian coal and resumed trade with Mongolia. The informal restrictions began in September 2020 after Canberra called for an independent investigation into the origins of COVID-19 (Yap, 2021).

Figure 13. Australian metallurgical coal exports, Mt



Source: Resources and Energy Quarterly

In relation to the restriction and lower global demand and prices, some Australian miners announced production cutbacks or temporary closures. Some mines have gone into "care and maintenance" citing their intention to halt production "while the coal price remains below economic levels and uncertainty remains regarding Chinese Government policy relating to Australian metallurgical coal imports." Glencore announced in December 2020 that it intends to close its Newlands hard coking coal and premium thermal coal mine in the Bowen Basin in the next few years as the resource is exhausted. BHP, who accounts for a quarter of Australia's metallurgical coal production, stated that its medium-term goal is to cut its 2020

metallurgical coal output to 40-44 Mt and to focus its production efforts on higher quality coals. Anglo American's Grosvenor mine is expected to remain suspended until the second half of 2021 after it closed in May 2020 due to an accident that injured 5 workers. Peabody also announced in December 2020 that its Metropolitan mine closed for 8 weeks starting from 1 January 2021, citing weak prices and a lack in orders.

Although the market conditions were difficult for mining companies in 2020, there are a couple of factors which reduce the risk of widespread mine closures in Australia. These include: "take-or-pay" contracts with rail and port operators, contracted export sales, and the costs associated with moving to care and maintenance.

Besides market risks, another risk to Australia's mine production is the annual heavy rainfall. The Australian Bureau of Meteorology advises that La Niña conditions are expected to continue through the first quarter of 2021. The heavy rainfall could pose risks to the supply side as companies stockpile in anticipation. The last significant La Niña was in 2010 and resulted in around 85 percent of Queensland coal mines to either restrict output or close. When Cyclone Debbie hit Queensland in March 2017, the impact of coal production caused prices to double and then ease over a two-month period.

Figure 14. Australian Metallurgical Coal Production by Company

Project	2019	2020e	2021e	2022e
BHP (BMA & Mitsui JVs)	74.4	72.0	75.0	77.0
Anglo American	22.9	19.0	23.0	26.0
Glencore	15.6	14.5	15.0	15.0
Jellinbah	13.5	13.3	13.3	13.3
Coronado (Curragh)	9.0	8.4	9.5	10.0
South32 (Illawarra)	5.1	5.0	5.0	5.3
Sojitz (Crinum + Wilton)	0.5	2.0	3.0	3.0
Qcoal (Byerwen)	2.5	5.5	7.5	7.5
Adaro (Kestrel)	5.7	5.4	6.0	6.0
Total	**149.1**	**145.1**	**157.3**	**163.1**

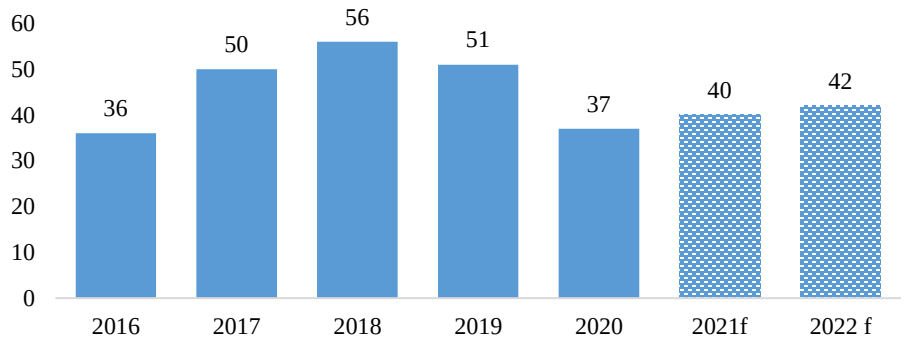
Source: Company reports, Bloomberg Intelligence

Investment in future Australian coal projects is uncertain. The weak market conditions in 2020 have resulted in capital expenditure reductions, write-downs, and final investment decision deferrals. There are currently 42 metallurgical coal projects in the pipeline for Australia. 30 of these projects are at the feasibility stage and 2 of the projects with committed investments are mine expansions. However, based on a compilation of near- and medium-term guidance targets of various Australian mines, coal exports may recover.

Rest of the World

United States metallurgical coal exports declined from 50 Mt in 2019 to 37 Mt in 2020. The US was hit particularly hard as its largest buyers, Brazil, and the EU, cut steel productions. US coal has relatively higher transportation and production costs. This makes it difficult to redirect its production to more distant markets. The recovery in US metallurgical coal may be slow as Brazil and Europe's steel industries' recoveries are slow.

Figure 15. US Metallurgical Coal Exports, Mt



Source: Bloomberg Intelligence

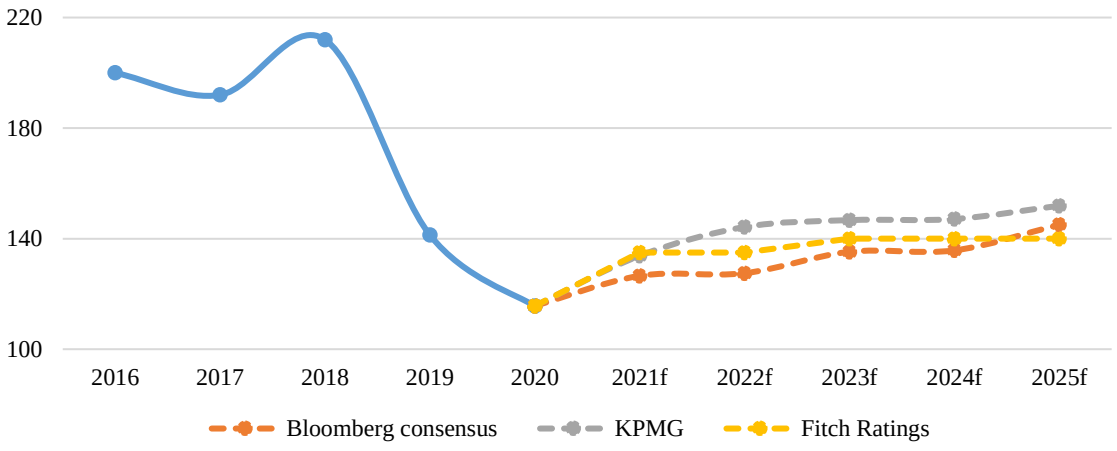
Russian metallurgical coal exports fell by 10 percent in 2020 to around 23 Mt. Exports are expected to recover to 24 Mt by 2021 and grow gradually until it reaches 32 Mt by 2026. As Russian coal is extremely low in sulphur, it is suitable for emerging Asian markets where pollution laws are becoming more stringent. Additionally, Russia has been significantly investing in new mining capacity, and rail and port expansions, which should improve their cost competitiveness.

Canadian metallurgical coal exports should rebound after a decline in 2020 as transport issues are rectified and demand bounces back in key end-markets of Japan, South Korea, India, and Europe. Canada exported around 31 Mt of metallurgical coal in 2020. Only around 10 percent of this was exported to China, which meant most of the decline in exports was due to exposure to non-Chinese markets. However, exports to China may increase in the short-term as Canada tries to fill in the gap created by China's informal import restriction on Australian coal.

PRICE

In 2019, spot price of hard coking coal hit a three-year low of USD 141 per tonne. This decline was due to muted demand growth, weak steel output in non-Chinese markets, anticipated caps on Chinese imports, declining steel margins in China, and growing supply from Australia, Canada and Mongolia as new capacities are added (Griffin, 2019).

Figure 16. Metallurgical coal price forecast, USD per tonne



Source: Bloomberg, KPMG, Fitch Ratings

The upturn in metallurgical coal in early 2020 to USD 147 per tonne was driven by supply disruptions stemming from weather conditions in Canada, the collapse of a roof at Anglo American's Moranbah North mine in Queensland in late January 2020, and the outbreak of COVID-19. However, this trend reversed as prices declined steadily in 2020 due to the slowing global economic activity in light of the spread of the COVID-19 pandemic, which reduced steel production all around the world. By the end of 2020, price of hard coking coal FOB Australia was USD 115 per tonne.

Metallurgical coal prices lifted sharply in the first quarter of 2021 to USD 124 per tonne due to fears over weather disruptions at Queensland ports. The recovery in metallurgical coal prices is expected to resume in 2021 as the steel industry rebounds and the possibility that China might relax the informal restrictions on Australian imports.

3.2. MONGOLIAN MARKET

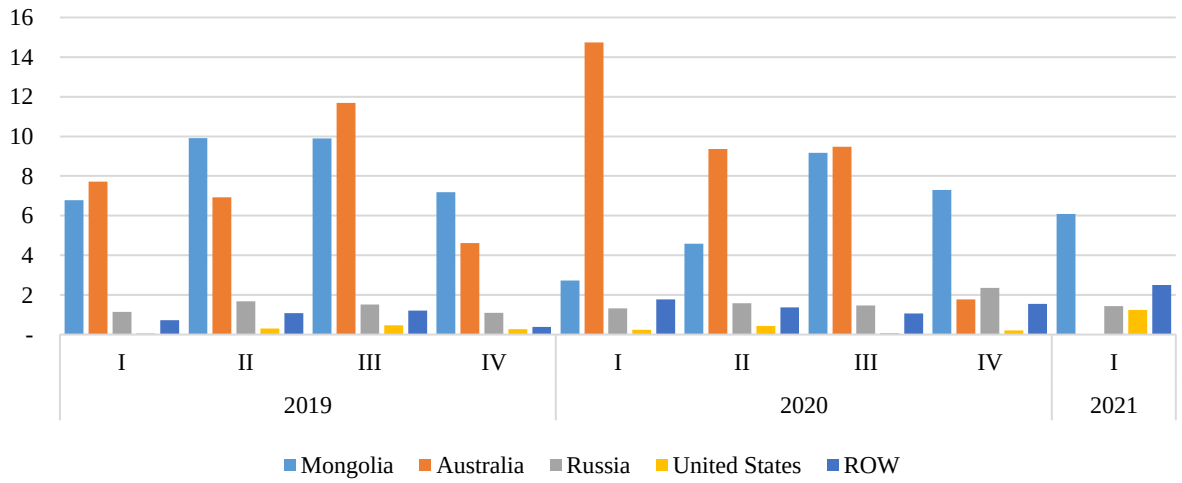
The COVID-19 pandemic had a significant impact on the Mongolian economy and its coal industry, just like everywhere else in the world. However, the effects were slightly less negative. Due to early containment measures, most of the country and mining operations did not have to halt operations in early 2020. As mentioned previously, demand from China rebounded relatively quickly, which ensured a relatively consistent market to export to. The main challenge to Mongolian coal industry in 2020 was border and port closures.

