

Base Metal Price Forecast (2016.12.26~12.30)

| | LME 3-M (USD/mt) | Change | SHFE 3-M (RMB/mt) | Change | Spot Premiums/Discounts (RMB/mt) | Change |
|----------|---------------------|--------|----------------------|--------|-------------------------------------|--------|
| Copper | 5400~5620 | ↓ | 44000~45500 | ↓ | (-300)~(-130) | ↓ |
| Aluminum | 1700~1730 | → | 12500~13000 | → | 80~160 | → |
| Zinc | 2550~2650 | → | 20700~21800 | → | 80~180 | → |
| Lead | 2050~2150 | → | 17800~18800 | → | (-150)~200 | ↓ |
| Tin | 20700~21000 | → | 142300~146000 | → | 145500~148000 (spot price) | → |
| Nickel | 10400~10900 | ↓ | 88000~92500 | ↓ | (-200)~550 | ↑ |

Sources: SMM, LME, SHFE

Base Metals to Keep Swinging at Highs

Highlights

This past week, base metals **fell back** to find support. The **strong dollar**, with index trading around 103 after US Federal Reserve's rate hike decision, weighed down the commodity market. **Cash liquidity** in China's market is also highly watched, especially at the year-end. During the last trading week of 2016, **risk aversion and profit-taking** will dominate the market, with prices expected to **swing at highs**.

- **Copper:** This past week, LME copper **dropped and rallied** at the tail of trading, and SHFE 1702 copper **fell by a total of 3%** in the week. (Page 1)
- **Aluminum:** LME aluminum mainly moved between **USD 1,705-1,740/mt** this past week. SHFE 1702 aluminum mainly ranged between **RMB 12,600-12,900/mt** this past week. (Page 7)
- **Zinc:** LME zinc **dipped to USD 2,549/mt** at one point this past week, and SHFE 1702 zinc **dropped to RMB 20,690/mt**. (Page 9)
- **Lead:** LME lead **dropped for 5 days** in a row, down as low as USD 2,100/mt. SHFE 1702 lead mainly moved between the 40 and 60-day moving averages with weekly lowest level **at RMB 17,665/mt**. (Page 14)
- **Nickel:** LME nickel dropped below the 60-day moving average to **USD 10,565/mt** this past week, the lowest level since November 8. SHFE 1705 nickel mainly moved above the 60-day moving average on Friday and closed the week **down 5.38%** on a weekly basis. (Page 17)

News

Shanghai Spot Premiums Expand Significantly on Supply Tightness

#0 zinc prices in Shanghai traded RMB 80-16/mt above SHFE February zinc December 22, with the premiums expanding RMB 60-70/mt from a day earlier. Spot premiums rose to around RMB 100/mt in the morning session. Meanwhile, the price spread between Shanghai and Tianjin widened to RMB 215/mt.

Spot supply tightness pushed up spot premiums in Shanghai. Market inventories are low, and maintenance at zinc smelters also tightened supply. Zinc inventories in Shanghai, Guangdong and Tianjin fell from 450,000 mt early this year to 220,000 mt, SMM statistics show. Inventories in Shanghai were 95,000 mt, the lowest from September 2008.

The average operating rate at domestic zinc smelters will slide 4.7 percentage points on the month to 75.6% in December. Output at Hanzhong Zinc Industry slid in December. Arriving shipments from smelters decreased recently because of maintenance at them.

Inflows of imported zinc increased in Shanghai recently, but were still limited since import window remains closed.

On the demand front, downstream buyers purchased modestly at lows. Zinc prices fell rapidly this week. SMM #0 zinc prices averaged RMB 21,475/mt as of Thursday, down RMB 1,165/mt on a weekly basis. This drove some bargain hunters into the market.

Some traders also sourced goods for term contract delivery at the year's end.

