



## The Impact of the COVID-19 Pandemic on World Copper Supply

### Introduction

In January and February 2020 all eyes were turned to China, and especially Wuhan, where a novel coronavirus (SARS-Cov-2) seemed to be spreading quickly among the population. The Western World looked at the total lockdown of a city of about eleven million people but did not imagine that less than two months later, a similar situation would occur in the rest of the world.

Indeed, the virus disseminated globally with Europe being the first region to be significantly impacted, mainly in Italy and Spain. On March 11, 2020, the World Health Organization classified COVID-19 (the disease originated by the new coronavirus) as a worldwide pandemic.

In Europe, the situation of Italy and Spain got very serious with the health care systems having difficulty coping with all the people infected, leading to large number of deaths.

In response to COVID-19 pandemic, most governments around the world, in an almost global consensus, have taken strict measures to mitigate the spread of this virus. These included the declaration of states of emergency, mandatory confinement of the population, the suspension of most economic activity (shutdown of all non-essential business), the restriction of movement of people and non-essential goods, the closure of all social activity (shutdown of schools, religious centres and entertainment places) and of country borders.

The global lockdown undertaken to protect the health of the population has resulted in an unprecedented economic and social crisis, different from the 2008/2009 financial crisis or any past crisis. The current crisis is affecting the different sectors of the economy (industry, commodity markets, tourism, accommodation/restaurants, transport/logistics, aviation, arts/entertainment, construction, real estate, among others) due to the mandatory confinement of the population and shutdown of non-essential businesses. Conversely, this is leading to a dramatic social crisis with a large share of the working population now unemployed (including from the informal economy) or in temporary lay-off agreements with total or partial loss of salaries. According to a report dated 7<sup>th</sup> April, the International Labor Organization estimates that COVID-19 related full or partial lockdown measures were now affecting almost 2.7 billion workers, representing around 81% of the world's workforce. [https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms\\_740877.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/briefingnote/wcms_740877.pdf)

COVID-19 is disrupting not only the world economy but also the lives of many people that have been put at a complete standstill resulting in financial difficulties. The World Bank, in its report dated 23 April, defines the current situation as “the deepest global recession in decades”.

The report states that “*as countries around the world contend with the health emergency of the COVID-19 pandemic, the economic effects of suspending almost all activity have immediately impacted the world's commodity markets and are likely to continue to affect them for months to come. The pandemic has affected both demand for and supply of commodities, the April edition of the Commodity Markets Outlook reports. Those effects are direct, resulting from shutdowns to mitigate the spread of the virus and*

*disruptions to supply chains, and also indirect, as the global response slows growth and leads to what is anticipated to be the deepest global recession in decades. The full impact of the pandemic on commodity markets will depend on how severe it is, how long it lasts, and how countries and the world community choose to respond to it. The pandemic has the potential to lead to permanent changes in the demand and supply of commodities, and especially to the supply chains that move those commodities from producers to consumers around the world.”* <https://www.worldbank.org/en/news/feature/2020/04/23/coronavirus-shakes-commodity-markets>

So a significant negative impact can be expected for both metals supply and demand.

Since the end-April/beginning of May, several countries are slowly easing their lockdown measures and gradually reopening the various sectors of the economy. While carefully undertaken these steps, Governments have to balance the risk of the health of the people with the urgent necessity to reopen and stimulate the economy to avoid the collapse of the modern society. With practically two months of non-activity a significant share of businesses either closed or are in serious cash difficulties. Therefore, Governments will have to find ways to rapidly support the industry and businesses, to create stimulus packs, to adapt fiscal/tax regimes, and to increase social support to unemployed people.

Due to the pandemic and travel restrictions, the April meetings of the International Copper Study Group (ICSG) were cancelled on the 16<sup>th</sup> March. At that time, the ICSG also decided not to prepare its spring forecast due to the uncertainty of the size of the global lockdown and still unknown measures to be taken by governments and industry to fight the pandemic as well as the fact that insufficient information to compile a meaningful outlook was made available.

The global lockdown is affecting both the supply and the demand of copper to an extent that is still difficult to accurately assess. However, we now have information from companies 1st quarter 2020 reports and through governments' announcements on the plans and schedule for the de-confinement of the population and reopening of the industry/businesses.

Therefore, ICSG secretariat decided to prepare this insight to give an update on the estimated impact of the pandemic on the supply and demand for copper and on ICSG's last forecast made in October 2019.

However, readers should be aware that the global effects of COVID-19 are still evolving. The performance of copper supply and demand remains related to the length of the current global lockdown, on the magnitude of the impact on the global economy, on the pace of recovery of economic activity, on the support and stimulus packages given by Governments, on the performance of commodities/financial markets, on the populations' ability to return to its pre-Covid19 life style/consumption habits (consumer confidence), on the strength of the copper price and on the risk of a second wave of infection with the possibility of a renewed lockdown.

Although the short-term outlook for copper is uncertain and dependent on the numerous factors described above, the medium and long-term outlook remains positive as copper is essential to modern life and contributes to a sustainable world. Copper is an important contributor to the national economies of mature, newly developed and developing countries. Mining, processing, recycling and the transformation of metal into a multitude of products creates jobs and generates wealth. These activities contribute to building and maintaining a country's infrastructure, and create trade and investment opportunities. Copper will continue to contribute to society's development well into the future.

The copper industry is resilient and we trust that the industry will adapt to and overcome these difficult times with the support of governments.

Over the next pages, the main COVID-19 related impact on copper mines and plants will be highlighted. Other events that have occurred since ICSG October 2019 meeting and that have impacted on our forecast for 2020 will also be discussed. Based on this, the main conclusions reached are as follows:

- **Global mine production in 2020 is likely to be about 950,000 tonnes copper lower than the ICSG forecast in October 2019. World output is now expected to decline by about 3% compared to 2019.**
- **Global refined output will be approximately 1.1 million tons lower than the Group forecast in October. Consequently, world refined production is now expected to remain unchanged for the second consecutive year.**

### **Overall impact of COVID-19 on the copper industry**

The COVID-19 pandemic poses an unprecedented challenge for the copper industry. As responsible operators, companies have been engaging with relevant authorities to comply with sanitary and government regulations while ensuring the safety and health of the workers, reorganising operating plans, preserving cash-flow, reducing capital and exploration expenditure, restructuring workforces and supporting local communities.

The extent to which each country's copper industry has been impacted is largely dependent on the health rules imposed by the authorities (confinement, travel restrictions, social distancing, etc.) and also on the decisions taken by governments to consider, or not, the mining/metals industry as a strategic sector of the economy

In certain countries, the mining and metals industry was considered an essential sector of the economy and was allowed to operate (respecting sanitary and health regulations). Examples include the United States, Chile and Australia. However, in other countries the copper industry had to shutdown, as in Panama, or was only allowed to operate at reduced levels.

The importance of industrial mining (including copper mining) was acknowledged by several countries and considered a strategic and essential sector that should continue operating despite the health emergency. The same thinking was applied to the refining and semis industries. While respecting sanitary regulations and social distancing, production was able to proceed with minor impacts as most operations are highly computerized and the workers are not confined to small rooms. The copper industry is considered by many countries as an essential sector to prevent disruptions in the manufacturing chain of vital products such as medical equipment, electric/power cables, tubes, wires, mobile phones, computers, refrigerators, air-conditioning, cars, among others.

However, even if allowed to operate in their own countries, copper mines, smelters, refineries or semis plants are also dependent on what occurs along the supply chain and in their export/import markets. Total lockdowns in industry, transportation and ports pose problems to the flow of materials. For instance, mines that export concentrates to India might have been impacted by the total lockdown enforced in the country that led to the closure of the smelters and for instance, China scrap imports have been affected by the total lockdown of Malaysia where the recycling industry and ports were at a standstill.

Other factors such as restrictions on travel by international contractors are leading to delays in project development as is the case of Mongolia (Oyu Tolgoi underground). Conversely, restrictions on the transportation sector are constraining the supply of goods and materials to certain operations.

Although the global press mainly focus on the operations that are impacted by more restrictive COVID-19 measures imposed in certain countries, there is a large part of the copper industry that so far did not shut down and has continued to operate at normal or reduced levels. (see table 1 attached).

Globally, copper industry operational levels should gradually recover with governments starting to ease restrictive measures. However, the risk of disruption still exists if infections occur at operations or if the supply chains of critical spare parts and consumables are interrupted or unavailable.

Conversely, the crisis also significantly affected the global demand for copper intensive products and therefore producers might have to adjust production in accordance with revisions to end-use demand.

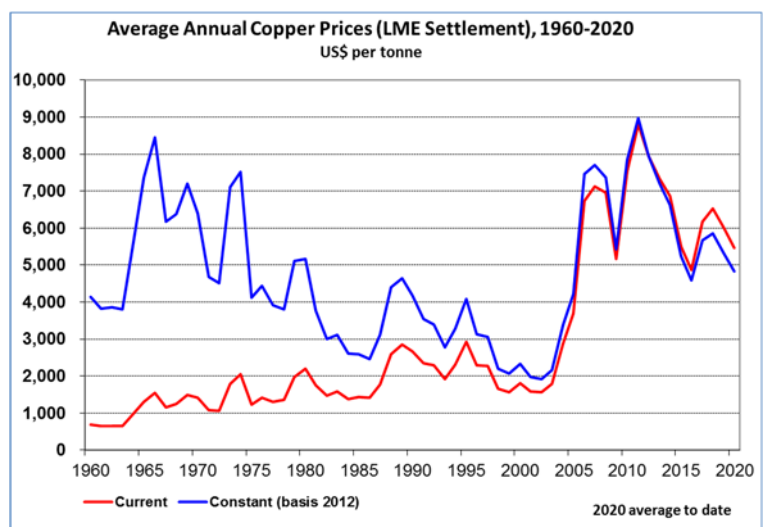
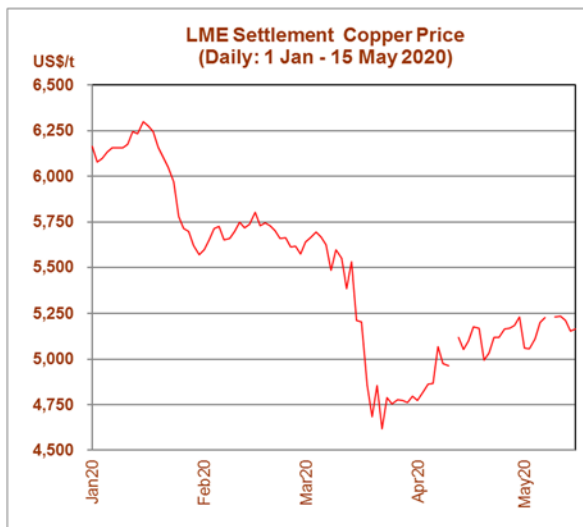
The copper price is also another factor that has to be considered as a factor that impacts operational levels.

