

COMMODITY INSIGHTS BULLETIN

Copper (2Q, 2013 and 3Q, 2013)

Introduction

Copper pricing has experienced a relative stability over the last 5 months to November 2013. The demand drivers from Chinese consumption and a recovering US have been complimented by consistency in output from major producers and refiners without any price altering outages or strikes.

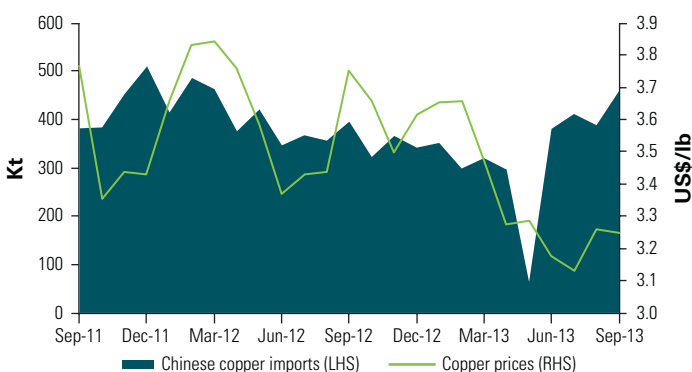
We continue to await the impact of an incoming wave of supply through various expansion and greenfield projects that is expected to lead to more pronounced price suppression and, as suggested

by Figure 2 below, highlights the supply side excess impacting the market balance in 2014 and beyond. With increasing confidence of sustained Chinese demand, whether we see this price suppression may be more of a function of what upsets the supply side apple cart. Labor tensions, production outages and environmental factors – and particularly a combination of all 3 at different major producers – all have the opportunity to change the market balance at short notice. Producers will all be hoping it is not their operations that change the supply side dynamics.

Commodity outlook

The average LME spot prices for grade A copper cathode declined q-o-q by 9.5 percent from US\$3.59/lb in 1Q, 2013 to US\$3.25/lb in 2Q, 2013. It further declined by 1.2 percent to US\$3.21 in 3Q, 2013. This can be primarily attributed to moderated copper consumption in the European Union and emerging economies along with a surge in both mine and refined production capacity. This has resulted in the copper market moving into an over-supply situation and an increase in global copper stocks.

Figure 1: China copper imports and LME copper prices, September 2011–2013



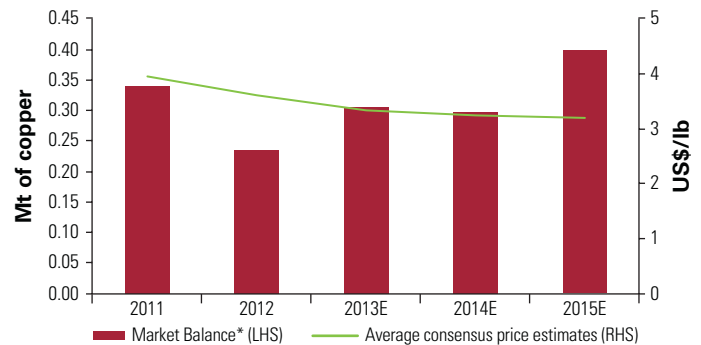
Source: HKTDC Research; IMF; KPMG Analysis

Despite expected demand growth due to increasing urbanization and infrastructure construction in China and other emerging economies, the global copper market will remain in surplus in the medium term, due to strong growth in new mining capacity and refined copper production. New mining

capacity is expected to come online in Chile, Africa, Peru, Kazakhstan¹ and Mongolia, while China is expected to lead the refined copper production with the installation of new refining capacity. Further, the country's financial sector reforms that restrict the use of copper as collateral in commercial financing could release more copper stocks into the market.

These developments are expected to result in surplus supply till 2015 and exert downward pressure on global copper prices. As per the consensus estimates, the average copper prices are expected to be about US\$3.25/lb during 2014 and further decline to US\$3.19/lb in 2015.