DEMAND SIDE

China remains the dominant market for Mongolian coal exports. As mentioned previously, the Chinese steel industry experienced a slight halt in operations in early 2020 but rebounded quickly to resume normal operations by late April. The Chinese steel market was even able to produce a record-breaking amount of crude steel, 1,065 Mt in 2020.

Prior to the COVID-19 pandemic, the Chinese government attempted to restrict coal imports to develop its domestic coal industry. Another factor in Chinese coal imports was quality – higher quality coal was sought by Chinese steel mills due to its higher levels of efficiency. Most Chinese coal imports tend to be from Australia due to the high quality of its metallurgical coal. However, Australian coal exports experienced a slight downturn when China imposed an informal restriction on its coals in October 2020. This created a gap in Chinese coal imports, which was mainly filled by Mongolia.

Figure 17. China metallurgical coal imports, Mt



Source: Bloomberg

As seen in the figure above, Mongolia and Australia are China's largest coal importers. The volume of metallurgical coal has remained relatively equal between Australia, exporting around 30 Mt each in 2019. In the previous study, it was noted that Mongolia may replace Australia as China's largest metallurgical coal supplier. This assumption was realized in 2019 and 2020 when Mongolia exported around 3 Mt more than Australia in 2019 and 11 Mt in 2020. The large difference in export volumes in 2020 was mainly due to the informal restriction on Australian coal. This restriction has continued onto the first quarter of 2021, thus, allowing Mongolia to maintain its status as the largest coking coal supplier to China.

Even if the restriction is lifted in 2021, Mongolia is still posed to be fierce competitor. Bloomberg expects Mongolia's coal production to increase substantially in the future with the completion of the Trans-Mongolia and Tavan Tolgoi railways.

SUPPLY SIDE

According to the Mineral Resource and Petroleum Authority's monthly mineral resource statistics, Mongolia's coal production increased from 54.6 Mt in 2018 to 57.1 Mt in 2019, an increase of around 5 percent year-on-year. However, export volume stayed relatively the same. A detailed breakdown of coal production and sales by company and type of coal is included in the Appendix.

Table 12. Mongolian coal production, Mt

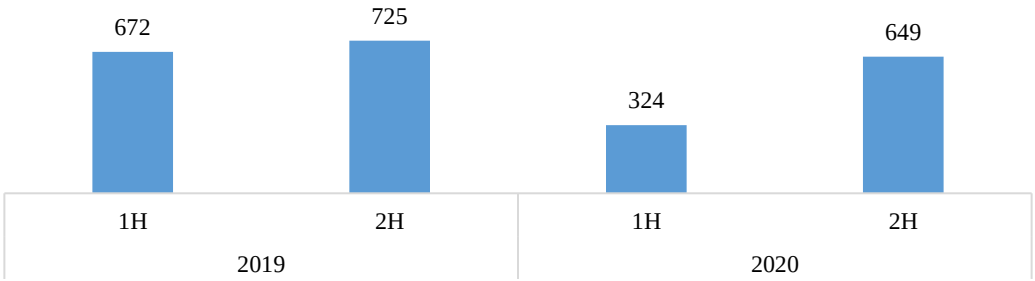
	2018	2019	2020	2021Q1
Stripping	244.86	292.18	209.36	69.52
Extraction	54.57	57.13	43.08	12.82
Sale	45.74	47.05	40.98	11.33
Export	**36.67**	**36.81**	**31.18**	**8.41**
Washed coking coal	5.48	6.85	4.96	1.09
Raw coking coal	14.40	16.80	14.41	4.68
Weak coking coal	11.68	8.70	9.18	1.67
Thermal coal	5.11	4.47	2.63	0.97
Domestic				
Bituminous and lignite coal	9.07	10.24	9.77	2.91

Source: Mineral Resource and Petroleum Authority

In 2020, Mongolia's coal production decreased by 24.6 percent year-on-year to 43.1 Mt. Of the 43.1 Mt, around 72 percent was exported. The decline in production was mainly due to border closures with China. Coal exports were temporarily suspended from early February to late March 2020 after the COVID-19 outbreak. During the first half of 2020, stringent procedures and requirements enforced by authorities at the China-Mongolia border led to a decrease in total cross-border traffic relative to the same period the previous year. However, the situation improved during the second half of 2020 when the temporary Green Gateway regulation was introduced.

According to the Mongolian Mining Corporation, there was a 34 percent decline in the total number of coal-loaded trucks crossing via the Gashuunsukhait-Ganqimaodi (GS-GM) border in 2020 as compared to 2019 (Mongolian Mining Corporation, 2020). A total of 134,028 coal-loaded trucks passed from Mongolia to China via GS-GM during 264 operating days in 2020 while in 2019, a total of 204,130 coal-loaded trucks passed during 292 operating days.

Figure 18. Average trucks per operating day crossing via GS-GM



Source: Mongolian Mining Corporation

Prior to COVID-19, up to 2000 coal trucks could cross the China-Mongolia border each day, under normal market conditions. However, after the border closures in February and March 2020 and before the Green Gateway regulation, the daily volume of coal transportation freight trucks was a couple hundred. After the implementation of the Green Gateway, the number of coal trucks exceeded 2,000, a return to the pre-COVID-19 level. On 25 August 2020, a total of 2001 heavy duty trucks for coal transportation moved through the Gashuunsukhait, Shiveekhuren, Yarant, and Khangai border crossing points to China (Baljmaa T. , 2020). The Green Gateway is a temporary regulation aimed at reviving trade, economic cooperation and progress with large-scale projects and programs, which came into effect on 1 August 2020. The regulation is expected to be implemented until the end of May 2021. Coal transportation was again disrupted in late November when a new wave of infections hit both countries. Mongolia recorded its first locally transmitted case of COVID-19. In response, both Chinese and Mongolian government authorities tightened border health clearance processes, which caused the daily number of trucks to fall to less than 20. The situation was further exacerbated by test result forgeries.

Mongolyn Alt (MAK) LLC

MAK commenced operations at its Nariin Sukhait mine in 2007. According to them, the company is projected to annually export 6-8 Mt of coal from 2018 to 2022. As the company is privately owned, the research team was unable to access its annual reports or operational reports. However, based on interviews and news articles, the research team was able to piece together a glimpse into its exports in 2020.

During the first four months of 2020, MAK exported a total of 300 thousand tonnes of coal. Relative to the same period the previous year, exports were substantially low. In 2019, during the first four months of the year, MAK exported 4 Mt of coal. The company planned to export around 7 Mt of coal in 2020; however, due to COVID-19 and border restrictions, they were unable to meet the target. Their 2019 export target was 8 Mt. In addition to coal production, MAK has a coal washing plant with a capacity of 1 Mt per year.

SouthGobi Sands LLC

The company's sales volume decreased from 3.7 Mt in 2019 to 2.6 Mt in 2020 due to the COVID-19 pandemic. The average selling price of its coal decrease from USD 34.9 per tonne in 2019 to USD 33 per tonne in 2020. The decrease in the average selling price was due to a higher portion of sales made at the mine gate instead of transporting the coal to the border and selling to third party customers within China.

Due to border closure with China from February 11 until March 28, SouthGobi Sands suspended its coal exports. After March 28 when the borders were re-opened for coal exports on a trial basis, there was an improvement in coal exports. To mitigate the financial impact of the border closure and to preserve working capital, the mine temporarily ceased its mining operations from February 2020 and resumed operations on

2 August 2020. Even with resumption of operations, the SouthGobi Sands management decided to pace production to meet expected sales in 2020. SouthGobi has the capacity to wash 2 Mt of coal per year.

Table 13. SouthGobi Sands sales volume and prices

	2019	2020
Premium semi-soft coking coal		
Sales (Mt)	0.67	1.01
Average price per tonne (USD)	32.96	33.22
Standard semi-soft coking coal		
Sales (Mt)	2.35	1.43
Average price per tonne (USD)	33.54	34.69
Standard thermal coal		
Sales (Mt)	0.09	-
Average price per tonne (USD)	29.43	-
Washed coal		
Sales (Mt)	0.63	0.19
Average price per tonne (USD)	43.05	41.96
Total		
Sales (Mt)	3.74	2.63
Average price per tonne (USD)	34.88	33.01

Source: SouthGobi Sands 2020 Annual Report

The company is cautiously optimistic about the Chinese coal market and expects coal supply and coal import in China to be limited due to increasingly stringent requirements related to environmental protection and safety production. In the medium-term, the objectives of the company are to: enhance product mix, expand customer base, optimize cost structure, and operate in a safe and socially responsible manner.

Tavan Tolgoi JSC

In 2020, Tavan Tolgoi extracted 2.5 Mt of coal; of which, 2.2 Mt were exported, and 316.9 thousand tonnes were sold to the domestic market. Total coal sale was 2.35 Mt in 2020, which was 45.7 percent of the planned amount (company planned to export 5.2 Mt in 2020). Although sales volume was slightly more than the previous year, total revenue was low due to low prices.