**The copper price**

As shown in Chart 1, the copper price peaked at 6,300 US\$/ton on the 16 January and then started to fall, negatively impacted by the COVID-19 outbreak in China, the spread of the virus to the rest of the world, the subsequent global lockdown and uncertain impact on the world economy, the uncertainty of the size of the impact on copper supply/demand and speculative activity. The copper price reached its lowest level of 4,617 US\$/t on the 23 March and last week was trading at around 5,200 US\$/t. Over the period 1<sup>st</sup> January to 15<sup>th</sup> May, the copper price has declined by 16%. The 2020 average to date is 9% below the 2019 year average and stands at 5,461 US\$/ton.

Chart 1: Trends in the LME daily copper price

Chart 2: Trends in the copper price (constant/current)



In constant terms (Chart 2), the copper price is below that during the financial crisis when a significant number of high cost operations had to shut down. In 2020, no significant closures have occurred so far related to the fall in the copper price. However, prolonged weak copper prices present a risk to operating levels and to project development, as companies try to cut costs and reduce capital and exploration expenditure.

The copper price has recovered since its low in March but further declines could prompt a response from producers by shutting down high cost operations, negatively affecting copper mine supply. However, there are currently some positive factors benefiting producers, which are contributing to a reduction in costs and help mitigating weak copper prices. These are the current lower energy costs, higher precious metals'

by-product credits (in the last 12 months the gold price has increased by 37% and the silver price by 15%) and favourable exchange rates of producing countries currencies against the US Dollar.

Weak copper prices have also had a negative impact on the availability of copper scrap.

**Copper stocks**

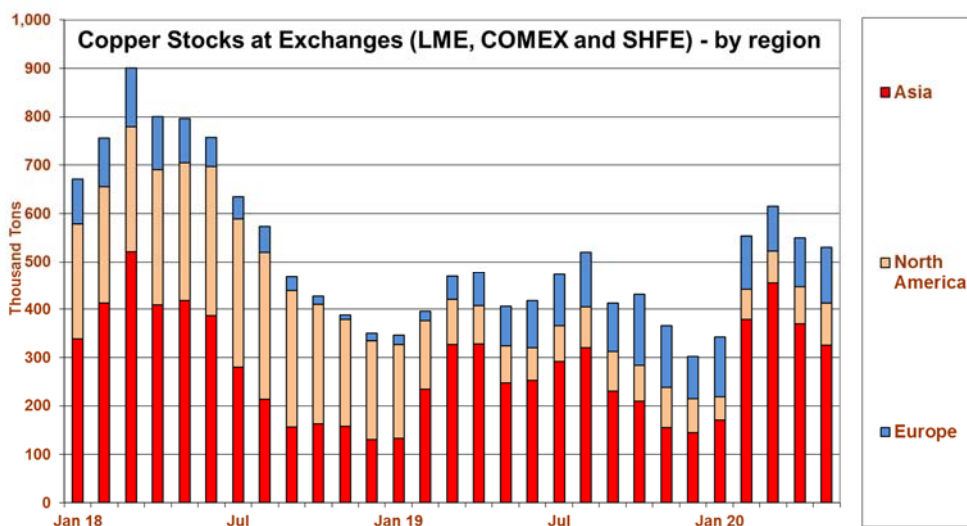
Chart 3 shows stock movements by region at the three Exchanges, LME, Comex and SHFE. As of 15<sup>th</sup> May, total Exchange stocks had risen by 75% to 530,000 t compared to the end of 2019.

Exchange stocks increased sharply in Asian warehouses from January to March as a result of the Chinese New Year and COVID-19 temporary related closures of semis plants. With the gradual resumption of production and increase in demand, exchanges stocks in Asia have started to decline. However, they remain at more than double the level seen at end 2019.

Stocks at the exchanges warehouses in North America and in Europe have been on a rising trend since March.

As compared to the end of 2019, Exchange stocks in Asia increased by 124%, in North America by 26% and in Europe by 33%

Chart 3: Exchange stocks by region



**Impact of COVID-19 lockdown on mines and plants**

Table 1 attached shows the announced measures taken by some of the biggest copper mining companies to comply with governments’ lockdown and quarantine regulations. The reader will be able to see what kind of impact occurred at the referred operations.

In most countries, the lockdowns were implemented in the second half of March, with most remaining in place in April. They then started to be gradually loosened in May.

It is worth noting that, although the lockdown occurred in several copper producing countries the copper industry was allowed to continue working by taking actions to prevent the spread of COVID-19 among workers. Only few major copper mines had to shut down completely or reduced output significantly.

Among the biggest copper mine producing countries, operations in the DRC, Indonesia, Mongolia and Zambia were working at normal levels, most of the biggest operations in Peru didn't shut down and were running at reduced levels, most of the copper mines in Chile and Canada were producing with only a minor impact resulting from COVID-19. However, in Panama, the copper industry had to shutdown completely and in the United States, some operations shutdown temporarily.

**Revisions to ICSG October Supply Forecasts**

ICSG undertook a preliminary revision of the supply forecasts published in October 2019 based on announced governments' plans to gradually de-confine the population and open the different sectors of the economy, based on company 1<sup>st</sup> quarterly reports and announcements and based on the information provided to ICSG by the industry and industry association.

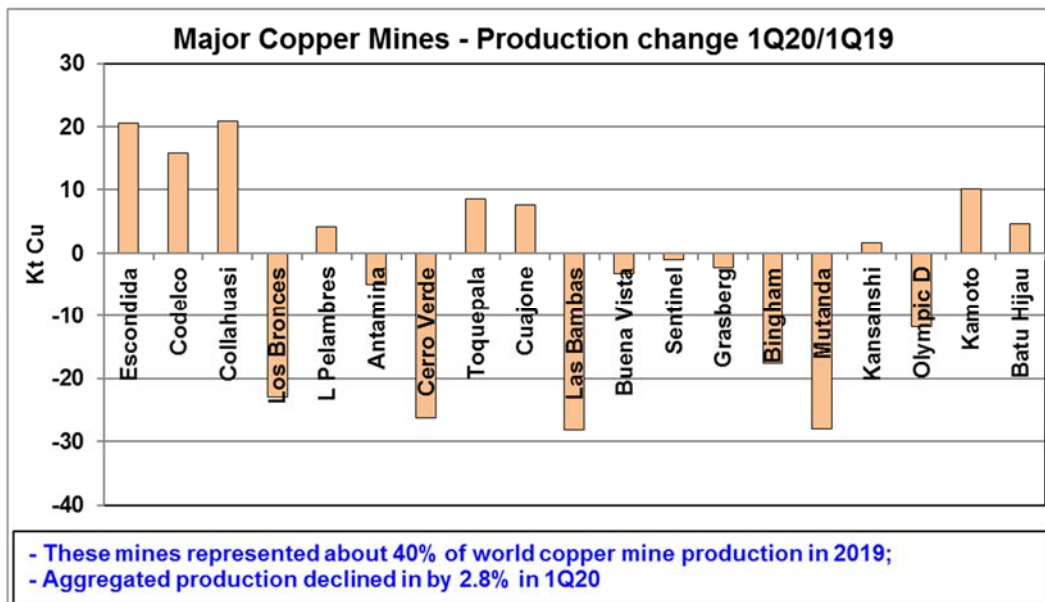
The revisions made to ICSG October supply forecasts take into consideration, not only the impact of COVID-19 related restrictions on production, but also the impact of low copper prices, company revisions in previous production plans and other known operational constraints that have occurred since the forecast was released (lower than anticipated head grades, adverse weather, strikes, or accidents).

Below we will review the main events that led to the revisions on ICSG forecast in terms of copper supply.

**Copper Mine Supply**

Based on first quarter 2020-company reports, production at selected major copper mines, that in 2019 represented 40% of the world copper mine production, declined by 2.8%. As shown in Chart 4, growth at some of the major copper mines was offset by declines at others.

Chart 4 : Production at major selected copper mines



As the lockdown in major copper producing countries only started in mid-end March, the impact on the 1<sup>st</sup> quarter production was not that significant. Most of the declines that occurred in the 1<sup>st</sup> quarter at the selected mines were mainly due to operational constrains.

The biggest decline occurred at **Mutanda** (DRC) as the mine entered temporary Care and Maintenance at the end of last year. Then at **Las Bambas** (Peru) where production levels were impacted as a result of repairs to the overland ore conveyor, blockades along Peru's southern road corridor and restrictions in activity due to the Peruvian State of Emergency. Cerro Verde (Peru) production was already lower by 6% in the first two months of the year before the lockdown and further declined in March due to the State of Emergency restrictions. **Los Bronces** (Chile) production was negatively impacted by continued drought restricting water availability. **Bingham** (USA) output was lower primarily due to pit sequencing, which contained lower copper ore grade material.

However, increases in production at **Escondida**, **Collahuasi**, **Codelco** operations, Southern Peru operations and **Kamoto** partially offset the declines mentioned at the other selected mines.

The impact of the global lockdown on copper mine supply will be felt more significantly in the second quarter of 2020.

Looking at the major copper mine producing countries, the major COVID-19 related impacts are summarized below.

In **Chile**, the impact of COVID-19 measures until now seems to be limited as no lockdown was imposed on the mining industry. Although companies had to adapt to new health measures and reduced workforces production plans have been either maintained or kept at the lower end of the original production guidance range. This is true for Escondida, Antofagasta operations (including Los Pelambres), Teck's Carmen de Andacollo and Quebrada Blanca mines and for AngloAmerican's operations. Freeport McMoran announced that operating plans at El Abra have been revised to incorporate lower mining rates, operating costs and capital spending.

Regarding **projects** currently under development in Chile, Teck announced that construction at **Quebrada Blanca Phase 2 (QB2)** project has been temporarily suspended on March 18. Extensive planning has been completed for a construction restart and the situation is continuously being assessed to allow for this as soon as practicable. Conversely, Antofagasta announced on 20 March that the workforce at the **Los Pelambres Expansion** project has been kept on care and maintenance until conditions are deemed appropriate for it to restart. BHP announced that the **Spence Growth Option** project is continuing to progress, however the schedule is under review with first production potentially delayed until early in the 2021 calendar year as a result of a lower headcount on site, reflecting the decision to reduce the occupancy at the construction camp to facilitate social distancing protocols. Freeport MacMoran also announced the deferral of construction of a new leach pad at **El Abra**.

Revisions to the Chilean production forecast for 2020, consider COVID-19 related losses, revised company plans, losses due to operational constraints that have occurred, lower than anticipated head grades and the above-mentioned delay in the start-up of Spence Growth Option project.

In **Peru**, on 15<sup>th</sup> March the government issued a Supreme Decree and declaration of a National Emergency in its efforts to contain the outbreak of COVID-19, subsequently extended through April and then 8<sup>th</sup> May and then 24<sup>th</sup> May. On May 4, the government announced Phase 1 of the planned restart of key economic activities that included mining. The new quarantine extended until the 24<sup>th</sup> May does not affect Phase 1 for the mining sector, once the companies obtain their respective permits.