Figure 2: Market balance and prices of copper, 2011–2015E



Source: EIU; J.P. Morgan; BMO Capital Markets; Morgan Stanley; Roth Capital Partners; Barclays; CIMB Research; KPMG Analysis

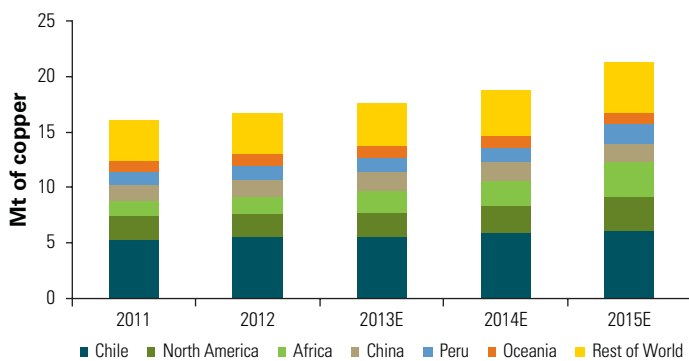
*Market balance represents the difference between the supply and demand of refined copper. A positive market balance indicates that the supply is more than the demand, whereas a negative market balance indicates demand exceeding supply.

¹ Cecilia Jamasmie "Kazakhstan's mining industry worth almost \$30 billion by 2017", Mining.com, 9 September 2013

Supply and demand^{2,3}

Mined copper production

Figure 3: Global production of mined copper, 2011–2015E



Source: BMO Capital Markets; Reuters; KPMG analysis

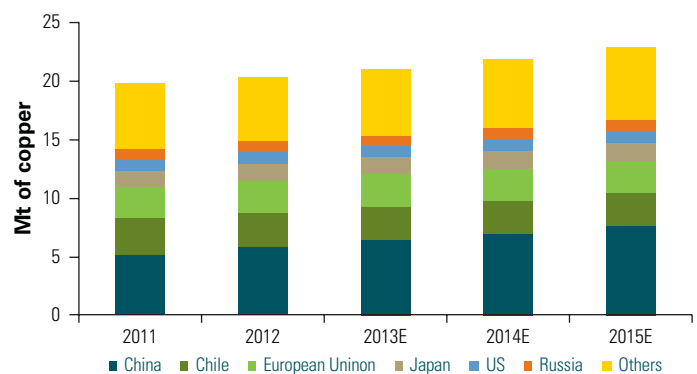
- Mined copper production is expected to increase to about 17.7 million tons (MT) in 2013, an increase of 6.1 percent over 2012. This is expected to be guided by an increased production from key copper mining regions, primarily Chile, Africa, Peru, Kazakhstan and Mongolia.
- Chile is expected to continue as the world's largest producer of mined copper with a production forecast of 5.7 MT in 2013 — a year-over-year increase of 3.9 percent. This growth is expected to be mainly supported by increased production from key mines, including the Escondida mine in the Atacama Desert in the north of Chile.⁴ Going forward, the country is expected to increase its production capacity at a CAGR of 4.0 percent, from 2012, and reach a production of 6.2 MT in 2015. This is expected to be supported by the starting of large-scale copper mines, including Codelco's Mina Ministro Hales mine, Pan Pacific Copper's Caserones mine and the KGHM-Sumitomo's Sierra Gorda mine.
- African copper production is expected to increase to 1.94 MT in 2013, a significant increase of 29.9 percent over 2012. The Central African copper-belt, comprising Zambia and the Democratic Republic of Congo (DRC), has been a major focus area for investment and production growth in recent years. Further, an increase in output is expected in the medium term with the commissioning of Vedanta's Konkola Deep project and First Quantum's new Sentinel and Kansanshi mines in Zambia. However, infrastructure inadequacies, high costs and labor disputes, which have been issues in Africa, could affect production growth.
- The total growth in mined production in 2013 is, however, expected to be lower than its development potential. This can be primarily attributed to mine accidents, labor strikes and disputes between mine operators and governments during the year. A landslide at Rio Tinto's Bingham Canyon mine in April 2013 shut down operations and affected

US copper production. A fatal tunnel collapse at Freeport McMoRan's Grasberg mine in Indonesia in May 2013 led to production shutdown for a month while safety inspections and enquires were conducted.^{5,6}

- The global mined copper production is expected to increase at a CAGR of 8.5 percent to reach 21.3 MT in 2015 from 2012. This is expected to be driven by the production ramp up at Glencore Xstrata's Antapaccay mine in Peru, Turquoise Hill Resource's Oyu Tolgoi mine in Mongolia and near-full production at the Grasberg mine in Indonesia.