The company decided on 30 November 2020 to provide 2 tonnes of coal for free to Umnugobi province residents over the age of 60 and to decrease the domestic coal price by 20 percent to MNT 30,800 from 2 December 2020.

Energy Resource LLC & Khangad Exploration LLC

Energy Resource LLC became an indirect wholly owned subsidiary of Mongolian Mining Corporation (MMC) in 2010. MMC also owns Khangad Exploration LLC. Energy Resource LLC operates the Ukhaa Khudag deposit while Khangad Exploration LLC operates the Baruun Naran deposit.

In 2020, 7.0 Mt of coal was produced from the Ukhaa Khudag deposit and 0.7 Mt from the Baruun Naran deposit. Coal output in 2020 was adjusted to take into consideration coal transportation and sales, which were impacted by border restrictions. 7.4 Mt of coking coal was processed in 2020, of which 6.7 Mt and 0.7 Mt was sourced from Ukhaa Khudag and Baruun Naran, respectively. The coal handling and preparation plant produced 3.5 Mt of washed coking coal and 1.2 Mt of washed thermal coal. In 2020, the two companies exported a total of 3.8 Mt of coal via the Gashuunsukhait-Ganqimaodu border crossing. Of this, 45 percent was exported using the companies' own trucking fleet and the remaining 55 percent was by third party contractors.

The two companies sold a total of approximately 4.2 Mt of coal products in 2020, a decline from the 5.1 Mt of coal sold in 2019. Of the 4.2 Mt sold in 2020, 3.1 Mt was hard coking coal, 0.4 Mt semi-soft coking

coal and 0.7 Mt thermal coal. The average selling price of hard coking coal was USD 121.4 per tonne in 2020 (USD 140 per tonne in 2019).

In 2021, the companies will aim to maximize production and sales volumes to meet the elevated demand. However, this is possible if the world and market can overcome the challenges faced due to the COVID-19 outbreak.

MoEnCo LLC

In 2020, during the six months between March 30 and September 30, MoEnCo produced around 336.1 thousand tonnes of coal and sold 238.7 thousand tonnes. Relative to the same period the previous year, coal production and sales declined by 67 percent and 66 percent, respectively. The decline in production and sales was due to the COVID-19 pandemic and travel restrictions and quarantines imposed in China and Mongolia during the six-month period. Of the 238.7 thousand tonnes of coal sold, 224.6 thousand tonnes were clean coking coal, 14.1 thousand tonnes were thermal coal, and 234 tonnes was raw coal. The average selling prices of these coals were approximately HKD 1,194.0 HKD 46.5, and HKD 647.7 per tonne, respectively. The average selling prices, relative to the same period the previous year, of cleaning coking coal declined by 7.3 percent, thermal coal increased by 20.4 percent, and raw coal declined by 7.7 percent.

Around 76 percent of the company's revenue was generated by one customer. Sales price and quantity is negotiated with the client on a monthly basis. With the other customers, sales are negotiated shortly before delivery under the prevailing market price and quantity of coal available.

MoEnCo's coking coal export to China was halted since February 2020 and only resumed at the end of May. With the implementation of the Green Gateway regulation, coal export capacity between the China and Mongolia increased, which assisted in the gradual recovery of the company's exports.

Erdenes Tavan Tolgoi JSC (ETT)

In partnership with "Ikh Gobi Ilch" LLC, ETT began to export its first value-added product of washed coking coal from 29 November 2019.

Prior to COVID-19, the planned export volume was 9.2 Mt from West Tsankhi and 16.2 Mt from East Tsankhi. However, due to the pandemic, export volume during the first half of the year was lower than expected; therefore, export volume projections for the year were revised. The revised export projection for 2020 was 12.6 Mt in total, 5.3 Mt from West Tsankhi and 7.3 Mt from East Tsankhi. In 2020, ETT extracted 13.1 Mt of coal, a decrease of 18 percent year-on-year, and exported 11.9 Mt, a decrease of 23 percent year-on-year. This is equivalent to around 41 percent of Mongolia's total coal exports and 3.32 percent of the world's total coking coal export.

In 2021, ETT announced that it will be issuing corporate bonds on the domestic market for a total value of MNT 2 trillion in three tranches in both MNT and USD. This bond issuance is part of the "MNT 10 Trillion Comprehensive Plan for Economic Recovery" under implementation by the Government of Mongolia. The first bond was issued on April 9. The total value of the first bond was MNT 600 billion with a 24-month maturity. Interest payments will be semi-annual and the interest rate for MNT is 10 percent and 6.8 percent for USD. Of the MNT 600 billion, MNT 400 billion will be in MNT bond and the remaining MNT 200 billion, or USD 70.17 million, will be in USD. The collateral for the bond is sales revenue.

The second bond will be issued sometime in the second quarter of 2021. The maturity for the second bond remains 24 months for MNT and increased to 36 months for USD. The third bond is expected to be issued between second and third quarter of 2021. The maturity for both the MNT and USD bond will be 36 months. The MNT 2 trillion ETT bond will be used to finance mine development, infrastructure projects and working capital. A detailed breakdown of how the ETT bond will be used is below:

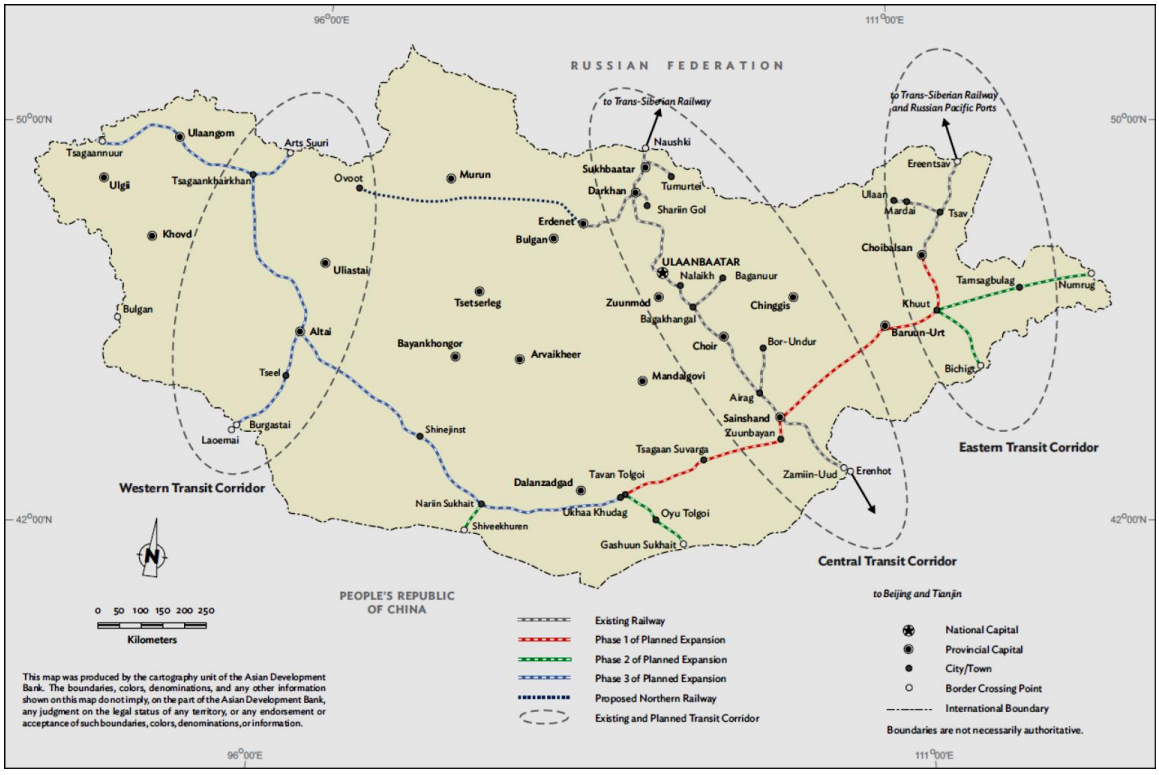
Table 14. ETT bond fund use

Infrastructure	Remaining financing required for the Tavan Tolgoi-Zuunbayan railway project	MNT 601.1 billion
	Financing for connection of Tavan Tolgoi-Gashuunsukhait, Tavan Tolgoi-Zuunbayan railways (30% of USD 75.2 million)	MNT 65.4 billion
	Construction of 450 MW Tavan Tolgoi thermal power plant (USD 105.6 million)	MNT 306.2 billion
	TOTAL	**MNT 972.7 billion**
Mine development	Purchase of mining machinery and equipment	MNT 50.0 billion
	Financing for connection of Tavan Tolgoi-Gashuunsukhait, Tavan Tolgoi-Zuunbayan railways (30% of USD 75.2 million)	MNT 65.3 billion
	Advance for the construction of a pipeline to draw water from the "Zagiin Usnii Khooloi" groundwater deposit located in Tsogttsetsii and Tsogt-Ovoo soums in Umnugobi province	MNT 16.2 billion
	16% of the financing for the first 10 Mt of coal concentrator block (USD 42.6 million)	MNT 123.5 billion
	Advance for the construction of a pipeline to draw water from the Tsagaantsav groundwater deposit in Mandakh soum in Dornogobi province	MNT 116.0 billion
	TOTAL	**MNT 371.0 billion**
Working capital		**MNT 650.6 billion**

Source: Erdenes Tavan Tolgoi

In 2019, construction of the Tavan Tolgoi-Gashuunsukhait and Tavan Tolgoi-Zuunbayan railways began with investments of MNT 308.9 billion and MNT 357 billion, respectively. In 2020, additional investments were made in the railways – Tavan Tolgoi-Gashuunsukhait was injected with MNT 644 billion in financing and Tavan Tolgoi-Zuunbayan with MNT 750 billion. As of May 2021, 416.2 kilometers of the Tavan Tolgoi-Zuunbayan railway has been completed.