Nevertheless, even during the country lockdown, major copper mines were allowed to operate under rigorous COVID-19 emergency protocols and a reduced workforce. Therefore, among major copper



mines, only two temporarily shut down (Antamina and Constancia), with others continuing to produce at reduced capacity.

On March 20, Hudbay announced that the company had commenced a temporary and orderly shutdown of operations at **Constancia**. On May 14, Constancia received recognition and approval from Peru's Ministry of Energy and Mines for its restart protocols and is planning to ramp up operations over the next week.

BHP announced that during March 2020 **Antamina** operated with a reduced workforce in response to COVID-19, before being given Government approval to demobilise the workforce and then taking a decision on 14 April 2020 to temporarily suspend operations. Timing on resumption of operations at Antamina is uncertain and guidance for the 2020 financial year is under review.

Other Peruvian major copper mines were allowed to operate at reduced levels as announced by different mining companies:

- Freeport McMoran, announced that **Cerro Verde** has temporarily transitioned to a care and maintenance status for a 15-day period which commenced on March 16, 2020. During April 2020, Cerro Verde operated at an average of approximately one-third of planned rates. Beginning in late April 2020, operating rates increased to over 50% of capacity. In early May, the Peruvian government updated its State of Emergency to allow major mining operations to gradually increase activities. Cerro Verde is in discussions with the Peruvian government to clarify the requirements for gradual resumption of normal operations. Compared with January 2020 estimates, mining and milling rates have been reduced by 13% (including the impact of the Peruvian government order and mine plan optimization in the second half of 2020).
- MMG announced on Mar 19 that **Las Bambas** had temporarily reduced operations and had begun the process to reduce employees and contractor levels at site. On April 13, the company announced that Las Bambas continued to operate, consistent with national guidelines and company health protections, at reduced levels of mining and production and that the transport of concentrates had been suspended, and the movement of people and critical supplies would also continue to be significantly restricted. Later, MMG announced that concentrate transport from Las Bambas to the Port of Matarani had resumed on April 28.
- Southern Copper, that operates the **Cuajone** and **Toquepala** mines in Peru, announced that as of March 31, 2020, their production facilities in Mexico and Peru had been working at approximately 90% of their production capacity.
- The **Toromocho** mine (Chinalco) that expanded capacity in March, temporarily reduced production.

Regarding projects, AngloAmerican announced the temporary withdrawal of the majority of employees and contractors from its **Quellaveco** copper project. Construction work on the project will therefore be significantly slowed, with only critical areas of the project continuing as normal, until such time as workers can return safely. Marcobre announced that the workforce at its **Mina Justa** project was reduced to maintain minimal services. Nexa Resources announced that **Magistral** project engineering studies (FEL3) had advanced as planned in 1Q20 but that future progress may be delayed due to COVID-19 related measures.

In **China**, and as mentioned in the latest report from BGRIMM Lilan Consulting that gives a thorough analysis of the impact of the lockdown on the Chinese copper market, major copper mines maintained stable production with only a few mines temporarily suspended. The impact of these suspensions is expected to be offset by a number of expansions coming on stream.



In **Mexico**, Southern Copper (Grupo Mexico), that operates the La Caridad and Buena Vista mines announced that as of March 31, 2020, their production facilities in Mexico and Peru had been working at approximately 90% of their production capacity. Two small mines were put on care and maintenance: Cozamin operated by Capstone Mining and Boleo, operated by Camrova Resources.

In **Mongolia**, Edernet Mining stated that operations were running at normal levels. Turquoise Hill Resources announced that Oyu Tolgoi is adapting to the challenges posed by the COVID-19 pandemic on both the open pit and underground operations, with the open-pit continuing to operate without interruption, while the underground development is experiencing a slow-down. The mine is on track to achieve 2020 copper production guidance, but the expansion might be delayed.

In **Panama**, First Quantum announced that on April 6, the Ministry of Health of the Republic of Panama ordered the temporary suspension of labour activities at the Cobre Panama operation, as a sanitary control measure due to COVID-19. The Company decided to place the Cobre Panama operation into preservation and safe maintenance from April 7, 2020, until MINSA are satisfied that the quarantine conditions are appropriate. The heightened quarantine conditions require that mining and processing operations be halted. In light of the preservation and safe maintenance period, production guidance for Cobre Panama for 2020 has been reduced to 210,000 to 235,000 tonnes of copper (the mine was previously on track to successfully deliver on its 2020 copper production guidance of between 285,000 and 310,000 tonnes).

In the **United States**, Freeport McMoran announced on the 24<sup>th</sup> April that it had completed a review of mine plans at each of its operating sites in North America ( Morenci, Bagdad, Safford, Sierrita, Miami, Chino, Tyrone) to target a lower cost mining configuration, defer all non-essential projects and preserve long-term value in the long-lived resources. Under the revised plans, mining and milling rates for the year 2020 have been reduced by approximately 20%, resulting in a projected 12% decline in North American copper sales for 2020 (compared to the January 2020 estimate). The plans take into account the impact of currently suspended operations at the **Chino** mine. FCX is currently assessing options and future timing of a restart of the Chino mine, which will take into account health and market conditions. FCX has also deferred approximately \$0.3 billion in capital projects from 2020 to future periods for the North American copper mines. Two smaller mines have announced temporary shutdowns: Excelsior Mining's Gunnison mine and Nevada Copper Corp.'s Pumpkin Hollow mine.

In other major producing countries, Australia, China, DRC, Indonesia, Iran and Russia no significant impact has so far occurred due to COVID-19 restrictions with only some minor production reductions as shown in table 1.

Although no major impact from COVID restrictions have occurred in the DRC so far, a possible closure of borders with surrounding countries through which copper is exported, could become a serious issue for copper producers.

Other countries have also been impacted by COVID-19 restrictions, but at lower levels, and are included in table 1.

Below is a brief description of the major downward revisions made to 2020 mine production since ICSG October 2019 forecasts.

Although **Chilean** output has not been significantly impacted by COVID-19 restrictions, a downward revision of about 400,000 tonnes (Kt) copper was made as compared to the October 2019 forecast, in view of revised company production plans, lower than expected performance at some operations, the impact of dry weather and lower ore grades.

The second largest revision was made in **Peru**, as some mines have been operating below capacity or shut down temporarily. However, the revision also includes non COVID-19 production constraints that occurred in the 1<sup>st</sup> quarter at major mines (namely Las Bambas, Cerro Verde, Antapaccay) that led to lower actual production than was anticipated in October 2019. The total downward revision in Peruvian output compared to the October forecast is about 300 kt copper.

A downward revision of about 75 kt Cu was made in **Zambia** mainly based on operational issues at Mopani and Konkola mines unforeseen in October. In addition, with the temporary COVID-19 related shutdown of the Cobre de Panama mine, Panamian production was adjusted downwards by 75 kt Cu based on revised company production guidance.

Smaller downward revisions were made for Australia, Indonesia, Mexico and the United States among others.

Globally, most of the downward revisions were made in concentrate output.

So after taking into consideration the impact of COVID-19 restrictions, operational constraints that already occurred and company revised 2020 production plans, **ICSG mine production forecast for 2020 has been revised downwards by about 950 thousand tonnes copper.**

The downward revision includes non-COVID revisions made to each individual country (that are substantial in Chile) and also includes a further 2.5% adjustment applied at the world level to account for further possible supply disruptions. As the world gradually reopens its industries, it is too soon to accurately assess how industry will respond. Supply will also be dependent on trends in demand, the copper price, the risk of increased infection among workers and the possibility of a second wave of the virus leading to new lockdowns.

World mine production remained essentially unchanged in 2019 as compared to 2018 mainly due to: a 1% decline in Chilean output due to lower copper head grades and few production disruptions; a 44% decline in Indonesian output as a consequence of the transition of the country's major two copper mines to different ore zones leading to temporarily reduced output levels; a 7% decline in Zambia due to operational constraints; disappointing growth of 0.8% in Peruvian output; and no significant output from new projects, except in Panama.

Last October, ICSG was forecasting a growth of about 2% for 2020 world mine production mainly based on: an overall recovery of production levels from 2019 lows, mainly in Chile and Indonesia; recovery in Zambia through operational improvements; a ramp-up of output in Panama; and additional output from few expansions and the start-up of small/medium size projects.

In view of the events that occurred in the first months of this year, and as explained in this insight, some of the assumptions for 2020 world mine production growth have now been downgraded: **Zambian output is not expected to improve as well as anticipated; the temporary shutdown of Cobre de Panama; Chilean output is now expected to remain flat; production in Peru is expected to significantly decline (-11%); expansions at number of mines have been delayed; a number of mines have temporarily shut down in the United States.**

**Therefore, based on the revisions made, ICSG currently estimates that world mine production might decline in 2020 by around 3%.**

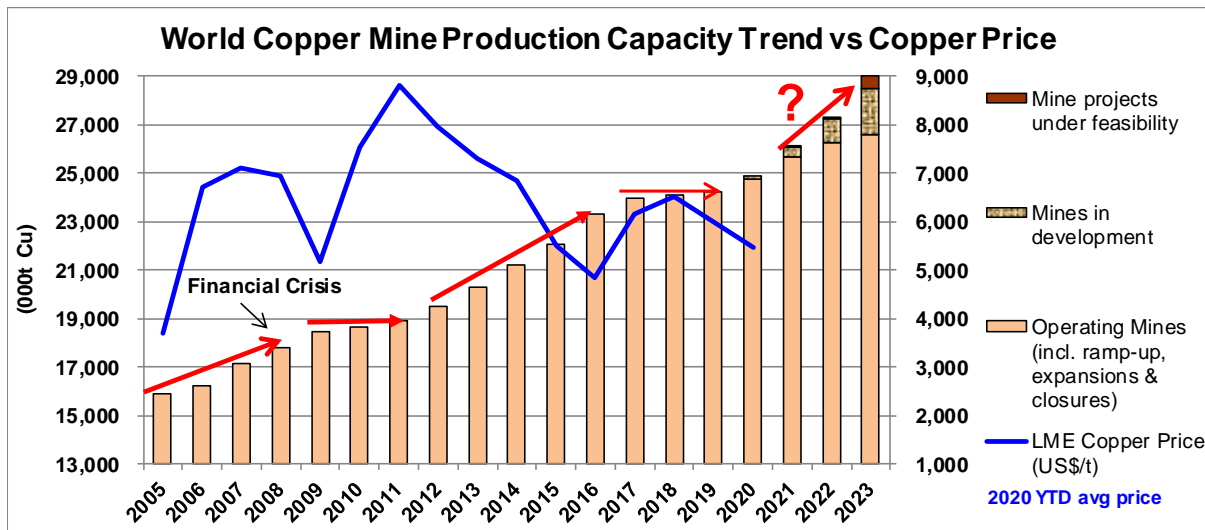
We would like to highlight that some projects and expansions currently under development have been delayed as mentioned above and as shown in detail in Table 1. These delays might have an impact on future supply.