Refined copper production

Figure 4: Global production of refined copper, 2011–2015E



Source: EIU; KPMG analysis

- World refined copper production is expected to increase to 21.08 MT in 2013, a 3.2 percent increase over 2012. Significant production growth from China is expected to be the main contributor to this growth.
- Chinese refined copper production is expected to increase 9.9 percent year-over-year to 6.4 MT in 2013. This growth in consumption is expected to be underpinned by freshly installed smelting capacity, favourable ore treatment, refining and tax charges in the country. Also, stronger domestic demand for copper is expected to drive production. The country plans to shut down outdated refining capacity across base metals and steel industries, though this is expected to have a minor impact on copper.
- Global refined copper production is expected to increase at a CAGR of 3.9 percent to 22.9 MT from 2012 to 2015. China is expected to be the main driver of this production growth. Major projects that are expected to come online during this period include Jinchuan Non-ferrous Metal Company's Jinchuan Fangchenggang refinery, Tongling Non-Ferrous Metals Group's Tongling refinery and Zhongtiaoshan Nonferrous Metals Company's Zhongtiaoshan Houma expansion project.

² "Resources and Energy Quarterly", Bureau of Resources and Energy Economics, Australian Government, September 2013

³ "World commodity forecasts: Industrial raw materials", The Economist Intelligence Unit, October 2013

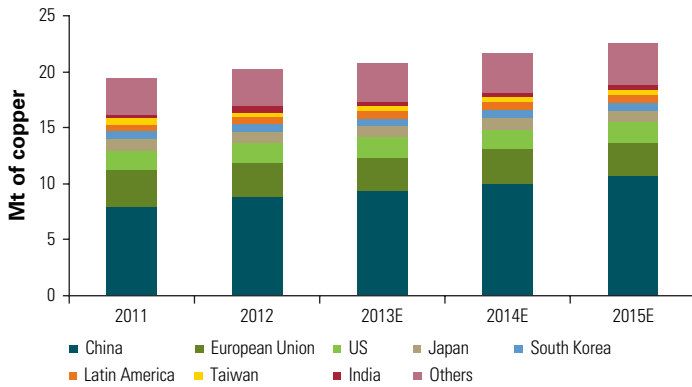
⁴ "Chile raises copper price, output forecast for 2013", MiningWeekly.com, 08 October 2013

⁵ "Huge landslide shuts Kennecott Utah Copper's Bingham Canyon Mine", new.co.au, 12 April 2013

⁶ Randy Fabi and Michael Taylor "Freeport suspends Indonesia mine after tunnel collapse", Reuters, 15 May 2013

Refined copper consumption

Figure 5: Global consumption of refined copper, 2011–2015E



Source: EIU; KPMG analysis

- Global refined copper consumption is expected to increase to 20.8 MT in 2013, a 2.9 percent increase over 2012. This is expected to be driven by favorable consumption growth in the emerging Asian economies and the Middle East mainly due to increased investments in electricity networks and construction sector.
- China is expected to consume 9.4 MT of refined copper in 2013, a 6.0 percent increase over 2012. This growth in

consumption is expected to be underpinned by a strong demand coming from the construction sector. Going ahead, Chinese consumption is expected to reach 10.63 MT in 2015, growing at a CAGR of 6.3 percent from 2012. This is expected to be driven by continued urbanization and increased investment in residential construction and electricity networks.⁷

- Emerging economies such as Brazil, India and Turkey are expected to play a larger role in global copper consumption during the medium-term. The manufacturing, infrastructure and electrical power sectors in India are expected to be the key drivers for copper demand in the country. The Brazilian economy is expected to focus on a program for building homes for its expanding middle class population, which is expected to drive demand.⁸
- Global refined copper consumption is expected to reach 22.49 MT in 2015, growing at a CAGR of 3.7 percent since 2012. Increased demand from the emerging economies, including China, is expected to be the key driver for this growth rate. Also, a sustained rebound in residential construction in the US is expected to support growth in copper consumption in the region, though to a smaller extent. Forecasted slower recovery in the European markets is expected to support only moderate growth in copper consumption in the European Union.