Figure 19. Planned Mongolia railway networks and transit corridors



Source: Central Asia Regional Economic Cooperation Program

The government is striving to have the Tavan Tolgoi-Gashuunsukhait railroad operational by July 2022 as it would enable Mongolia to ramp up its mineral and cargo exports. Coal export is expected to increase four-fold to 30-50 Mt per year, production at the Tavan Tolgoi mine is estimated to double or triple, and around 2,000 full-time jobs will be created. As of early May 2021, earthworks of the railway constriction are at 81 percent completion, while the assembling of upper infrastructure is progressing at 67 percent. According to contractors, of the planned 233-kilometer railway, 201 kilometers have been built. A potential problem in the future for the railways could be gauge sizes. Mongolian railways typically use a broad gauge like Russia; however, China uses a narrow gauge. Therefore, during transportation, cargo on the new railway may need to be unloaded and reloaded due to the differing gauge sizes.

Table 15. Erdenes Tavan Tolgoi coal extraction and sales forecast, 2018-2025

	2018	2019	2020	2021f	2022f	2023f	2024f	2025f
Coal extraction, Mt	**11.0**	**16.1**	**13.1**	**22.04**	**29.04**	**37.13**	**47.50**	**50.38**
East Tsankhi				12.00	12.00	12.00	15.00	15.00
West Tsankhi				8.00	12.00	15.00	17.00	20.06
Bor Teeg				2.04	5.04	10.12	15.50	15.32
Sales volume, Mt	**13.1**	**15.5**	**11.9**	**21.12**	**28.02**	**33.18**	**43.41**	**46.91**
East Tsankhi				11.64	11.80	11.46	13.28	13.94
West Tsankhi				7.67	12.0	13.24	16.78	19.80
Bor Teeg				1.81	4.22	8.48	13.35	13.17
Average selling price, USD/t				**43.64**	**55.72**	**68..91**	**66.62**	**65.67**
East Tsankhi				43.44	57.80	74.81	71.85	69.73
West Tsankhi				46.41	59.24	75.29	72.35	71.53
Bor Teeg				33.20	39.87	51.00	54.23	52.57

Source: Erdenes Tavan Tolgoi JSC

From 2021 to 2025, ETT expects its coal extraction and export to double. This increase is expected due to mine development and financing of major projects. Besides the projects being financed by the ETT bond, the company expects to fund other projects, such as the Coal Shipping Center, Khangi Mandal, Gashuunsukhait road, coal chemical plant, steel plant, and coke plant, using its own finances.

THERMAL COAL

In a drastic measure to combat air pollution, the Government of Mongolia implemented a ban on consumption of raw coal in Ulaanbaatar from 15 May 2019. For decades, severe air pollution in the winters was a constant problem for Ulaanbaatar. 80 percent of Ulaanbaatar's air pollution was caused by households and low-pressure boilers burning raw coal in the ger districts (World Health Organization, 2019). Researchers estimated that 200,000 gers burn 600 thousand tons of raw coal every winter to stay warm.

Under the ban, households and enterprises who violate the ban will be fined from MNT 300,000 to MNT 3 million. Households in Ulaanbaatar will be supplied with processed coal (coal briquette) instead of raw coal. A household that burns 4-5 tons of raw coal will only need 3 tons of coal briquette for heating. The new coal briquette began being sold on 15 June 2019 for MNT 150 thousand per ton.

202 thousand households used to use stove in 2018 while 6 thousand households moved into apartments in 2019. Around 30 thousand household solved their heating with electricity and other resources while 177 thousand households used stove. These households consumed 474 thousand tons of coal briquette in 2019-2020, which is 2 times lower than the amount of raw coal consumed in 2018. Since the implementation of the ban on consumption of raw coal and usage of coal briquette, it is estimated that air pollution has halved.

Tavan Tolgoi Tulsh LLC

Within the scope of preparing for the 2020-2021 winter, Tavan Tolgoi Tulsh plans to reserve 200 thousand tons of refined coal during the summer. According to the company, the plant was capable of producing 30-40 tons of coal briquette per hour in 2019. Furthermore, the company is constructing another coal briquette

factory in Nalaikh which was expected to be operational by November 2020. The Nalaikh plant will provide the households in secluded districts, such as Gachuurt, Nalaikh, Baganuur, and Bagakhangai with coal briquette. The new plant has an annual capacity of 600 thousand tons of coal briquette. It was announced that the new eastern regional factory was commissioned on December 8. The factory consisted of the first and second plants and recycling plant.

Tavan Tolgoi Tulsh's first factory is in Songinokhairkhan. However, due to complaints of environmental pollution, the Cabinet has decided to move the western factory in Tolgoit to Sergelen soum in Tuv province within the third quarter of 2021. The company plans to rehabilitate the remove the environmental pollutions it caused at the current location before moving. Once the factory is moved, the facility will be used as a story facility for refined coal. The relocation of the western factory may not finish by the end of 2021 due to COVID-19, especially while maintaining its normal refined coal production and distribution.

In 2019, the coal briquettes cost at least MNT 150,000 per ton, but those packaged in 25-kilogram cost MNT 3,750. During the 2 December 2020 Cabinet meeting, it was decided that coal briquette will be purchased at 50 percent discount price or MNT 75,000 per ton from December 3 to 1 April 2021. The discount rate was further increased by 25 percent from December 14, so the total discount on coal briquette is 75 percent.

Baganuur JSC & Shivee-Ovoo JSC

Baganuur JSC was established in 1978 and has a coal reserve of 787 Mt. The annual production capacity is 4 Mt and the average calorific value of its coal is 3360 kcal/kg. The company supplies coal to all five Combined Heat and Power plants in Ulaanbaatar, Darkhan and Erdenet; in other words, it supplies 60 percent of Mongolia's thermal coal. The average price of 1 tonne of thermal coal is MNT 33,500. According to Baganuur JSC's 2020 annual report, the company sold 4.05 Mt of thermal coal in 2020, a decrease of 1.5 percent year-on-year.

Shivee-Ovoo JSC was established in 1990 and has a coal reserve of 626 Mt. The annual production capacity of the mine is 2 Mt and the average calorific value is 3000 kcal/kg. In 2012, the company met 30 percent of the country's domestic coal needs and 51 percent of the Thermal Power Plant-4. According to the company's 2020 operational report, 2.01 Mt of coal was extracted in 2020 and 1.98 Mt was sold. The average price of 1 tonne of thermal coal was MNT 29,060 in 2020.

On 24 December 2020, the Minister of Finance and the Director of Infrastructure and Environment Finance Group of the Japan Bank for International Cooperation (JBIC) established a financing agreement of MNT 37.5 billion to increase capacity of machinery and equipment of Baganuur and Shivee-Ovoo JSCs. With the JBIC loan, the first phase of renovations has been made in 2020 with the procurement of 20 pieces of machinery worth USD 18.3 million. Around 60-70 percent of the equipment at the two mines are obsolete forcing its parent company, Erdenes Mongol LLC, to spend around MNT 3-4 billion in repair and maintenance. With these upgrades and renovations in technology and equipment, the two mines can reduce costs and increase production capacity.

Khuren Tolgoi Coal Mining LLC (previously known as Qinhua-MAK-Nariin Sukhait LLC)

The company was registered as Qinhua-MAK-Nariinsukhait LLC in 2002 with 50 percent of the company owned by Mongolian entities and the other 50 percent by Chinese entities. Since 4 August 2020, the company has become 100 percent Mongolian owned and was renamed Khuren Tolgoi Coal Mining LLC.

Usukh Zoos LLC

In 2019, Usukh Zoos planned to export 4 Mt of coal. During the first four months of 2019, the company was able to extract around 200 thousand tonnes of coal. Additionally, around MNT 20 billion was raised to

construct a washing plant with an annual capacity of 2.5 Mt. The coal washing plant was expected to commence operations in May 2019.

The planned coal export volume was 3.4 Mt in 2020. However, due to COVID-19, Usukh Zoos temporarily suspended mining production from February 10. The company's exports resumed from April 1 and around 40 coal trucks crossed the border and back on April 13. This is substantial considering the number of trucks which crossed the Shiveekhuren border crossing that day was 160 and the pre-COVID-19 levels were 600-800 trucks.

During the first quarter of 2020, Usukh Zoos planned to export around 1 Mt of coal; however, as of April 13, they have exported around 40 thousand tonnes of coal. If coal exports resumed to normal operations, the company expects to export 2.5 Mt; however, if the border bottlenecks continue, the company may not be able to even export 1 Mt. During the suspension of mining operations, the company made maintenances and repairs to its technology in preparation for future use.

PRICE

Despite the pandemic, coal demand from China driven by its steel industry rebounded relatively quickly. Decrease in crude steel output only occurred between February and April 2020. Purchases of Mongolian coking coal was strengthened by end users in the Inner Mongolia region as coking coal supply was limited. Coal supply in that region has been curbed due to corruption probes and production quotas. Due to this, Mongolian coking coal prices increased by 20-30 CNY at the Ganqimaodu border crossing. As of September 2020, "Mongolian 5# unwashed coking coal" was priced at CNY 800-830 per tonne and washed coking coal at CNY 1,010-1,050 per tonne (Fenwei Energy, 2020). Additionally, there was increased demand for Mongolian coal from China during the fourth quarter of 2020 as China imposed an informal restriction on Australian coal from October. This likely further increased Mongolian coking coal exports and prices. Major Mongolian mining companies have cited a decrease in revenue; however, that decline was mainly caused by decline in export volumes, not prices. The border closures and stringent border checks due to COVID-19 have worsened the bottlenecks at the border. A breakdown of Mongolian coal prices by company and type of coal for 2019 is included in the Appendix.

The effects of the pandemic and supply disruptions caused by border closures will hopefully dissipate in the coming years and increase Mongolian exports. Based on that optimistic outlook, the following coking coal export forecasts were made.