Included in the projects where development delays (or potential delays) have been announced, are the Los Pelambres expansion, the underground development of Oyu Tolgoi, the Spence Growth Option project, Quebrada Blanca phase 2 (QB2), Magistral, Mina Justa, Platref, Kipushi and Voisey’s Bay.

One of the determinant factors in the development of a project is the copper price. As mentioned previously the copper price has declined this year and to date the annual average is the lowest since 2016.

Chart 5 shows the significant negative impact the 2008/09 and 2015/16 falls in the copper price had on copper mine project development. Therefore, it is anticipated that the current weak copper prices, if prolonged, might also negatively affect CAPEX and project development.

Chart 5: World Copper Mine Capacity Trend vs Copper Price



### Refined Copper Supply

In most countries, the smelter and electrolytic refining industries appear to be less affected by COVID-19 related constraints than the mining industry with the exception of China and to a lesser extent India.

However, and as detailed on next page, non-COVID-19 operational issues are constraining refined production in other countries

Since the publication of ICSG October 2019 forecast we have decreased expected 2020 **Chinese** refined production by 850kt Cu, which is in line, or slightly below, revisions undertaken by other independent consultants in the same period. Delays in project development, COVID-19 related constraints, high acid stocks, raw material constraints and weak cathode demand were among factors that led to the downward revision in Chinese refined production. We now anticipate that Chinese refined production could decline by 2-3% this year.

In **India**, the total lockdown of the country led to a temporary closure of the Birla (Hidenco) smelter from the end of March to early May. Reports indicate that the plant has now restarted but only at half capacity.

The Vedanta smelter that closed in 2018 remains shut. As a consequence, India refined production has been revised down by 100 kt Cu.

Regarding smelter projects, besides some delays in China, Freeport McMoran announced that, as a result of disruptions to work and travel schedules of international contractors and limitations on access to the proposed physical site at Gresik associated with COVID-19 mitigation measures, PT-FI had notified the Indonesian government of delays in achieving the completion timeline of December 2023. PT-FI is currently discussing with the Indonesian government a deferred schedule for the project as well as other alternatives in light of COVID-19 and global economic conditions.

As already stated, besides COVID-19 related constraints there have been other operational issues and announced maintenances that have led to downward revisions in refined production in a few countries, as compared to the ICSG October forecast:

- In **Zambia**, smelting and refining industries were affected by temporary shutdowns and operational issues and production was significantly constrained in 2019. In 2020 a recovery is expected but output has been revised down by 75 kt compared to that anticipated in October 2019. The situation at Mopani remains uncertain and this could result in further downward revisions.
- In the **United States**, refined production was revised down by about 100kt mainly due to the prolonged strike at Asarco's operations and an earthquake at Kennecott (damage to the smelter furnace impacting the company's full year copper guidance).
- **Belgian** refined production was revised downwards due to damage at the tankhouse at Olen.
- In **Australia**, refined production was revised down by a small amount. The replacement of the Olympic Dam refinery crane and commissioning planned for commencement in the 1<sup>st</sup> quarter 2020 has been impacted by COVID-19 restrictions, and completion is now expected by the end of 2020. An unplanned downtime at the smelter also occurred during the 1<sup>st</sup> quarter.
- Based on lower production rates at Paranapanema in the 1<sup>st</sup> quarter 2020, **Brazilian** refined production was also revised downwards.
- Electrowinning production in **Chile, Mexico and Peru** was impacted by temporary closures or reduced production rates at SX-EW mines.

Globally, secondary refined production was revised downwards (mainly in China) due to the tight supply of scrap expected this year due to the global lockdown (see section on scrap).

World refined production remained essentially unchanged in 2019 as compared to 2018 as growth in China and other few countries was offset by significant declines in three major producing countries: Chilean electrolytic refined output declined by 22% due to temporary smelter shutdowns whilst undergoing upgrades to comply with new environmental regulations (total Chilean refined production including Electrowinning declined by 8%); Zambian refined output decrease by 44% due to power supply interruptions, smelter outages and temporary shutdowns; and Indian output declined by 24%, mainly as a consequence of the shutdown of Vedanta's Tuticorin smelter in April 2018.

Last October, ICSG was forecasting growth of about 4% for 2020 world refined production mainly based on an overall recovery from 2019's significantly constrained production and further expansion of capacity in China. However, in view of the events that have occurred so far this year, and explained in this Insight, most of the previous assumptions for 2020's world refined production growth are no longer valid.

Therefore, ICSG 2020 refined production forecast has been revised downwards by over 1.1 Mt copper based on the assumptions explained and also taking into consideration adjustments for feed shortage.

Consequently, **2020 world refined copper production is expected to remain essentially unchanged** for the second consecutive year. Secondary refined production (from scrap) is expected to significantly decline.

### **Scrap flows disrupted**

In the first 3 months of 2020 Chinese imports of copper concentrate remained essentially unchanged but scrap imports declined by 37%. Since the global lockdown trade flows have been impacted by COVID-19 related constraints on logistics and transport.

The lockdown not only affected scrap trade flows but also generation, collection and disassembling activity. Weak copper prices are also unfavourable for the scrap business.

Therefore, in 2020 scrap availability is expected to be tight as a consequence of:

- Weak copper prices so far this year reducing interest from recyclers;
- Lockdown and confinement in many countries is restricting the collection and transport of scrap;
- The scrap business was not classified as an essential sector in many countries;
- Scrap generation is weak, with the demolition activity, an important source of scrap, significantly reduced;
- The restriction on transportation of non-essential goods and the temporary closure of ports have had a negative impact on trade flows and the availability of scrap;
- The lockdown of Malaysia (including industrial activity and ports) severely affected scrap supply in China. With the new regulations on scrap imports in China, Chinese companies opened disassembly plants in Malaysia, but the total lockdown of the country prevented scrap flow to China;

The tight availability of scrap negatively impacted world secondary refined production but has been positive for copper cathode demand from the semis fabricators.

### **Refined copper usage**

Copper usage is closely linked to world economic growth and the COVID-19 related global lockdown is significantly constraining all sectors of the economy. IMF suggests that the global economy will contract sharply by 3% in 2020, an outcome far worse than during the 2008-09 financial crisis.

Refined copper usage is also dependent on the availability of scrap and the developments in the semis industry.

Refined copper usage data has been reviewed in conjunction with the IWCC (International Wrought Copper Council) supplemented by additional information provided to ICSG by ICSG member countries, industry advisors and industry associations

Overall, the 2020 outlook for refined usage looks to be pessimistic for most of the major consuming regions. The lockdown of countries, the deterioration in world economic activity and the confinement of consumers have had a significant negative impact on copper demand in 2020.

China currently represents 50% of the world refined copper usage and trends in China significantly impact global usage growth.

ICSG uses an apparent refined usage calculation for China based only on reported data (production + net trade +/- SHFE stock changes) and does not take into account changes in unreported stocks (State Reserve Bureau (SRB), producer, consumer and merchant/trader), which can be significant during periods of stocking or de-stocking. Apparent refined usage is subject to fluctuations in net refined copper imports and reflects the country demand for cathodes, including cathodes that are directed to bonded (or other) stocks. This demand differs from the underlying “real” demand of refined copper (cathode) by the semis industry.

In its latest report, BGRIMM Lilan Consulting infers that Chinese real demand of refined copper declined by about 22% in the 1st quarter of 2020 as a consequence of COVID-19 related production suspensions. The report also suggests that real demand of refined copper could decline by 2.8% in 2020: copper usage from the construction sector might be flat or even negative; copper use in the infrastructure sector is expected to increase by 2%; copper usage in the transportation sector could decline by around 5% (auto production declined by 45% in 1<sup>st</sup> quarter 2020); copper usage for general consumers goods could be down by about 3% (impacted by lower family income, low demand in the aircon sector, and a weak export market for copper containing products); a thigh scrap supply will however give some boost to cathode usage.

Around 17% of the total refined usage in China is arising from the export of copper contained products to the rest of the world. With most main consuming regions subject to lockdowns, Chinese demand from overseas is being negatively impacted.

In the rest of the world, refined copper usage was fairly stable in the 1<sup>st</sup> quarter 2020 as countries’ lockdowns only started in mid-March. It is however expected that refined usage will be significantly impacted in the 2<sup>nd</sup> quarter. For the full year, an overall decline is expected for most refined copper using countries, with the depth of the fall depended on the speed of economic recovery and return of consumer confidence.

Preliminary revisions to ICSG usage forecast suggest a decline of about 4% in world refined copper usage in 2020.

Over the longer term, sustained growth in refined copper usage is expected to continue because copper is essential to modern society. Additionally infrastructural development in major countries like China and India should sustain continued growth in copper refined usage. The gradual shift towards cleaner energy and electric vehicles, which are more copper intensive together with the implementation of the Chinese Belt and Road initiative, should also boost usage over the decade.

Comments or Questions

Please contact Ana Rebelo at the ICSG Secretariat. Email [rebelo@icsg.org](mailto:rebelo@icsg.org)