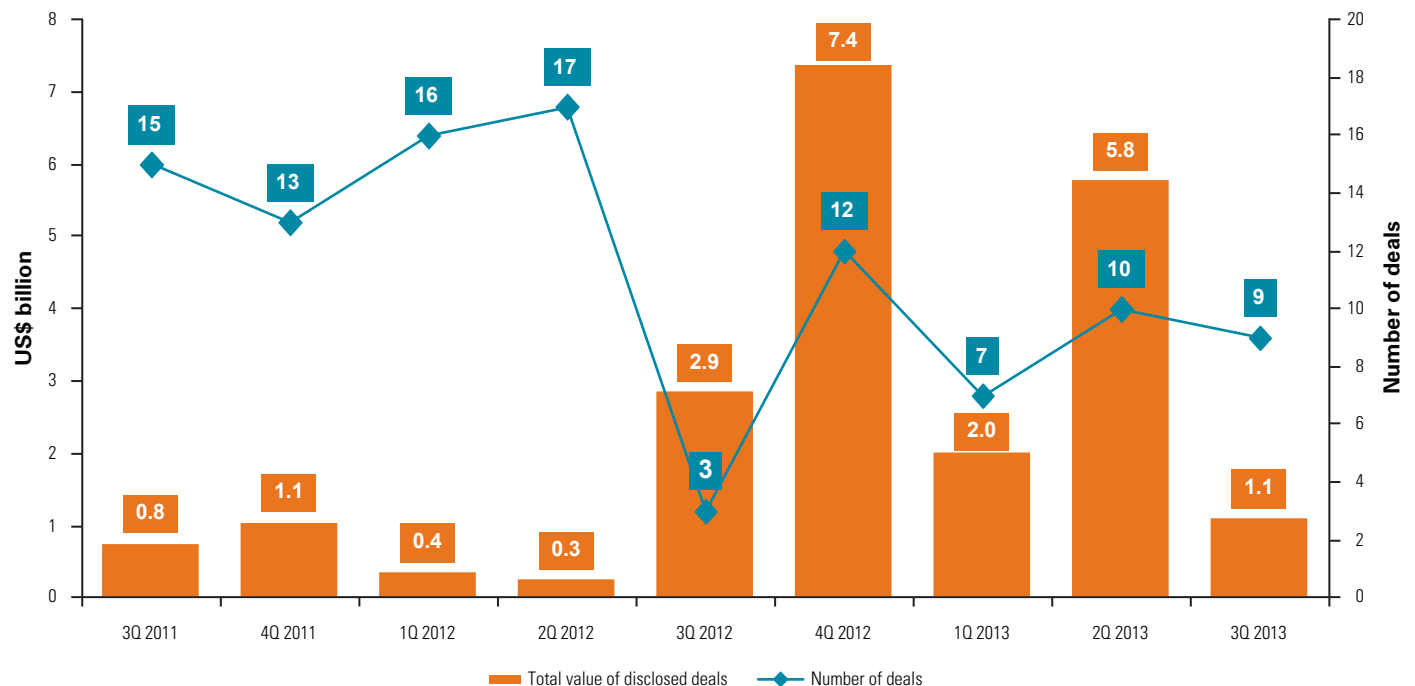
Key developments

Ownership changes⁹

The total value of announced deals in the copper industry showed a q-o-q increase of 183 percent to reach US\$5.8 billion in 2Q, 2013, whereas the q-o-q

deal value fell by 81 percent in 3Q, 2013 to reach US\$1.1 billion. The number of deals in 3Q, 2013 fell to nine as compared to 10 in 2Q, 2013.