Table 16. Mongolian coking coal export forecasts, Mt

	2021	2022	2023	2024
Government of Mongolia	42	39	41	43
Bloomberg	34	39		
DISER	26	32	32	32

Source: DISER, Bloomberg, Medium Term Fiscal Framework for 2022-2024, Draft Law on the 2021 State Budget

There are a couple of factors which could increase the price of Mongolian coal in the future. One is the commission of the new railway from Tavan Tologi to Gashuunsukhait, which could lower transportation costs while increasing export volume. Second, Mongolian mining companies have been increasing their coal washing capacities by commissioning new plants and there are more processing plants included in the business plan of various companies as well as the government. Third, relations between China and Mongolia have been positive, even during COVID-19 with the implementation of the Green Gateway. This amicable relation could make trade between the two countries more efficient. Based on all these factors, the near-term outlook for Mongolian coal prices is very optimistic.

Figure 20. Price forecast, USD per tonne

	2022	2023	2024
Unwashed coking coal	85.0	84.3	86
Washed coking coal	112	115	115
Coal via Gantsmod	136.2	133.0	129.6

Source: Medium Term Fiscal Framework for 2022-2024, Erdenes Tavan Tolgoi JSC

3.3. CONCLUSION

The COVID-19 pandemic imposed a unique disruption to global production, trade, and economy. Steel output, the main indicator of coal demand, decreased in all countries except China in 2020. Due to China's heavy investment into its construction and infrastructure sector, decline in global steel output was less than expected. Additionally, China's informal restriction on Australian coal boosted coking coal exports from other countries, such as Mongolia.

On the supply side, Australian coal production was not critically impacted by the pandemic. As most mining companies have contractual obligations to meet with rail and port operators and consumers, mine closure or suspension was limited. Additionally, the cost of transitioning a mine to "maintenance and care" is high. Some of the smaller mines suspended mining operations citing weak demand and low prices. In Mongolia, the border restrictions caused most mines to suspend mining operations temporarily while continuing to export.

Due to weak demand from China, Australian coking coal prices were low. In the near-term, prices are expected to recover slightly as demand rebounds and the informal restriction on Australian coal is lifted. On the other hand, Mongolian coal prices were boosted by high demand despite low exports.

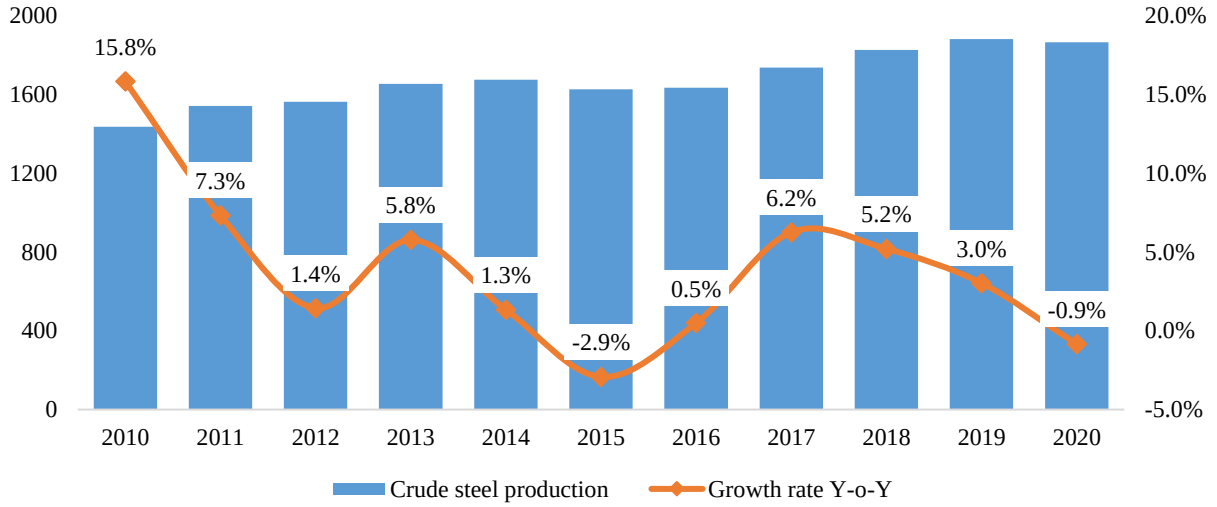
4. IRON ORE

4.1. WORLD MARKET

DEMAND SIDE

The steel industry is the main driving force of coking coal and iron ore demand as both commodities are utilized in the steel-making process. Similar to coking coal, steel production and its projections determine the demand for iron ore. Since 2016, steel production has been increasing steadily. However, in 2020, crude steel production declined. For explanation for the decline and more detail regarding crude steel production, please refer to the coal section above. During the first five months of 2021, world crude steel production increased by 14.5 percent year-on-year, to reach 837.5 Mt.

Figure 21. World steel production, Mt



Source: World Steel Association

As mentioned in the coal section, China is the largest producer of crude steel. Therefore, despite the significant decline in crude steel production in countries excluding China in 2020, the boost in Chinese production driven by government stimulus led to a lower-than-expected decline in overall production.

According to the Australia government's Department of Industry, Science, Energy and Resource, the annual crude steel production of world is forecasted to grow by 1 percent and 2.8 percent in 2021 and 2022, respectively (DISER, 2021). China's crude steel production is projected to increase by 1.7 and 0.8 percent in 2021 and 2022, respectively (DISER, 2021). Most analysts expect Chinese crude steel production to slightly increase in 2021 despite the government's desire to reduce output. For instance, S&P Global project that the high steel prices will drive Chinese steel production up and import of iron and steel down (S&P Global, 2021). Bloomberg Intelligence expects China to reduce its steel production growth slightly or maintain it at the 2020 level in the coming year. Chinese crude steel production is forecasted to increase by 2 percent 1.5 percent in 2021 and 2022, respectively; and Chinese steel demand to increase by 3.6 percent in 2021 (Bloomberg Intelligence, 2020).

China pledges to achieve CO2 emission peak before 2030 and carbon neutrality by 2060. Within this scope, the Ministry of Industry and Information Technology released a draft guideline at the end of 2020 to promote high-quality development of the steel industry. According to this guideline, the steel industry should strive to achieve peak CO2 emissions by 2025 (China Daily, 2021). Although the Chinese

government is aiming not to increase steel production in 2021, the country's production continues to reach record highs. According to the World Steel Association, total Chinese crude steel production was 269 Mt during the first five months of 2021, an increase of 13.9 percent year-on-year.

Additionally, the second largest producer of crude steel, India, could face production declines in 2021. Due to the current surge in COVID-19 cases, Indian steel plants have been redirecting production of liquid nitrogen and argon to supplying liquid medical oxygen to hospitals (Fastmarkets MB, 2021).

SUPPLY SIDE

World iron ore production reached 2.45 billion tonnes in 2019, a decrease of 2 percent year-on-year. This decline continued in 2020 as iron ore production fell by 2 percent to 2,400 Mt. The 2019 decline in production was primarily driven by an 85 Mt decrease in Brazil's iron ore production. The 2020 decline was due to decreased production in most countries as a result of the COVID-19 pandemic.

Table 17. World iron ore production, Mt

	2017	2018	2019	2020
Australia	883	900	919	900
Brazil	425	490	405	400
China	360	340	351	340
India	202	200	238	230
Other	560	570	537	530
World	**2430**	**2500**	**2450**	**2400**

Source: United States Geological Survey

Australian iron ore production increased by 2.1 percent to 919 Mt in 2019 and then declined by 2 percent to 900 Mt in 2020 (U.S. Geological Survey, 2021). Although Australia's overall iron ore production declined in 2020, Rio Tinto and BHP Billiton's production increased in 2020 (Table 18). Rio Tinto's iron ore production in Australia increased by 2 percent in 2020. A number of Rio Tinto's iron ore mines are expected to commence operations in the coming years, increasing the company's total iron ore output. For instance, the Koodaideri iron ore mine with an annual capacity of 43 Mt is expected to be commissioned in 2022; the expansion of the West Angelas and Mesa B, C & H mines are expected to be complete by 2021 – increasing the annual capacity of the mines to 30 Mt and 25 Mt, respectively (Rio Tinto, 2020). BHP Billiton's iron ore production increased by 6.4 percent in 2020, which was due to increased production at the Jimblebar mine (BHP Billiton, 2020). Similar to Rio Tinto, BHP Billiton's production is expected to increase as the South Flank mine with an annual capacity of 80 Mt is expected to begin in May 2021. On the other hand, Fortesque Metals Group's iron ore production decreased by 1.6 percent in 2020 (Fortesque, 2020). Australia's overall iron ore exports are expected to increase by 3.4 percent and 5.9 percent in 2021 and 2022, respectively (DISER, 2021).

In 2019, Brazilian iron ore production declined by 21.5 percent to 302 Mt due to the collapse of Vale's tailings dam (Vale, 2019). As mentioned in the previous commodity update, the dam collapse occurred at the Brucutu mine and due to this incident, Vale suspended some of its mine operations to monitor and inspect the other mine sites to prevent the same incident from occurring. In 2020, Vale's iron ore production declined by 0.5 percent to 300.4 Mt. The gains from the resumption of halted operations of Vargem Grande, Timbopeba, Fabrica and Serra Leste (+12.3 Mt), ramp up of the S11D project (+9.5 Mt), and operation of the Alegria site (+6.7 Mt) were offset by the restrictions of tailings in Itabira and Brucutu (-20.7 Mt), delays in mining of the Serra Norte (-3.7 Mt), impacts of COVID-19 (-3.5 Mt), and the four-month shutdown of the Fazendao mine (-2.9 Mt). Vale expects to increase their iron ore production capacity by 28 Mt to achieve a total capacity of 350 Mt by the end of 2021 (Vale, 2020). In 2020, Anglo American's Minas Rio iron ore mine production reached 24.1 Mt, an increase of 4.3 percent year-on-year. Brazil's total iron ore export is expected to increase by 16 percent and 8 percent in 2021 and 2022, respectively (DISER, 2021).