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Australia	Oz Minerals	Carrapateena	Mine	Conc.	Operating	No impact	25	No material production impacts have been experienced to date as a result of our COVID-19 response or government restrictions. The Company has in place a comprehensive management plan to protect the health and safety of our people and other stakeholders, including the early introduction of travel restrictions, improved hygiene measures and social distancing initiatives. We have however planned for a range of potential worsening scenarios, some of which may necessitate a future change to guidance if production is impacted and costs or capital are further reduced	Company	15-Apr
Australia	BHP	Olympic Dam	Refinery	Cathode	Operating	Repairs delay	250	Unplanned downtime at the smelter during the March 2020 quarter. Production for the 2020 financial year is now expected to be approximately 170 kt. The physical replacement of the refinery crane and commissioning planned for commencement in the March 2020 quarter, has been impacted by COVID-19 restrictions, and completion is now expected by the end of the 2020 calendar year.	Company	21-Apr
Australia	Oz Minerals	Prominent Hill	Mine	Conc.	Operating	No impact	90	No material production impacts have been experienced to date as a result of our COVID-19 response or government restrictions. The Company has in place a comprehensive management plan to protect the health and safety of our people and other stakeholders, including the early introduction of travel restrictions, improved hygiene measures and social distancing initiatives. We have however planned for a range of potential worsening scenarios, some of which may necessitate a future change to guidance if production is impacted and costs or capital are further reduced	Company	15-Apr
Australia	Heron Resources	Woodlawn	Mine	Conc.	Operating	Temporary shutdown	3	Operations suspended at Woodlawn on 24 March 2020 due to travel and other restrictions imposed by Australian Federal and State Governments in response to the COVID 19 pandemic, along with related health and safety concerns for site personnel. Site currently in care & maintenance to preserve mining and processing infrastructure for future restart (Cap 10kt Cu)	Company	28-Apr
Brazil	Paranapanema	Dias D'Avila	Smelter & Refinery	Cathode	Operating	No impact	290	Dias D'Avila/BA plant (Caraiba products), responsible for the production of primary copper (Caraiba brand products), and historically accounting for around 85% of the Company's revenue, continues to operate regularly, in line with the current Company's focus to manufacture and export its copper cathode (commodity) production, considering that this product has an ongoing and expressive demand in the foreign market, especially from Asian markets.	Company	08-May
Brazil	Paranapanema	Eluma	Semis	Cathode	Operating	Reduced production		Due to this scenario brought about by COVID-19, the operations of the industrial plants in Santo André/SP and Serra/ES (Eluma products) were temporarily reduced as of the end of March and a significant number of the employees allocated in such units had their employment contracts suspended, in line with Provisional Measure No. 936/20 of the Federal Government. Despite the temporary reduction in these plants, the production of hospital tubes continued, and they were used to equip 20,000 hospital beds across Brazil.	Company	08-May
Brazil	Vale	Salobo and Sossego	Mine	Conc.	Operating	Reduced production	200/120	Vale revised its copper 2020 production guidance to 360-380 kt from 400 kt. The new copper production guidance considers actual and potential losses, including Voisey's Bay mine shut down since March, which may be extended until July as recently stated, as well as limited ability to keep current maintenance shutdown schedules, mainly due to (i) our decision to minimize the workers contingent at the sites as a protective measure against the Covid-19 pandemic; (ii) travel restrictions and disruptions in the supply of the necessary materials; and (iii) a meaningful increase in absenteeism, which could result in lower productivity levels. Some effects are already being felt in Salobo, as ongoing and scheduled maintenance is being impacted due to dependency on external contractors and cross-border restrictions ( COVID-19 related losses as compared to plann Sossego 7kt and Salobo 6kt )	Company	17-Apr
Bulgaria	Dundee Precious	Chelopech	Mine	Conc.	Operating	No impact	21	On March 11, 2020, the World Health Organization classified COVID-19 as a worldwide pandemic and governments across the globe have undertaken extensive measures to combat the spread of this virus. To date, as a result of the proactive actions being taken within the regions in which we operate and by personnel at each of our sites, the impact of COVID-19 on the Company's mining and smelting operations has been minimal. The Company's Chelopech and Ada Tepe mines in Bulgaria continue to operate at full capacity and have not experienced any disruptions to their operations.	Company	07-May
Canada	Copper Mountain Mining	Copper Mountain	Mine	Conc.	Operating	Reduced production	40	Copper Mountain Mining Corporation has revised its mine plan and project schedule at its Copper Mountain Mine, located in Southern British Columbia, with the objective of maintaining solid positive margins and cash flow in response to current market conditions and near-term copper price uncertainty as a result of the Coronavirus impact to metal prices. A summary of changes includes: Deferral of Ball Mill 3 installation capital expenditures, saving US\$22million in 2020. Reducing operating costs by re-sequencing short term production to lower cost mine phases. Preserving high grade ore in Pit 3 scheduled for mining in 2020 to now be mined in 2021 for the benefit of expected higher metal prices in future and to match deferred Ball Mill 3 expansion capital expenditures.	Company	10-Mar
Canada	Copper Mountain Mining	Copper Mountain Mine	Mine	Conc.	Expansion	Expansion delay		Deferral of Ball Mill 3 expansion capital expenditures.	Company	11-Mar



**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Canada	Taseko	Gibraltar	Mine	Conc.	Operating	No impact	60	To-date, there has not been any impact on Gibraltar operations as a result of COVID-19. The health and safety of our employees remain the top priority for the Company during these very challenging times and we are pleased to report that there have been no cases of COVID-19 at Gibraltar or any of our other locations. We will remain vigilant and continue with the extra measures that are in place to mitigate the risk of an outbreak, which are being supported by the efforts of our employees." We will continue to monitor market conditions and adjust operating plans as required to respond to changes in copper price movements in the future. Production guidance for 2020 remains unchanged at 130 million pounds (+/-5%), although we now expect production to be at the higher end of that range based on the revised	Company	29-Apr
Canada	Teck	HVC	Mine	Conc.	Operating	Reduced production	155	At Highland Valley Copper, we reduced on-site workforce by up to 50% for an initial two week period and temporarily scaled back operations accordingly. These measures reduced our production to approximately 85% of normal levels. Operating crews have returned to 75% of normal levels, following an initial two week period at 50% that ended after the first week of April. Opportunities are being evaluated to increase production back up to normal operating levels	Company	21-Apr
Canada	Glencore	Matagami	Mine	Conc.	Operating	Temporary shutdown	6	26/Mar: The government of Quebec has ordered all non-essential businesses to close in an attempt to slow the spread of COVID-19. Accordingly, our Raglan (nickel) and Matagami (zinc) operations in Quebec will be on care and maintenance for the next three weeks. 14/Apr: the government of Quebec has extended the order for all non-essential businesses to remain closed until 4 May. Mining has been classed an essential activity with effect from 15 April. Accordingly, our Raglan and Matagami operations are analysing options to restart operations before 4 May.	Company	26-Mar & 14-Apr
Canada	Glencore	Matagami	Mine	Conc.	Operating	Restart	6	Operations stopped late March. Now recommenced and in process of being ramped up. Direct impact is less than one month of output	Company	30-Apr
Canada	Centerra Gold	Mt Milligan	Mine	Conc.	Operating	Reduced production	40	As a precautionary measure in light of the COVID-19 pandemic, the Mount Milligan Mine in British Columbia, Canada will significantly reduce manpower and temporarily reduce mill throughput to 50,000 tonnes per day for a two week period commencing April 6, 2020.	Company	01-Apr
Canada	Vale	Voisey's Bay	Mine	Conc.	Operating	Temporary shutdown	30	In this date, Vale took the decision to ramp down its Voisey's Bay mining operation and place it on care and maintenance for a period of four weeks, as a precaution to help protect the health and well-being of Nunatsiavut and Innu indigenous communities in Labrador in face of the COVID-19 pandemic. The decision also impacts Voisey's Bay Mine Expansion project currently underway to transition to underground operations.	Company	17-Mar
Canada	Vale	Voisey's Bay	Mine	Conc.	Operating	Temporary shutdown	30	Vale S.A. ("Vale") informs that it is extending the care and maintenance period at its Voisey's Bay mine in Labrador, Canada by up to three months while continuing to monitor progress and events associated with the COVID-19 (coronavirus) outbreak.	Company	08-Apr
Canada	Vale	Voisey's Bay	Mine	Conc.	Operating	Temporary shutdown	30	in the Base Metals business, Vale ramped down its Voisey's Bay mining operation and placed it on care and maintenance for an initial period of four weeks, later extending this period additionally by up to three months, with an impact of up to 6 kt of copper concentrate production in 1H20	Company	17-Apr
Canada	Vale	Voisey's Bay	Mine	Conc.	Expansion	Expansion delay		On this date, Vale took the decision to ramp down its Voisey's Bay mining operation and place it on care and maintenance for a period of four weeks, as a precaution to help protect the health and well-being of Nunatsiavut and Innu indigenous communities in Labrador in face of the COVID-19 pandemic. The decision also impacts Voisey's Bay Mine Expansion project currently underway to transition to underground operations.	Company	17-Mar
Chile	Antofagasta	Antucoya, Zaldivar, Centinela, Los						Assuming mining operations continue to run at or close to capacity and no shutdowns are required, Group copper production in 2020 is expected to be at the lower end of the original 725-755,000 tonnes guidance range as the new health measures and lower manpower on-site have required mine movement and maintenance activities to be rescheduled, which will impact copper production during the rest of the year	Company	22-Apr
Chile	Teck	Carmen de Andacollo	Mine & SX-EW	Conc & Cathode	Operating	No impact	70	At Carmen de Andacollo and Quebrada Blanca operations, we have maintained normal production levels while reducing the on-site workforce where possible and working with our contractors and the local communities to ensure adequate preventative measures are in place.	Company	21-Apr
Chile	Anglo American	Collahuasi, Los Bronces, El Soldado	Mine & SX-EW	Conc & Cathode	Operating	No impact		Production guidance for the year is unchanged at 620,000-670,000, subject to water availability and the extent of further COVID-19-related disruptions		
Chile	Freeport MacMoRan	El Abra	Mine & SX-EW	Cathode	Operating	Reduced production	90	Operating plans at El Abra have also been revised to incorporate lower mining rates, operating costs and capital spending	Company	24-Apr

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Chile	BHP	Escondida	Mine & SX-EW	Conc & Cathode	Operating	No impact	1250	For the June 2020 quarter, our Chilean copper operations are expected to operate with a reduction of more than 30 per cent in their operational workforces as we have prioritised critical roles for operational continuity and incorporated a series of planned preventative measures for COVID-19. 1Q20 Strong concentrator throughput was driven by ongoing improvements in maintenance and operational performance and was achieved despite Escondida operating with a reduced headcount on site during March 2020. Guidance for the 2020 financial year remains unchanged at between 1.160 and 1.230 kt.	Company	21-Apr
Chile	Antofagasta	Los Pelambres	Mine	Conc.	Operating	Reduced production	370	To help prevent the spread of infection, our operations are now operating with about half our workforce. To date the impact on production has been limited and we will review full year guidance in our 1st Quarter Production Report, which will be released on 22 April 2020.	Company	02-Apr
Chile	Antofagasta	Los Pelambres	Mine	Conc.	Expansion	Expansion delay	90	As announced on 6 April, the Los Pelambres Expansion project is currently suspended on a precautionary care and maintenance basis because of the health emergency caused by COVID-19. The suspension is expected to be for a maximum of 120 days	Company	22-Apr
Chile	Teck	Quebrada Blanca	Mine & SX-EW	Conc & Cathode	Operating	no impact	25	At Carmen de Andacollo and Quebrada Blanca operations, we have maintained normal production levels while reducing the on-site workforce where possible and working with our contractors and the local communities to ensure adequate preventative measures are in place.	Company	21-Apr
Chile	Teck	Quebrada Blanca (Phase 2)	Mine	Conc.	Project	Project delay	250	As previously announced, construction at our Quebrada Blanca Phase 2 (QB2) project was temporarily suspended on March 18. Extensive planning has been completed for construction restart and the situation is continuously being assessed to allow for a restart as soon as practicable. The impact of the initial 4-week construction suspension period is estimated to be approximately US\$75 to \$125 million with a schedule delay of up to 8 weeks. For each additional month of suspension, we estimate an additional impact of approximately US\$25 to \$50 million and one month of additional schedule delay. It is not currently possible to estimate a remobilization date and the impact on the cost and schedule for the project will depend on the length of the suspension.	Company	21-Apr
Chile	Codelco	several company operations	Mine		Operating	Marginal Impact		Codelco reducirá el nivel de su actividad a fin de disminuir al mínimo posible las dotaciones propias y de terceros, con tal de mantener la continuidad operacional y la seguridad de las personas y las instalaciones, por un periodo de 15 días a partir del 19 de marzo de 2020.	Company	18-Mar
Chile	BHP	Spence	Mine & SX-EW	Conc & Cathode	Operating	Workforce reduced	180	For the June 2020 quarter, our Chilean copper operations are expected to operate with a reduction of more than 30% in their operational workforces as we have prioritised critical roles for operational continuity and incorporated a series of planned preventative measures for COVID-20	Company	21-Apr
Chile	BHP	Spence (CONCS)	Mine	Conc.	Project	Project delay	185	The Spence Growth Option is continuing to progress, however the schedule is under review with first production potentially delayed until early in the 2021 calendar year as a result of lower headcount on site, reflecting the decision to reduce the occupancy at the construction camp, to facilitate social distancing protocols. As a result of the reduction of the on-site workforce, the commissioning of the desalination plant could potentially be delayed a few months until the first half of the 2021 financial year	Company	21-Apr
DRC	Ivanhoe Mines	Kamoa-Kakula	Mine	Conc.	Project	No impact	380	At Kamoa-Kakula, the minesite has been locked down and all key personnel is on site, except for the supply of food and critical equipment under strict delivery protocols. A total of 881 employees, who were previously based in surrounding communities and Kolwezi, have been moved to permanent minesite accommodation, and up to 250 additional employees will be moved to the minesite once accommodations have been expanded and subject to appropriate and stringent quarantine protocols. At present, a total of 3,532 employees and contractors are based at the minesite, which ensures operational continuity and minimizes the impact on the development schedule.	Company	02-Apr
DRC	Ivanhoe Mines	Kamoa-Kakula	Mine	Conc.	Project	No impact	380	Announced today that underground development at the Kakula Copper Mine continues to advance ahead of schedule. The company is fully focused on bringing the Kakula Copper Mine to production on schedule and on budget. The extraordinary protective measures that we put in place to safeguard the health and safety of our employees and contractors have enabled our outstanding multi-national mining team to repeatedly set new underground development records. This accomplishment positions us to deliver a world-class copper mine fortuitously timed for the highly probable recovery of the world economy by the third quarter of 2021."	Company	27-Apr