Figure 6: Value of announced deals in the copper industry



Source: Mergermarket; KPMG analysis

⁷ "LMEWeek-China's 2014 metals demand seen brightening, helped by building drive," Reuters, 6 Oct 2013

⁸ "Where is the hard landing? "Dramatic" growth of copper consumption in emerging economies," Commodity discovery fund, <http://www.cdfund.com/en/blog-eng/where-is-the-hard-landing-dramatic-growth-of-copper-consumption-in-emerging-economies/>, accessed 29 October 2013

⁹ Mergermarket database, accessed 27 October 2013

Table 1: Copper deals in 2Q & 3Q13

Date announced	Target	Target nation	Acquirer	Acquirer nation	Status	Value of transaction (US\$ million)	Stake (%)
25-Sep-13	Kimber Resources Inc.	Canada	Invecture Group, S.A. de C.V.	Mexico	Announced	12.3	80.9
16-Sep-13	Formation Metals Inc. (Certain Refineries And Lands)	USA	Silver Opportunity Partners LLC	USA	Announced	12.0	NA
29-Aug-13	Mkushi Copper Project	Zambia	Elephant Copper Ltd.	British Virgin Islands, Zambia	Announced	13.1	51.0
20-Aug-13	Newshelf 1114 Proprietary Limited	South Africa	Sibanye Gold Limited	South Africa	Announced	147.8	74.0
28-Jul-13	Northparkes Mines	Australia	China Molybdenum Co Ltd	China	Announced	820.0	80.0
25-Jul-13	Kansuki Concession	Congo, the Democratic Republic of	Mutanda Mining Sprl	Congo, the Democratic Republic of	Completed	NA	NA
16-Jul-13	Schaft Creek copper project	Canada	Teck Resources Limited	Canada	Announced	60.0	75.0
02-Jul-13	Minera AQM Copper Peru S.A.C.	Peru	Mitsubishi Materials Corporation	Japan	Completed	22.6	40.0
01-Jul-13	Blackfin Pty Ltd (Duchess Paradise project)	Australia	Crystal Yield Investments Limited	Hong Kong	Announced	19.0	100.0
27-Jun-13	Kagara Ltd (Thalanga and Lioatown/Waterloo Projects)	Australia	Lucky Metals Pty Ltd	Australia	Lapsed	11.8	NA
24-Jun-13	Eurasian Natural Resources Corporation Plc	United Kingdom, Kazakhstan	Eurasian Resources Group B.V.	Kazakhstan, Luxembourg, Russia	Completed	4,690.5 ¹⁰	NA
19-Jun-13	Compania Minera Condestable S.A.	Peru	Southern Peaks Mining LP	Peru	Announced	NA	98.7
12-Jun-13	Rio Tinto's Eagle Mine, LLC	USA	Lundin Mining Corporation	Canada, Sweden	Completed	325.0	100.0
07-Jun-13	Ferguson Lake Project	Canada	2369785 Ontario Inc.	Canada	Completed	NA	NA
21-May-13	Discovery Metals Limited	Australia, Botswana, United Kingdom	Consortium for Discovery Metals Ltd	China	Lapsed	NA	NA
06-May-13	Mungana Pty Ltd; Kagara Ltd (Nothorn Chillagoe project)	Australia; Australia	Lucky Metals Pty Ltd	Australia	Lapsed	54.6	NA
01-May-13	Andash Mining Company	Kyrgyzstan	Robust Resources Limited	Australia	Announced	15.5	100.0
28-Apr-13	BHP Billiton Pinto Valley mine (Arizona); San Manuel Arizona Railroad Company	USA;USA	Capstone Mining Corp.	Canada, Mexico	Completed	650.0	100.0
23-Apr-13	UCL Resources Limited	Australia	Mawarid Mining LLC	Oman	Announced	32.9	Over 50.0 percent

Source: Mergermarket; KPMG analysis

¹⁰ Value of transaction is GBP3, 043 million. GBP to USD exchange rate as on 24 June 2013