In 2019, Indian and Chinese iron ore production increased by 19 percent and 3.2 percent, respectively (Table 17). However, in 2020, production declined by 3.3 percent and 3.1 percent, respectively, due to the COVID-19 pandemic.

Table 18. Iron ore production by major companies, Mt, year ended December 31

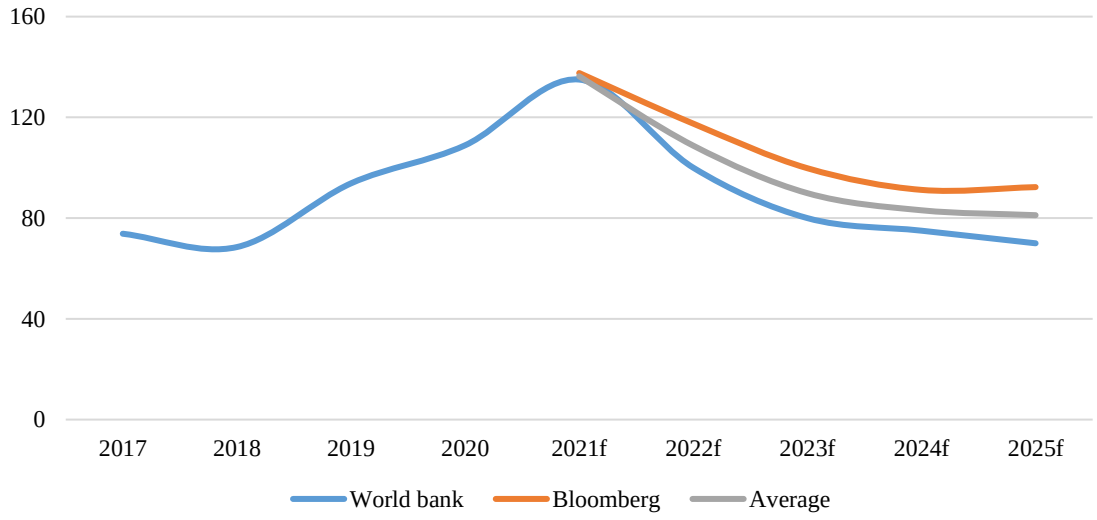
Company	Country	2019	2020	Change/%/
Vale	Brazil	302.0	300.4	-0.5
Rio Tinto	Australia	326.7	333.4	2
BHP Billiton	Australia	240	255.4	6.4
Fortesque	Australia	210.8	207.5	-1.6
Anglo-American	Brazil and South Africa	65.5	61.1	-6.7
ArcelorMittal	North America, Asia	57.1	58	1.6
World total		2450	2400	-2

Source: Anglo-American, ArcelorMittal, BHP Billiton, Fortesque Metals Group, Rio Tinto, and Vale

PRICE

Iron ore prices have been steadily increasing since 2018. In 2019, iron ore prices increased by 36.9 percent year-on-year due to an increase in Chinese steel production and a decrease in Brazilian iron ore production. In 2020, prices increased by 16.1 percent. The increase was due to a boosted investment in infrastructure from the Chinese government to curb COVID-19 related economic downturn and a disruption in Brazilian iron ore supply as mines were forced to shut down due to COVID-19. According to Bloomberg Intelligence, Chinese steel demand increased by 4.6 percent in 2020.

Figure 22. Iron ore price forecast, USD per tonne



Source: World Bank and Bloomberg

The increase in iron ore prices is expected to continue into 2021. According to World Bank and Bloomberg forecasts, iron ore prices will reach USD 135 per tonne and USD 137 per tonne, respectively, in 2021. As of March 2021, iron ore prices are USD 168.2 per tonne (World Bank, 2021) and is continuing to rise in the months after. According to Fastmarket MB, the seaborne price of iron ore at the Chinese port of Quindao was USD 237 per tonne on 19 May 2021.

However, from 2022 and on, the price of iron ore is expected to decline due to an expected surge in supply. Iron ore supply will likely increase due to high iron ore prices and as Brazil's iron ore production recovers.

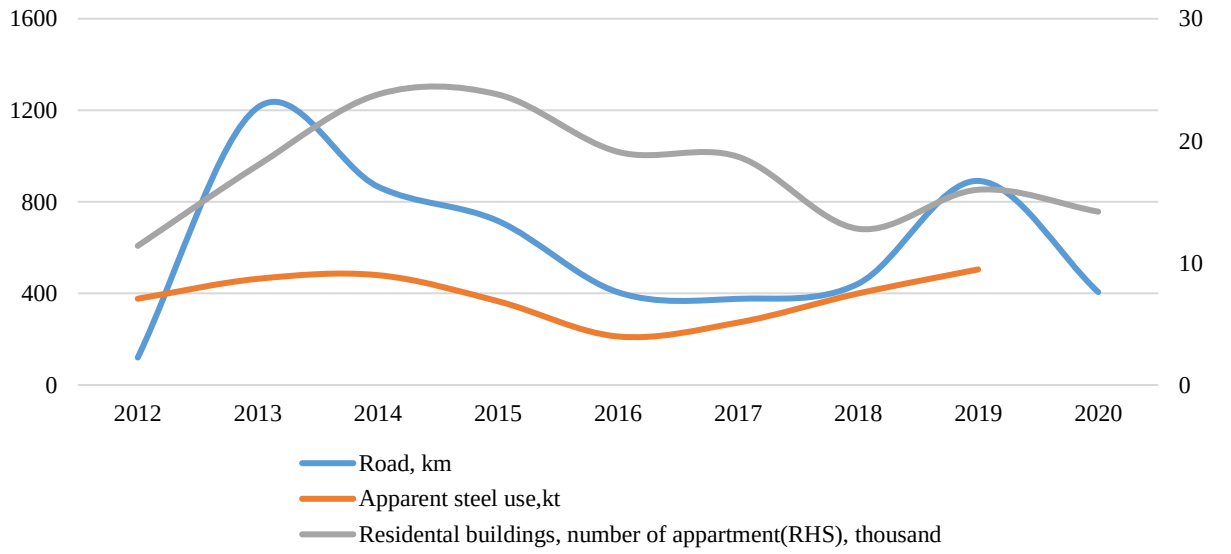
4.2. MONGOLIAN MARKET

DEMAND

Steel consumption tends to follow growths in the infrastructure and construction sectors as these sectors are the main consumers of steel. As mentioned in previous commodity updates, infrastructure and construction sectors growth and production tend to mimic economic growth, but with a delayed effect. Since 2017, the Mongolian economy has been recovering, which means the infrastructure and construction sectors began to recover in 2019 (Figure 23). However, in 2020, some activities and sectors in Mongolia underwent several curfews and restrictions due to COVID-19. Due to these restrictions, infrastructure and construction sectors output decreased by 54.5 percent and 11.2 percent year-on-year, respectively. This trend is expected to continue into the year 2021.

Prior to 2020, Mongolia's steel consumption had been on a rise due to a steady economic growth. In 2019, Mongolia's steel consumption reached 550 kiloton (kt), the highest level in a decade. However, this trend was not maintained in 2020 and is not expected to in 2021 too. However, due to the low domestic capacity of steel production, domestic steel consumption has a limited impact on demand for Mongolian iron ore.

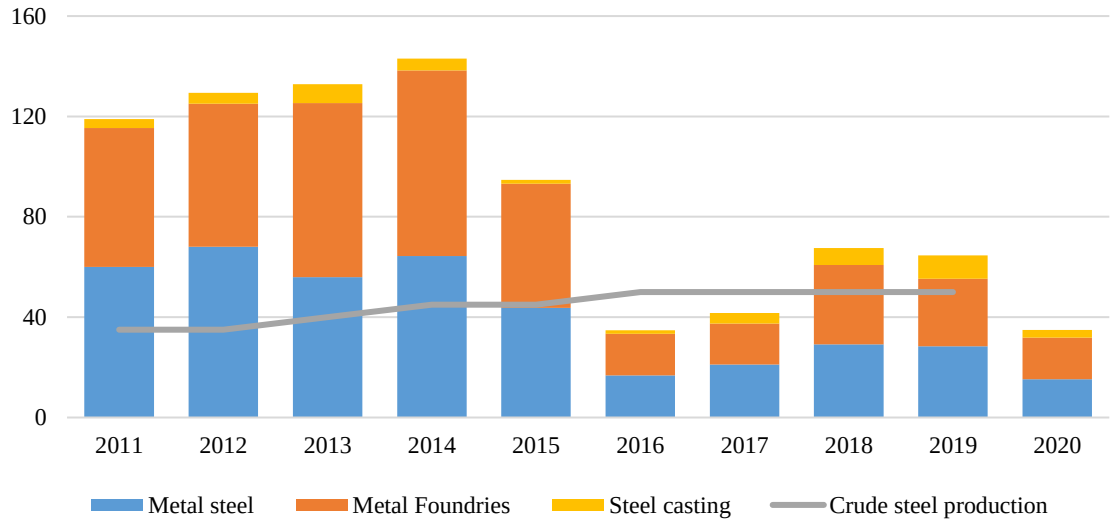
Figure 23. Finished construction, road, and steel use



Source: National Statistics Office and World Steel Association.

There are a few small-scale plants that produce steel products in Mongolia. In 2019, 28.4 thousand tonnes of metal steel (-3 percent), 26.9 thousand tonnes of metal foundries (-15 percent) and 9.6 thousand tonnes of steel casting (+39 percent) were produced. Production of all types of steel products declined sharply in 2020 to 34.9 thousand tonnes (Figure 24). In 2020, production of metal steel, metal foundries and steel casting decreased by 46 percent, 38 percent, and 67 percent year-on-year, respectively. The decline in steel production was due to the COVID-19 pandemic. According to the Minister of Construction and Urban Development, there are 15 metallurgical plants, excluding the Darkhan Metallurgical Plant, which did not operate in 2020 (Ministry of Construction and Urban Development, 2021).