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/Impact	CAP. (kt Cu) *	Notes	Info Source	Date
DRC	Ivanhoe Mines	Kamoa-Kakula	Mine	Conc.	Project	No impact	380	Development of the Kakula Copper Mine, the first of multiple, planned mining areas at the Kamoa-Kakula Project, is making excellent progress. Early implementation of extraordinary COVID-19 prevention measures has allowed development of the flagship Kakula Copper Mine in the Democratic Republic of Congo to continue uninterrupted, with initial production on track for third quarter of 2021. In response to government-imposed travel restrictions and emergency protocols introduced worldwide, strict quarantine and lock-down procedures have been implemented at all three of the company's projects – Kamoa-Kakula, Platreef and Kipushi – to prevent the corona virus from spreading to the minesites. To date, no COVID-19 cases have been discovered at Ivanhoe's projects.	Company	13-May
DRC	Glencore	Kamoto	Acid Plant	Acid	Project	Project delay		As previously announced, the Company continued to progress towards commissioning of its sulphuric acid, sulphur dioxide production and steam turbine generator project at KCC (the "Acid Plant"). However, commissioning of the Acid Plant has been delayed as a result of the inability to mobilize necessary commissioning experts to site due to travel and social distancing restrictions imposed as a result of the COVID-19 pandemic. The Acid Plant is now expected to be commissioned in the second half of 2020, rather than in the first half of 2020.	Company	22-Apr
DRC	Glencore	Kamoto	Mine & SX-EW	Cathode	Operating	No impact	300	The Company also demobilized non-essential work activities towards the end of Q1 2020, which will impact the timing of the commissioning of various major capital expenditures. While there were no material disruptions to the Company's productive operations during Q1 2020, there can be no certainty that the COVID-19 pandemic and the restrictive measures implemented by the government of the Democratic Republic of the Congo (the "DRC") and other governments to slow the spread of the virus will not impact the company's operations in the coming weeks and months. The Company will likely be materially and adversely impacted if its operations are disrupted for any extended period of time, or if it is unable to either import required supplies or export finished product. Further, the lack of extensive health infrastructure in the DRC may materially and adversely impact the Company.	Company	22-Apr
DRC	MMG	Kinsevere	Mine & SX-EW	Cathode	Operating	no impact	75	Operations have largely continued as normal in Australia and the Democratic Republic of Congo, with relatively limited impacts from the COVID-19 outbreak. On this basis, and noting the inherent ongoing uncertainty associated with COVID-19, MMG at this stage continues to maintain existing 2020 guidance for its Dugald River, Rosebery and Kinsevere operations.	Company	13-Apr
DRC	Ivanhoe Mines	Kipushi	Mine	Conc.	Project	Project delay	3	Kipushi also has temporarily suspended operations in order to reduce the risk to the workforce and local communities. The project is maintaining a small workforce to conduct care and maintenance activities, and to maintain pumping operations.	Company	02-Apr
DRC	Ivanhoe Mines	Kipushi	Mine	Conc.	Project	Project delay	3	the company also has modestly reduced activities at the historic Kipushi zinc-copper-lead-germanium mine in the DRC and allocated a 2020 budget of US\$28.7 million.	Company	27-Apr
DRC	Ivanhoe Mines					Cut costs		While Ivanhoe Mines is in a strong financial position going into this period of global uncertainty with cash and cash equivalents of US\$603 million at the end of March and no significant debt, the company has identified several cost-reduction initiatives to generate cash savings of up to US\$75 million through 2021. The savings will be generated through reducing discretionary spending at the company's projects, lowering general and administrative costs and corporate overheads, voluntary salary reduction for senior management and deferral of certain exploration activities previously planned for 2020 and will be fully directed towards developing the company's flagship Kakula Copper Mine to commercial production on schedule and on budget.	Company	27-Apr
Ecuador	Ecuacorriente	Mirador	Mine	Conc.	Operating	Temporary shutdown	90	Due to the health measures taken by the government to control the pandemic, production is suspended (info in company facebook - 29 Mar)	Company	29-Mar
Germany	Aurubis	Hamburg	Smelter & Refinery	Cathode	Operating	Marginal Impact	400	Considering the COVID-19 pandemic, we have steered Aurubis through the crisis well so far. By implementing measures very early on, we were able to effectively protect our employees' health, prevent infection chains from forming, and continue production without limitations. Until the end of March, the economic impacts of the coronavirus pandemic on Aurubis were marginal, especially considering the dimension this global challenge has taken on.	Company	15-May
India	Hidalco	Birla	Smelter & Refinery	Cathode	Operating	Temporary shutdown	500	Shutdown from end March to early May.	Gov	08-May

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Indonesia	Freeport MacMoRan	Grasberg	Mine	Conc.	Operating	No impact	400	PT-FI has implemented a series of actions to prevent a spread of COVID-19 at its remote operating site in Papua. PT-FI has been successful in maintaining the health of its workforce while continuing to make important progress in increasing production from its underground ore bodies. PT-FI remains on track to continue to ramp-up production rates and expects 2021 production of 1.4 billion pounds of copper (more than 75 percent above the current April 2020 estimate) and 1.4 million ounces of gold (70 percent above the current April 2020 estimate). The successful completion of this ramp up is expected to enable PT-FI to generate average annual production for the next several years of 1.55 billion pounds of copper and 1.6 million ounces of gold at an average unit net cash cost of approximately \$0.20 per pound. PT-FI's revised plans incorporate benefits of reduced input costs for energy, foreign exchange and recent increases in gold prices. PT-FI has also deferred approximately \$0.2 billion in capital projects from 2020 to future periods, primarily related to a delay in construction and installation of an additional milling circuit from 2022 to 2023, mostly reflecting limitations on work schedules and travel by international contractors during COVID-19 mitigation measures..	Company	24-Apr
Indonesia	Freeport MacMoRan	Grasberg	Mine	Conc.	Operating	Deferral in capital projects		PT-FI has also deferred approximately \$0.2 billion in capital projects from 2020 to future periods, primarily related to a delay in construction and installation of an additional milling circuit from 2022 to 2023, mostly reflecting limitations on work schedules and travel by international contractors during COVID-19 mitigation measures..	Company	24-Apr
Indonesia	Freeport MacMoRan	New refinery	Smelter & Refinery	Cathode	Project	Project delay	400	As a result of disruptions to work and travel schedules of international contractors and current limitations on access to the proposed physical site in Gresik, Indonesia associated with COVID-19 mitigation measures, PT-FI has notified the Indonesian government of delays in achieving the completion timeline of December 2023. PT-FI is currently discussing with the Indonesian government a deferred schedule for the project as well as other alternatives in light of COVID-19 and global economic conditions.	Company	24-Apr
Iran	NICICO	several company operations	Mine & Refinery	Conc & Cathode	Operating	No impact		Operations running normaly with protective measures.	Company	25-Apr
Kazakhstan	Kaz Minerals	Aktogay	Mine	Conc.	Expansion	Expansion delay	80	Following a review of construction progress to date and the near-term impact of Covid-19 restrictions, the project remains on track for completion in 2021, as previously guided, but is now expected to commence production in late 2021. Measures taken to control the spread of Covid-19, both in Kazakhstan and internationally, have negatively impacted the supply chain, reduced the availability of local contractors and prevented vendor representatives from entering the country to support equipment installations.	Company	30-Apr
Kazakhstan	Kaz Minerals	several company operations	Mine & Refinery	Conc & Cathode	Operating	No impact		All mines have maintained operations in the year to date and 2020 production guidance is unchanged (mines include Aktogay, Bozshakol, Esat Region mines)	Company	30-Apr
Kyrgyzstan	Kaz Minerals		Mine	Conc.	Operating	No impact	8	All mines have maintained operations in the year to date and 2020 production guidance is unchanged	Company	30-Apr
Mexico	Camrova Resources	Boleo	SX-EW	Cathode	Operating	Temporary shutdown	20	Camrova also advises that following recommendations it made to Kores and MMB in March with respect to mitigating the impact of the Corona Virus and in accordance with recent Decree by the Government of Mexico, MMB has reacted responsibly and placed the Boleo Mine and Plant on care and maintenance until April 30, 2020. This closure will be extended if required.	Company	22-Apr
Mexico	Southern Copper (Grupo Mexico)	Buena Vista , La Caridad	Mine & Refinery	Conc & Cathode	Operating	Workforce reduced		Grupo México continues to operate its essential productive processes. We implemented strict hygiene and protection measures at all its facilities and in the three Divisions to protect the health of its workers, their families, and the nearby communities. In Mexico: less than 40 percent of the workforce for essential functions; about 6,000 workers, distributed among 8 mining and metallurgical facilities, 9,000 people have been sent home as a preventive measure. We expect marginal impact in production.	Company	24-Apr
Mexico	Southern Copper (Grupo Mexico)	Buena Vista and La Caridad				Marginal Impact		As of March 31, 2020, the Company's production facilities in Mexico and Peru were working at approximately 90% of their production capacity.	Company	04-May
Mexico	Capstone Mining	Cozamin	Mine	Conc.	Operating	Temporary shutdown	17	On April 7, the Company safely commenced ramping down operations at Cozamin to comply with a Mexican Federal Government decree which was extended from April 30, 2020 to until May 30, 2020. The decree allows for the normal operations to resume on May 18, 2020 in municipalities which present low or null transmission of COVID-19. Zacatecas is a low-risk jurisdiction based on current statistics. The Company is taking all steps necessary to be able to quickly and safely ramp production back up to full capacity by May 18, 2020.	Company	1Q Rep
Mongolia	Erdenet Mining Corp.	Erdenet	Mine	Conc.	Operating	No impact	130	2020 production levels are normal and the mine is operating as usual	Company	07-May