Regulatory updates

Table 2: List of recent regulations in copper industry

Country	Regulation	Description
Democratic Republic of Congo (DRC) ¹¹	Ban on export of copper and cobalt concentrates	<ul style="list-style-type: none"> On 5 April 2013, the government of DRC banned the export of copper and cobalt concentrates while providing a 90-day moratorium to mining operators who held mining stockpiles of concentrates. On 4 July 2013, acknowledging the lack of electric energy supply, the government postponed the ban on export of copper and cobalt concentrates to 31 December 2013.
New Mexico ¹²	Copper mining groundwater regulations	<ul style="list-style-type: none"> The Water Quality Control Commission (WQCC) of New Mexico approved regulations aimed at protecting groundwater at the state's copper mines. As per the WQCC, the purpose of the regulation is to control and contain the discharge of water contaminants to copper mine facilities and their operations to prevent water pollution and protect all ground water of the state of New Mexico for present and potential future use for domestic and agricultural water supply and surface water recharge.
Peru ¹³	Softened environmental rules	<ul style="list-style-type: none"> Peru's government excluded the Ilo, Arequipa and La Oroya cities from some environmental regulations after local refiners of copper and other metals warned about possible closures of their plants. The environmental ministry postponed stricter environmental standards aimed at reducing sulphur dioxide in the air, which will now be gradually implemented instead of from 1 January 2014.
Chile ¹⁴	Exploration alliance	<ul style="list-style-type: none"> Codelco has signed a memorandum of understanding (MOU) with Colombia's mines and energy ministry for the development of exploration activities in Colombia. The alliance will be valid for two years and can be renewed if the parties agree.
Russia ¹⁵	Draft law exempting Greenfield projects from the profit tax for a period of five years,	<ul style="list-style-type: none"> The Russian government has approved a draft law exempting Greenfield projects from the profit tax for a period of 5 years. The tax would further be reduced to 10 percent for the following 5 years.

Cross-section of global copper projects

Table 3: Cross-section of global copper projects

Project	Country/Region	Operators/ Owners	Commodities	Start year	Stage	Initial capex excluding sustaining capex (US\$ million)
Andina Copper Phase II	Valparaiso, Chile	Codelco	Copper	2021	Feasibility studies completed and early works starting	6,800
Caspiche Gold/Copper Project	Atacama, Chile	Exeter Resource Corporation	Copper, gold, silver	NA	Pre-feasibility/ Scoping	4,800
Cobre Panama Copper/Gold/Molybdenum ¹⁶	Penonome, Panama	First Quantum Minerals Ltd.	Copper, molybdenum, gold, silver	2016	Construction	6,181
Frieda River Copper/Gold Project	Sanduan, Papua New Guinea	Glencore Xstrata plc	Copper, gold, silver	2017	Feasibility Study	5,561
Golpu Copper/Gold Deposit	Morobe, Papua New Guinea	Harmony Gold Mining Company Limited	Copper, molybdenum, gold, silver	2019	Pre-feasibility/ Scoping	4,845
KSM Gold/Copper Project	British Columbia, Canada	Seabridge Gold Inc.	Copper, molybdenum, gold, silver	2015	Pre-feasibility/ Scoping	5,256
Los Azules Copper deposit	San Juan, Argentina	McEwen Mining Inc.	Copper, gold, silver	NA	Pre-feasibility/ Scoping	3,920

¹¹ Emery Mukendi Wafwana & Associates PC, Jonathan van Kempen and Fulgence Kalema Bwatunda "DRC's ban on export of copper and cobalt concentrates postponed until December 31, 2013," Lexology.com, 30 July 2013

¹² Dorothy Kosich "New Mexico approves contentious copper mining groundwater regs," Mineweb, 11 September 2013

¹³ "Peru softens environmental rules to help metal refineries," via Factiva, accessed 29 October 2013

¹⁴ "Codelco signs exploration alliance with Colombia's mines ministry," via Factiva, accessed 29 October 2013

¹⁵ "SEG. Exploration review," Mkt&Ind Reports, Metals Mining News, 30 July 2013

¹⁶ The capex of US\$6,181 million includes only the initial capex and does not include sustaining capex (US\$2.92 billion).