Figure 24. Production of crude steel and steel products, thousand tonnes



Source: MRPAM and World Steel Association

Domestic demand for iron ore is relatively low as Mongolian steel producers mainly use steel scraps in their steel production. As mentioned in previous commodity updates, there is a possibility to increase domestic iron ore demand by constructing new steel plants. Currently, the Darkhan Metallurgical Plant, Beren Steel LLC, and Erdenes Steel LLC are discussing the possibility of producing steel from iron ore. Darkhan Metallurgical Plant and Beren Steel LLC have been discussing to construct a metallurgical plant which could produce steel from iron ore; however, it is yet to be completed. Currently, these metallurgical plants produce steel by using scraps. Erdenes Steel LLC's "Coke and Steel Plant Complex" project's feasibility study was approved in 2019 and has begun construction.

For the last decade, the Government of Mongolia set the goal of developing the metallurgical industry and producing steel products for both domestic consumption and export. Although this goal is reflected in a number of policy documents, the goal is yet to be achieved. The reason why the goal has yet to be achieved is because the government has not taken significant steps and measures to support the industry and there has been a lack of investment in companies operating in the metallurgical industry.

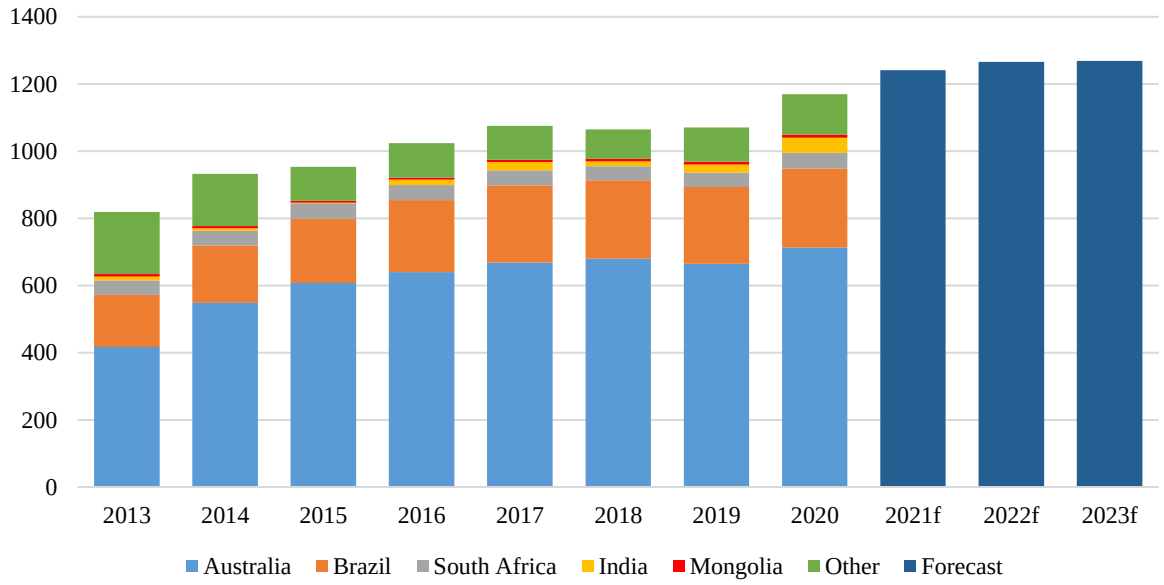
According to the "Mongolian Government Action Plan for 2020-2024" and the "Policy on Heavy Industry Development 2019-2023," the government plans to support metallurgical companies and their respective projects. The following plans are included in the "Policy on Heavy Industry Development 2019-2023": gradually increase production of steel products and reduce iron ore exports, ensure the consumption of basic products such as steel bars and steel balls by the domestic market, improve the capacity utilization of iron ore concentrators and steel mill, and boost integration of new technology for efficiency.

Due to the small-scale of domestic steel production, Mongolia's steel demands and needs are mainly met by imports. Since 2020, global steel prices have surged, leading to increased production costs for Mongolia's infrastructure and construction sectors, which in turn has increased housing price. Additionally, infrastructure and construction works have been increasing year-by-year, increasing the demand for steel products. In light of this, the Government of Mongolia needs to implement policies and provide financial support for the metallurgical industry to increase production of steel products in the coming years as steel is the main commodity utilized in the infrastructure and construction sectors.

Additionally, due to Mongolia's limited capacity of steel production, the main market for Mongolian iron ore is China. In 2019, Chinese total iron ore imports increased modestly by 0.6 percent year-on-year.

Although imports from Australia and Brazil declined by 2.3 percent and 2 percent, respectively, imports from other countries increased substantially. Imports from South Africa and India increased by 4.3 percent and 61.4 percent, respectively, in 2019. Over the past two years, Chinese iron ore import from India has been increasing exponentially. China's total iron ore imports increased 9.3 percent year-on-year, to reach 1170 Mt, in 2020 (Figure 25). Of the 1170 Mt, 60.9 percent is from Australia, 20.1 percent from Brazil, and 0.7 percent from Mongolia. In 2020, Chinese iron ore import from Australia, Brazil and Mongolia increased by 7.3 percent, 2.9 percent, and 0.7 percent, respectively, from the previous year.

Figure 25. Chinese iron ore import, Mt



Source: Department of Industry, Science, Energy and Resources and International Trade Center

According to the forecasts by the Department of Industry, Science, Energy and Resource, Chinese iron ore imports are expected to increase in the near term. Total Chinese iron ore imports are expected to reach 1241 Mt in 2021 as Chinese steel demand increases (DISER, 2021).

SUPPLY

Iron ore is one of Mongolia's main export products. In 2020, iron ore exports accounted for 8.4 percent of total export. Iron ore's share of total exports has been slightly increasing in recent years. In 2019, Mongolian iron ore production increased 37.8 percent to 8.6 Mt and exports increased 13.4 percent to 8.4 Mt (Figure 26). In 2020, iron ore production was 9.2 Mt, an increase of 7.6 percent year-on-year; while iron ore exports were 8.2 Mt, a decrease of 2.9 percent year-on-year. As of May 2021, Mongolia has exported 3.8 Mt of iron ore, a decrease of 2 percent year-on-year. The decline in iron ore exports was due to COVID-19 related restrictions at the border.

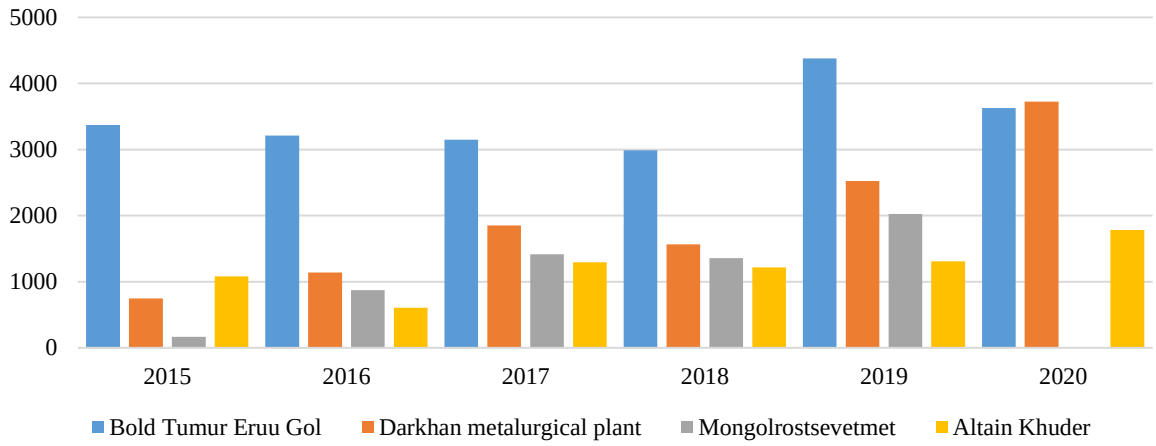
Figure 26. Mongolian iron production and export, thousand tonnes

Source: National Statistics Office, Customs

High iron ore prices and supply disruptions in Brazil created favorable conditions for Mongolian iron ore producers in 2019. For instance, production at Boldtumur Eruu Gol LLC, the largest iron ore producer in Mongolia, reached 4.4 Mt, an increase of 46.5 percent year-on-year. Similarly, iron ore production at Darkhan Metallurgical Plant, Mongolrostsevetmet, and Altain Khuder increased by 61.1 percent, 49.2 percent, and 7.3 percent, respectively.

Due to favorable conditions such as high iron ore price and supply disruptions in Brazil, iron ore production at Mongolia's two major iron ore producers sharply increased during 2020. Iron ore production at the Darkhan Metallurgical Plant increased by 47.6 percent year-on-year to reach 3.7 Mt in 2020. According to the survey conducted by ERI for the "COVID-19 Impact on Mining" study, the increase in production at the Darkhan Metallurgical Plant was due to high iron ore prices and increased investment. In 2020, Altain Khuder produced 1.8 Mt of iron ore, an increase of 36.2 percent year-on-year. On the other hand, Boldtumur Eruu Gol produced 3.6 Mt of iron ore, a decrease of 17.1 percent year-on-year. The decline in production at Boldtumur Eruu Gol in 2020 was due to the COVID-19 pandemic; however, the company obtained a new iron ore mining license in Eruu soum of Selenge province. With the new mining license and high iron ore prices, production is expected to increase in the near term.