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Mongolia	Turquoise Hill Resources	Oyu Tolgoi	Mine	Conc.	Expansion	Expansion delay	~300	The unprecedented circumstances of COVID-19 have had an impact on the underground development by restricting access for teams from Oyu Tolgoi, Rio Tinto and our construction partners, and although the open pit has continued to operate uninterrupted, COVID19 restrictions have challenged our supply logistics. Shafts 3 and 4 have been placed on care and maintenance until expert service providers can return to site to complete technical commissioning of specialised equipment and commence sinking activities. Work has also slowed on some critical underground material handling infrastructure, in particular the construction of primary crusher one, which has been reduced to day shift activity	Company	16-Apr
Mongolia	Turquoise Hill Resources	Oyu Tolgoi	Mine	Conc.	Operating	No impact	170	Oyu Tolgoi is adapting to the challenges posed by the COVID-19 pandemic on both the open pit and underground operations, with the open-pit continuing to operate without interruption, while the underground development is experiencing a slow-down. On track to achieve 2020 copper and gold production guidance. We will continue to update the market as the impact of COVID-19 becomes clearer.	Company	16-Apr
Namibia	Dundee Precious	Tsumeb	Smelter	Anode	Operating	Reduced production	50	On March 11, 2020, the World Health Organization classified COVID-19 as a worldwide pandemic and governments across the globe have undertaken extensive measures to combat the spread of this virus. In April 2020, the Tsumeb smelter in Namibia curtailed its operations by shutting down ancillary plants for 30 days and reducing complex concentrate smelted for the month by approximately 20% in response to a government directive aimed at limiting staffing levels. Full operations resumed in May with ongoing management of the number of employees and contractors at site and adherence to the COVID-19 control practices that have been established across all sites. With the throughput now back to full capacity, the smelter remains on track to achieve 2020 annual guidance.	Company	07-May
Namibia	Dundee Precious	Tsumeb	Smelter	Blister	Operating	Reduced production	50	In cooperation with the government of Namibia's directive to temporarily limit staffing for the health and safety of the workforce and local communities, Tsumeb has reduced capacity primarily in certain ancillary areas of the plant, including the slag mill. As a result of these reductions, Tsumeb is expected to process approximately 600 tonnes per day of complex concentrate, relative to its targeted capacity of approximately 700 - 750 tonnes per day. This reduction is expected to be in place until April 16, 2020 or as otherwise required by the government or the Company to ensure the health and safety of the workforce. Based on the current timing we expect to operate at this capacity, DPM expects a minimal impact on annual throughput, which continues to be in line with the previously issued annual guidance for Tsumeb. on April 2, 2020, operations at certain ancillary areas of the Tsumeb smelter were reduced in cooperation with the government of Namibia's directive to temporarily limit staffing in response to COVID-19. This resulted in a 20% reduction in concentrate treatment as from April 2, 2020.	Company	2/4 and 9/4
North and South America	Freeport MacMoRan					Capital expenditure		During 2019, FCX advanced initiatives in its North America and South America operations to enhance productivity through the use of new technologies, data science and a more interactive, multi-disciplined operating structure. Capital projects associated with this initiative, which were expected to total \$150 million for the year 2020, and were projected to add approximately 200 million pounds of copper per year beginning in 2022, have been suspended in response to current market conditions and capital preservation initiatives.	Company	24-Apr
Panama	First Quantum	Cobre e Panama	Mine	Conc.	Operating	Temporary shutdown	300	First Quantum Minerals Ltd. announces that it is in receipt of Resolution No. 11622 dated April 6, 2020 issued by the Director General of Health of the Ministry of Health of the Republic of Panama ("MINSa") ordering the temporary suspension of labour activities at its Panamanian subsidiary Minera Panama, S.A., as a sanitary control measure due to COVID-19. The Company has decided to place the Cobre Panama operation onto care and maintenance until MINSa are satisfied that the quarantine conditions are appropriate.	Company	09-Apr
Panama	First Quantum	Cobre e Panama	Mine	Conc.	Operating	Temporary shutdown	300	On April 6, 2020, the Ministry of Health of the Republic of Panama ("MINSa") ordered the temporary suspension of labour activities at the Cobre Panama operation, as a sanitary control measure due to COVID-19. The Company has decided to place the Cobre Panama operation onto preservation and safe maintenance from April 7, 2020, until MINSa are satisfied that the quarantine conditions are appropriate. The heightened quarantine conditions require that mining and processing operations be halted. The port and power plant have continued operations in order to supply essential electrical power into the Panama national grid, and to sustain the preservation and safe maintenance activities. In light of the preservation and safe maintenance period, production guidance for Cobre Panama for 2020 has been reduced to 210,000 to 235,000 tonnes of copper (was on track to successfully deliver on its 2020 copper production guidance of between 285,000 and 310,000 tonnes)	Company	27-Apr
Peru	Southern Copper					Reduced production		Facilities in Peru and Mexico working at approximately 90% of capacity	Company	04-May
Peru	BHP, Glencore, Teck, Mitsubishi	Antamina	Mine	Conc.	Operating	Temporary shutdown	450	During March 2020, Antamina operated with a reduced workforce in response to COVID-19, before being given Government approval to demobilise the workforce and then taking a decision on 14 April 2020 to temporarily suspend operations. Timing on resuming operations at Antamina is uncertain and guidance for the 2020 financial year is under review. The Peruvian state of emergency has been extended until 26 April 2020.	Company	21-Apr

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Peru	Glencore	Antamina	Mine	Conc.	Operating	Temporary shutdown	450	Operations were initially halted for a two-week period from 13 April. This has now been extended, with restart timing subject to Antamina being able to ensure the workforce's ongoing health and wellbeing	Company	30-Apr
Peru	Freeport MacMoRan	Cerro Verde	Mine & SX-EW	Conc & Cathode	Operating	Temporary shutdown	450	To comply with the Government's requirements, Cerro Verde has temporarily transitioned to a care and maintenance status for a 15-day period which commenced on March 16, 2020. During this period, onsite personnel will be limited to critical activities necessary to maintain the facilities pending a return to normal operations.	Company	17-Mar
Peru	Freeport MacMoRan	Cerro Verde	Mine & SX-EW	Conc & Cathode	Operating	Reduced production	450	As previously reported, in mid-March 2020, the Peruvian government issued a Supreme Decree and declaration of a National Emergency in its efforts to contain the outbreak of COVID-19, and subsequently extended this order through May 10, 2020. To comply with the government's requirements, Cerro Verde temporarily transitioned to a care and maintenance status and has adjusted its operations to prioritize critical activities. Cerro Verde has also completed construction of temporary onsite facilities and enhanced protocols to enable critical operations to be maintained in compliance with the Peruvian government order. From April 1, 2020, to April 23, 2020, Cerro Verde has operated at approximately one-third of planned rates. Cerro Verde's revised 2020 plans reflect limited operations during second-quarter 2020 and increased mining and milling rates in the second half of the year. Cerro Verde's mine plans have been revised to target a lower cost mining configuration, defer all nonessential projects and preserve long-term value in the long-lived resource. Compared with January 2020 estimates, mining and milling rates have been reduced by 13% (including the impact of the Peruvian government order and mine plan optimization in the second half of 2020), resulting in a decline in projected copper sales of approximately 130 million pounds (13%) in 2020. The revised mine plans also include	Company	24-Apr
Peru	Hudbay	Constancia	Mine	Conc.	Operating	Temporary shutdown	115	In response to the challenging environment in Peru following the Peruvian government's recent declaration of a state of emergency, the company has commenced a temporary and orderly shutdown of operations at Constancia, as described in more detail below.	Company	20-Mar
Peru	Hudbay	Constancia	Mine	Conc.	Operating	Restart	115	On May 14, Constancia received recognition and approval from Peru's Ministry of Energy and Mines for its restart protocols and is planning to ramp up operations over the next week. Hudbay expects to provide an update to its Peru guidance with second quarter results.	Company	15-May
Peru	MMG	Las Bambas	Mine	Conc.	Operating	Reduced production	400	MMG Limited (MMG) advises that, in response to the State of National Emergency and measures declared by the Government of Peru to restrict the spread of coronavirus (COVID19), Las Bambas has temporarily reduced operations and has begun the process to reduce employees and contractor levels at site. The transport of concentrates and critical supplies will also be significantly restricted during the period of National Emergency.	Company	19-Mar
Peru	MMG	Las Bambas	Mine	Conc.	Operating	Reduced production	400	The Company wishes to advise that the Government of Peru, on 8 April 2020, declared an extension of 14 days to the State of National Emergency and other measures to restrict the spread of COVID-19. As a result of this extension, Las Bambas will continue to operate, consistent with national guidelines and Company health protections, at reduced levels of mining and production. The transport of concentrates has been suspended, and the movement of people and critical supplies will also continue to be significantly restricted. MMG has continued to assess the potential impacts of the measures declared by the Government of Peru, on production and cost guidance. In light of the extension to the State of National Emergency in Peru and the ongoing constraints on normal operations, the Company advises that it formally withdraws its full-year 2020 guidance for Las Bambas.	Company	13-Apr
Peru	MMG	Las Bambas	Mine	Conc.	Operating	Resumption of concs. transport	400	MMG Limited (MMG or Company) refers to the previous updates regarding COVID-19 released on 19 March and 13 April 2020. The Company is pleased to advise that, consistent with Peru Government guidelines and appropriate health and hygiene protections, the progressive resumption of concentrate transport from Las Bambas to the Port of Matarani has commenced as of 28 April 2020. MMG continues to pro-actively respond to the COVID-19 outbreak, working closely with national authorities in relevant jurisdictions to protect the health and safety of its employees, host communities and other stakeholders.	Company	29-Apr
Peru	Nexa Resources	Magistral	Mine	Conc.	Project	Project delay	40	Magistral engineering studies (FEL3) advanced as planned in 1Q20. Future progress may be delayed due to COVID-19 related measures.	Company	
Peru	Marcobre	Mina Justa	Mine & SX-EW	Conc & Cathode	Project	Project delay	100	workforce reduced to maintain minimal services (info in company Facebook)	Company	25-Mar
Peru	Anglo American	Quellaveco	Mine	Conc.	Project	Project delay	300	Anglo American plc ("Anglo American") announces the temporary withdrawal of the majority of employees and contractors from its Quellaveco copper project in Peru, following the Government of Peru's announcement of a 15-day national quarantine to curb the spread of COVID-19. Construction work on the project will therefore be significantly slowed, with only critical areas of the project continuing as normal, until such time as workers can return safely. The Quellaveco copper project is expected to begin production in 2022. The Government of Peru has extended its initial 15-day national quarantine period by 13 days to 12 April.	Company	17-Mar & 27-Mar