Cross-section of global copper projects

Table 3: Cross-section of global copper projects

Project	Country/Region	Operators/ Owners	Commodities	Start year	Stage	Initial capex excluding sustaining- capex (US\$ million)
Oyu Tolgoi Copper/ Gold 160 Ktpd expansion	Omnogovi, Mongolia	Turquoise Hill Resources Ltd.	Copper, molybdenum, gold	NA	Feasibility studies completed	5,115 ¹⁷
Pampa de Pongo Magnetite Project	Arequipa, Peru	Nanjinzhao Group Co., Ltd	Copper, gold, iron ore, raw magnetite	NA	Pre-feasibility/ Scoping	~2,740
Pebble Copper/ Gold/Molybdenum Deposit	Alaska, US	Pebble Limited Partnership	Copper, molybdenum, gold	2015	Pre-feasibility/ Scoping	4,700
Resolution Copper/ Molybdenum Deposit	Arizona, US	Rio Tinto Limited	Copper, molybdenum	2021	Pre-feasibility/ Scoping	More than 5,000
Tampakan Copper/ Gold deposit	Mindanao, Philippines	Glencore Xstrata plc	Copper, molybdenum, gold	2019	Feasibility Study	4,400 ¹⁸
Udokan Copper Deposit	Chita, Russia	Baikal Mining Company LLC	Copper, silver	2016	Open pit: Feasibility study	5,294
Sierra Gorda Copper/ Molybdenum Project ¹⁹	Antofagasta, Chile	KGHM Polska Miedz S.A.	Copper, molybdenum, gold	2014	Construction	2,877
Bozshakol Copper/silver mine	Pavlodar, Kazakhstan	Kazakhmys PLC	Copper, molybdenum, gold, silver	2015	Construction	~1,900
Aktogay copper deposit	Shyghys, Kazakhstan	Kazakhmys PLC	Copper, gold, silver	2015	Construction	~2,000
Las Bambas mine	Apurimac, Peru	Glencore Xstrata plc	Copper, molybdenum, gold, silver	2015	Construction	5,200
El Pachon deposit	San Juan, Argentina	Glencore Xstrata plc	Copper, molybdenum, gold, silver	2016	Feasibility study	4,100
Relincho deposit	Atacama, Chile	Teck Resources Ltd	Copper, molybdenum	2017	Feasibility study	3,900
El Teniente new mine level	Libertador Bernardo Ohiggins, Chile	Codelco	Copper	2017	Under construction	3,500
Chuquicamata underground	Antofagasta, Chile	Codelco	Copper	2018	Feasibility studies completed and starting early works	4,200
El Morro project	Atacama, Chile	Goldcorp	Copper, gold	2015	Feasibility study	3,834 ²⁰
Cerro Casale deposit	Atacama, Chile	Barrick Gold Corp.	Copper, gold, silver	2014	Feasibility study	4,184 ²¹
Escondida Organic growth project 1	Chile	BHP Billiton	Copper, gold, silver	2015	Under development	3,800
Escondida oxide leach area project	Chile	BHP Billiton	Copper, gold, silver	2014	Under development	721

The capex mentioned in the table above includes only the initial capex for a project and excludes sustaining capex, contingency amount (if any) etc.

The list is not exhaustive and contains only a limited number of projects.

Source: Company data; Intierra

¹⁷ Capex for the total development program of the 160 Ktpd expansion project. Includes the capex for mining, processing, infrastructure, indirects, EPCM, construction, operation and Mongolian government payments. Does not include the capex of US\$6.6 billion for the phase I operations

¹⁸ Excluding provision for associated infrastructure and a contingency of more than US\$800 million

¹⁹ Technical Report for Sierra Gorda project, 8 June 2011. The capex of US\$2,877 million includes only the initial capex and does not include sustaining capex (US\$975 million) and expansion capex (US\$818 million).

²⁰ Total initial capital expenditure through Year 1 is \$3.834 billion including contingency and excluding working capital

²¹ Initial capital cost excluding sustaining capital cost

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