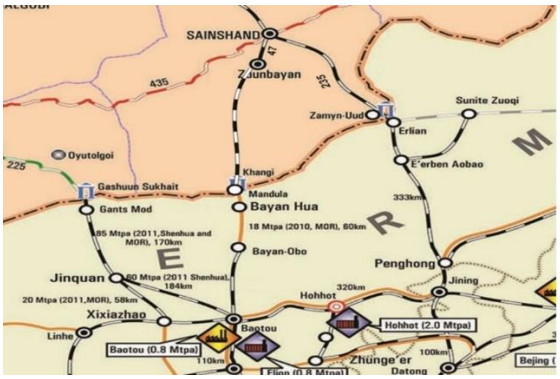
Figure 27. Iron ore production of major Mongolian companies, thousand tonnes



Source: MRPAM and EITI

As mentioned in the Marketing and Trading study, around 80 percent of Mongolian iron ore is transported by railways to the Altanbulag-Zamyn-Uud railway for export. The transportation cost of iron ore is considerably high due to the high tariff imposed by Ulaanbaatar Railways. A possible solution to reducing costs and increasing the capacity of iron ore exports is to build an alternative railroad between Zuunbayan and Khangi (ERI, 2018). As mentioned in the previous commodity updates, a new railroad project is being planned by the Government of Mongolia in the south part of Mongolia. Please refer to the coal section above for the implementation of this railway project.

Figure 28. Planned Mongolia railway networks, Zuunbayan-Khangi railroad



Source: Montsame

Part of the planned railroad project is the Zuunbayan-Khangi railroad. After the completion of the Tavan Tolgoi-Gashuunsukhait railroad, the Zuunbayan-Khangai railroad is expected to commence. The construction of the Zuunbayan-Khangi railroad is included in the "Mongolian Government Action Plan for 2020-2024". The new railroad is expected to increase export capacity of iron ore and decrease the freight costs as the Khangi border is closer to Baotou Metallurgic Company, the largest consumer of Mongolian iron ore.

4.3. CONCLUSION

On one hand, iron ore supply from Australia and Brazil is expected to increase in 2021. On the other hand, iron ore demand is expected to remain high as China's steel production continues to increase. As a result, the world price of iron ore is forecasted to be high, around USD 135 per tonne in 2021. However, from 2022 and on, the price of iron ore is expected to decrease steadily to around USD 81 per tonne in 2025. In the medium-term, iron ore supply is expected to increase as iron ore prices remain high and production at Vale recovers.

Domestic demand for iron ore is relatively low as Mongolian steel producers mainly use steel scrap for steel production. The Government of Mongolia has been planning on developing the metallurgical industry for over a decade, but no concrete action has materialized. Domestic demand for iron ore could potentially increase if the government increased its focus and efforts on promoting and developing the steel industry.

Mongolian iron ore production surged in 2019 and 2020 due to high iron ore prices. If prices remain high and the COVID-19 pandemic eases, iron ore exports will likely increase. Additionally, a new railway via the Sainshand-Khangai-Mandal-Bugat route in the southern region of Mongolia could increase export capacity and reduce transportation costs.

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APPENDIX

Table 19. Mongolian coal production in 2019

Target Market		Company	Production volume (thous. tonnes)
Domestic	Thermal power plants and other	Baganuur JSC	4,099.9
		Shivee-Ovoo JSC	1,992.4
		Sharyn Gol JSC	1,136.8
		Redhill Mongolia LLC	76.2
	Provincial and soum boilers and other	Mongolyn Alt MAK LLC /Aduunchuluu/	50.3
		Tsegeen-Uuden LLC	64.8
		Bayalag-Ord LLC	26.5
		Bayanteeg JSC	196.8
		Mogoin Gol JSC	130.0
		Tevshiin Gobi LLC	1.0
		Khartarvagatai LLC	46.7
		Khotgor LLC /1441A/	47.9
		Khotgor LLC /20853A/	47.7
		Berkh-Uul LLC	59.7
		Erchim Bayan-Ulgii LLC	13.8
		Mandal Khuder LLC	9.4
Total domestic			**8,000.0**
Export		Erdenes Tavan Tolgoi JSC /East Tsankhi/	11,097.6
		Erdenes Tavan Tolgoi JSC /West Tsankhi/	5,430.1
		Mongolyn Alt MAK LLC /Nariinsukhait/	4,084.8
		Energy Resource LLC	10,028.0
		SouthGobi Sands LLC	5,051.3
		Tavan Tolgoi JSC	2,240.0
		Khangad Exploration LLC	956.5
		Qinhua-MAK-Nariin Sukhait LLC	315.3
		CUAL LLC	880.1
		Javkhlant Ord LLC	213.7
		Mo En Co LLC /Khushuut/	3,634.5
		Petrocoal LLC	9.3
		Tsagaan-Uvuljuu LLC	588.9
		Ikh Gobi Energy LLC	30.7
		Usukh Zoos LLC	3,684.7
		Stein Kole LLC	18.8
		Friendship Resources LLC	37.0
		Kosma Coal LLC	100.0
		Arvijikh Energy LLC	88.2
		Bilegt Bayalag LLC	10.0
		Nagaaranz LLC	38.5
		Enkhtunkh Orchlon LLC	56.8
		Tefis Mining LLC	200.4
		South Gobi Coal Trans LLC	333.5
Total export			**49.128.7**
TOTAL			**57,128.8**

Source: EITI Mongolia

Table 20. Mongolia coal export sales in 2019

Type of coal	Company	Sales volume (thous. tonnes)	Average selling price (per tonne)	Converted to MNT
Washed coking coal	Energy Resource LLC	4,074.8	858.6 CNY	331,247.9
	Mo En Co LLC	1,273.9	88.1 USD	234,143.4
	SouthGobi Sands LLC	500.4	220 CNY	84,568.0
	CUAL LLC	355.2	671.4 CNY	256,474.8
	Khangad Exploration LLC	594.2	586.5 CNY	226,330.4
	Achir LLC	47.5	195 CNY	74,743.5
Raw coking coal	Erdenes Tavan Tolgoi JSC /East Tsankhi/	9,223.5	63.6 USD	172,050.7
	Erdenes Tavan Tolgoi JSC /West Tsankhi/	5,515.4	70.5 USD	190,716.6
	Tavan Tolgoi JSC	1,738.1	62.8 USD	167,443.6
	CUAL LLC	320.1	633.3 CNY	245,847.1
Weak coking coal	Mongolyn Alt MAK LLC /Nariinsukhait/	4,073.9	302.5 CNY	118,670.8
	SouthGobi Sands LLC	823.2	200.7 CNY	77,329.7
	Qinhua-MAK-Nariinsukhait LLC	269.8	400 CNY	152,880.0
	Usukh Zoos LLC	2,662.3	272.4 CNY	105,173.6
	Javkhlant Ord LLC	187.3	450.7 CNY	173,158.9
	Tsagaan-Uvuljuu LLC	616.1	70.5 USD	187,565.3
	Enkhtunkh Orchlon LLC	66.7	76.8 USD	204,126.7
Thermal coal	Energy Resource LLC	463.1	34.4 CNY	12,445.9
	Erdenes Tavan Tolgoi JSC /East Tsankhi/	347.2	11.2 USD	30,298.2
	Erdenes Tavan Tolgoi JSC /West Tsankhi/	38.7	10.5 USD	28,404.6
	Tsinghua-MAK-Hariin Sukhait LLC	0.9	120 CNY	46,908.0
	SouthGobi Sands LLC	2,222.4	195 CNY	74,802.0
	Badmaarag Khash LLC	2.6	15.8 USD	41,885.8
	Usukh Zoos LLC	211.2	80 CNY	30,536.0
	Khangad Exploration LLC	38.2		199,097.7
	Tavan Tolgoi JSC	294.5	13 USD	34,699.6
	Tsagaan-Uvuljuu LLC	21.1	19.2 USD	50,544.0
	Chinggisiin Khar Alt LLC	25.5	206.5 CNY	77,210.4
	Stein Kole LLC	2.5		73,333.3
	Friendship Resources LLC	24.9		48,423.4
	Mega Erin Zuun LLC	11.8		79,000.0
	Kosma Coal LLC	398.0	200 CNY	76,240.0
	Nagaaranz LLC	3.9	36 CNY	13,860.0
	Arvijikh Energy LLC	39.7	190 CNY	73,872.0
	Enkhtunkh Orchlon LLC	66.8	76.8 USD	204,126.7

	South Gobi Coal Trans LLC	175.1	38.7 USD	92,671.0
	Bilegt Bayalag LLC	78.6	67.9 CNY	26,589.6

Source: EITI Mongolia

Table 21. Mongolian domestic thermal coal sales in 2019

Company	**Sales volume (thous. tonnes)**	**Average selling price per tonne (MNT)**
Baganuur JSC	4,133.00	36,646.2
Shivee-Ovoo JSC	2,138.00	27,900.0
Sharyngol JSC	1,147.30	47,855.5
Erdenes Tavan Tolgoi JSC /East Tsankhi/	103.00	137,854.2
Erdenes Tavan Tolgoi JSC /West Tsankhi/	98.20	185,754.9
Khangad Exploration LLC	105.30	15,000.0
Energy Resources LLC	1,041.10	15,000.0
Redhill Mongolia	61.40	33,983.0
Mongolyn Alt (MAK) Aduunchuluu	90.60	14,177.1
Tavan Tolgoi JSC	342.90	15,000.0
Chinggisiin Khar Alt LLC	19.80	82,788.0
Petrocoal LLC	9.30	24,093.8
Tsegeen Uuden LLC	64.00	21,404.3
Bayalag Ord LLC	52.00	21,750.0
Bayanteeg LLC	198.20	26,363.6
Mogoin Gol JSC	82.90	33,000.0
Tevshiingobi LLC	1.00	23,000.0
Khartarvagatai LLC	50.90	25,775.0
Khotgor /1441A/	48.40	27,145.4
Khotgor /20853A/	47.10	27,145.4
Berkh Uul LLC	59.50	23,480.3
Erchim Bayan-Ulgii	9.60	10,909.1
Mo En Co /Khushuut/ LLC	56.70	21,954.0
Tsinghua-MAK-Nariin Sukhait LLC	0.10	55,000.0
Mandal Khuder	6.70	44,000.0
Moncoal Petromining LLC	271.80	49,401.6

Source: EITI Mongolia