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Peru	Grupo Mexico	several company operations				Marginal Impact		Grupo México continues to operate its essential productive processes. We implemented strict hygiene and protection measures at all its facilities and in the three Divisions to protect the health of its workers, their families, and the nearby communities. In Peru: Mining is considered essential. 5,500 workers (61% of the total) were sent home, and only around 3,000 are working on essential tasks. We expect marginal impact in production.	Company	24-Apr
Peru	Toromocho	Toromocho	Mine	Conc.	Operating	Reduced production		The Toromocho mine, which is in the Junin region of central Peru, had moved to partial operations under a national quarantine called for by the government in mid-March in response to the coronavirus pandemic.	Reuters	07-May
Poland	KGHM	KGHM operations	Mine & Refinery	Conc & Cathode	Operating	No impact	420	The coronavirus pandemic did not have a significant impact on the production results of the Group. As a result of the threat related to COVID-19, the companies of the KGHM Group are taking preventative actions aimed at reducing the risk of infection amongst employees and subcontractors, as well as the risk of potential restrictions to production as a result of eventual production shutdowns.	Company	23-Apr
Portugal	Lundin Mining	Neves Corvo	Mine	Conc.	Expansion	Expansion delay	45	construction and commissioning activities directly related to the Zinc Expansion Project at the Neves-Corvo operation in Portugal have been temporarily suspended until further notice. The Company is continuing to assess the impacts of the temporary suspension of the project on the timelines and budget and will provide an update once the assessments have been completed	Company	25-Mar
Russian Fed.	Norilsk	several company operations	Mine & Refinery	Conc & Cathode	Operating	No impact	420	All production assets of the Company operate in a business-as-usual mode, while dedicated emergency response teams continuously monitor the situation on sites. Owing to vertically-integrated business model with in-house energy and transport infrastructure Norilsk has not been experiencing so far any material disruptions to its operations or logistics. Thus, the Company confirms its full year 2020 production guidance given at the Capital Markets Day in November 2019.	Company	30-Apr
South Africa	Various	.	.	.	.	.	.	On 23rd of March the President announced a 21 day nationwide lockdown to combat COVID-19, that was extended by a further 14 days to 30 April 2020.	Company	
South Africa	Palabora	Palabora	Mine & Refinery	Conc & Cathode	Operating	Temporary shutdown	70	Palabora temporarily halted production during country lockdown	Reuters	26-Mar
South Africa	Ivanhoe Mines	Platreef	Mine	Conc.	Project	Project delay	6	As previously announced and in compliance with the initial 21-day, country-wide lock down imposed by the South African Government, the company has temporarily suspended site activities at its Platreef palladium-platinum-nickel-copper-gold-rhodium project in South Africa. The board of directors has allocated a reduced 2020 budget of US\$41.7 million for the Platreef Project. The sinking of Platreef's Shaft 1 will continue and be completed to facilitate a relatively quick transition to production.	Company	27-Apr
South Africa	Ivanhoe Mines	Platreef	Mine	Conc.	Project	Restart	6	Platreef temporarily suspended its shaft-sinking operations in compliance with the country-wide lock down imposed by the South African Government on March 26th. In late April, mine development operations resumed at Platreef with reduced staffing levels and strict COVID-19 preventative procedures.	Company	13-May
South Africa	Orion Minerals	Prieska	Mine	Conc.	Project	Project delay	24	Desktop work to finalise the updated Feasibility Study Report for the Prieska Copper-Zinc Project in South Africa's Northern Cape Province (Prieska Project) is currently being completed by the study team working remotely; and • The Company has re-evaluated the process and timing of its project finance activities in relation to the development of the Prieska Project. This has resulted in the postponement of debt financing activities until global macro economic and market conditions stabilise.	Company	24-Mar
South Korea			Smelter & Refinery					Korea copper smelters are operating normally without the effects of the epidemic	KONMA	14-May
Spain	First Quantum	Las Cruces	Mine & SX-EW	Cathode	Operating	Temporary shutdown	55	Mining operations at Las Cruces were shut down on March 30, 2020, following an order by the Spanish government, which designated mining as a non-essential operation. The plant continued to process the surface ore stockpile, sufficient for an expected two months of production at current levels. Las Cruces resumed operations on April 13, 2020, following the end of the government imposed shutdown on non-essential services on April 9, 2020. Production guidance for Las Cruces is unchanged.	Company	27-Apr
Spain	Atalaya Mining	Rio Tinto	Mine	Conc.	Operating	Temporary shutdown	50	As announced on 30 March 2020, the Royal Decree issued by the Spanish Government resulted in the Company stopping operations at Proyecto Riotinto for four full days until clarification was provided on 3 April 2020 and operations restarted. Proyecto Riotinto continues operating with specific requirements and recommendations to prevent the COVID-19 exposure and the spread of the virus. The COVID-19 pandemic may still further impact how the Company manages its operations and is accordingly keeping its guidance under regular review. Should the Company consider the current guidance no longer achievable, then the Company will provide a further update.	Company	15-Apr



**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Sweden	Boliden	Aitik and Kevitsa	Mine	Conc.	Operating	Absentism		The COVID-19 pandemic resulted in increased short-term absence at the end of the first quarter. Shortterm absence is also anticipated to be at a higher level during the second quarter. As a result of this, the previously announced goals of a production rate of 45 Mtonnes/year in Aitik and 9.5 Mtonnes/year in Kevitsa are not expected to be achieved until the third quarter this year	Company	28-Apr
United States	Freeport MacMoRan	Chino	Mine & SX-EW	Conc & Cathode	Operating	Temporary shutdown	150	Currently suspended operations at the Chino mine. FCX is currently assessing options and future timing of restart of the Chino mine, which will take into account health and market conditions	Company	24-Apr
United States	Excelsior Mining	Gunnison	Mine & SX-EW	Cathode	Operating	Temporary shutdown	11	Our priority is the safety and health of our employees and their families, and as such we have implemented a response plan that allows for the temporary suspension of operations as we wait for clarity in these very uncertain times," said Stephen Twyerould, President and CEO. "We will take advantage of the inherent flexibility of the in-situ mining method and preserve cash as we wait for this global crisis to abate."	Company	26-Mar
United States	Excelsior Mining	Gunnison	Mine & SX-EW	Cathode	Operating	Temporary shutdown	11	As the duration of the suspension remains unknown at this time, Excelsior is taking steps to conserve cash and maintain a robust balance sheet. Excelsior is reducing its workforce, while retaining the personnel necessary to maintain the facilities and sustain environmental monitoring and compliance requirements. The Gunnison Copper Project will be maintained in a safe care and maintenance state; thereby, allowing Excelsior the ability to restart the wellfield when timing is deemed optimal.	Company	09-Apr
United States	Freeport MacMoRan	Lone Star	Mine & SX-EW	Cathode	Project	No impact	90	Following extensive review, FCX has elected to complete the initial phase of the Lone Star copper leach project with a remaining investment of approximately \$100 million in 2020. The decision was supported by the advanced stage of the project (approximately 90 percent complete), expected quick return of the remaining investment and long-term value of the resource. First production is expected during the second half of 2020.	Company	24-Apr
United States	Nevada Copper Corp.	Pumpkin Hollow	Mine	Conc.	Operating	Temporary shutdown	23	Nevada Copper Corp.c announces that it has become necessary to temporarily suspend copper production at its Pumpkin Hollow project as a result of the restrictions imposed by government-mandated measures and other impacts of the COVID-19 pandemic. The temporary suspension of copper production, currently anticipated to last six weeks or more, will be subject to revision in response to any further government-mandated measures related to the COVID-19 pandemic, including directives from the Governor of Nevada's Office. During this period, essential mine services will continue on site, including reduced underground mine development and other activities necessary to maintain the operation in a ready condition for the ramp back-up of activities as COVID-19 related impacts are ameliorated. The Company is reviewing various cost reduction initiatives to preserve liquidity and protect the Company during the	Company	06-Apr
United States	Freeport MacMoRan	several company operations	Mine & SX-EW	Conc & Cathode	Operating	Reduced production		FCX has completed a review of mine plans at each of its operating sites in North America ( Morenci, Bagdad,Safford, Sierrita, Miami, Chino, Tyrone) to target a lower cost mining configuration, defer all nonessential projects and preserve long-term value in the long-lived resources. Under the revised plans, mining and milling rates for the year 2020 have been reduced by approximately 20 percent, resulting in a projected 12 percent decline in North America copper sales for the year 2020 (compared to the January 2020 estimate), lower unit net cash costs and lower capital spending requirements. The plans take into account the impact of currently suspended operations at the Chino mine. FCX is currently assessing options and future timing of restart of the Chino mine, which will take into account health and market conditions. FCX has also deferred approximately \$0.3 billion in capital projects from 2020 to future periods for the North America copper mines	Company	24-Apr
Various	Lundin Mining	several company operations	Mine	Conc.	Operating	Cut costs		the Company has not experienced significant disruptions to production, shipments of concentrate or its supply chain as a result of COVID-19. However, the Company has reassessed production guidance in light of the temporary suspension of ZEP and the other changes to operating procedures that the Company has implemented to reduce the risk of infections at our sites. In addition, cost reduction programs have been implemented to respond to the low metal price environment. As a result, certain capital and operational spending has been eliminated or deferred.	Company	29-Apr
Various	First Quantum					Capital expenditure reduced		Under the assumption of an extended period of health protocols, travel restrictions and depressed commodity prices, the Company's main overall priority is the active management of all capital spending and operating costs while maintaining a high level of safety and productivity. Within this context, capital expenditure guidance for 2020 has been reduced by \$175 million, reflecting the deferral of some initiatives	Company	27-Apr
Zambia			Mine					The Government has put some measures in place to curb the spread of Covid 19 and there are also some laws that have been relaxed to enable operations to continue. Mines have also put up stringent measures to help curb the spread of the disease. Mines are running as usual.	Ministry	07-May

**Table 1: Announcements related to COVID-19 impact on copper mines and plants**

Country	Company	Mine/Plant	Type	Product	Status	Event/ Impact	CAP. (kt Cu) *	Notes	Info Source	Date
Zambia	First Quantum	Kansanshi and Sentinel	Mine & SX-EW			Marginal Impact	235 / 240	With the closure of the South African and Zimbabwean borders, the export of the Company's Zambian production is currently being managed through alternate routes. To date, there has not been any significant disruption to sales, supply chains and product shipments at the Company's other operations however, its exploration programs have been affected by international and local travel restrictions associated with COVID-19.	Company	27-Apr
Zambia	Glencore	Mopani	Mine & Refinery	Conc & Cathode	Operating	Temporary shutdown		Following Mopani's recent announcement regarding the transition of its mining operations to care and maintenance, Glencore is currently in discussions on the way forward with the Government of Zambia.	Company	14-Apr

**Note: \* Basis 2020**