Copper — LME Copper to Trade between USD 5,400-5,620/mt

Survey

SMM's survey of 20 domestic copper tube/pipe producers, representing 1.54 million mt/yr in capacity, shows the following:

SMM's Survey of 20 Copper Tube/Pipe Producers on Dec. 23, 2016

| Capacity (kt p.a.) | Number of Manufacturers | Total Capacity (kt p.a.) | Refined Copper Consumption (kt p.m.) | Export of Copper Pipes (kt p.m.) | Raw Material Inventory/ Monthly Production | Average Operating Rate |
|--------------------|-------------------------|--------------------------|--------------------------------------|----------------------------------|--|------------------------|
| ≥100 | 3 | 1,010 | 68.5 | 9.5 | 81% | 81% |
| 50- 100 | 3 | 170 | 8.1 | 0.9 | 57% | 56% |
| < 50 | 14 | 363 | 22.1 | 1.6 | 73% | 74% |
| Total | 20 | 1,543 | 98.6 | 11.9 | 77% | 77% |

1) Average Operating Rate up to 76.69% in November

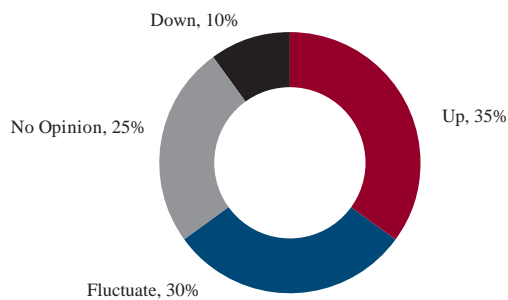
SMM's survey of 20 domestic copper tube/pipe producers showed their average operating rate was 76.69% in November, up 6.29 percentage points YoY and 3.99 percentage points MoM, the highest level so far this year. It is a busy production month for copper tube/pipe producers in November. The rarely-seen surge in copper market gave another incentive to copper tube/pipe producers, especially after market players accepted price gains in mid November, and air conditioners started replenishing goods, to avoid risks from further price gains.

2) Input Inventory Ratio Down to 12.62% in November

The ratio of raw material inventories to total production at those surveyed was 12.62% in November, flat at October's level. In early November, those producers preferred to consume on-hand inventories due to high prices, and later entered the market as the rising momentum was asserted, to avoid risks.

3) Copper Price Forecast

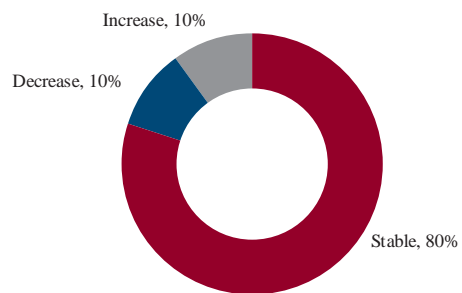
Copper Price Forecast



Source: SMM

4) Sales Forecast

Sales Forecast

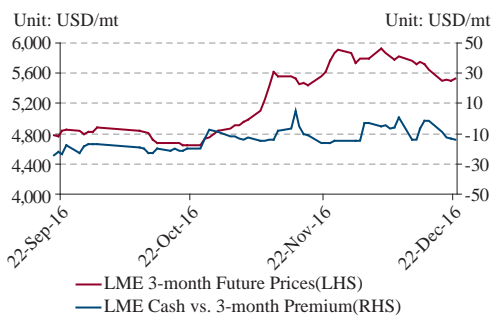


Source: SMM

Price Trends

Review

LME Copper Prices and Premium



Source: LME, SMM

LME copper started another round of price declines this past week. Market players in western countries exited from market for Christmas holiday to reduce risks and take profits. US's housing figures were positive and Bank of Japan held interest rate unchanged in December's meeting, allowing US dollar index to keep strong. The firm US dollar kept weighing down LME copper this past week. Moreover, LME copper inventory stopped 6-day rises and reduced for three days in a row since December 20, down 9,675 mt in total. Effect from falling inventory was amplified by short covering. LME copper opened the week trading at USD 5,620/mt and then dropped after meeting resistance from the moving averages. Later, LME copper swung widely at around the 40-day moving average with positions closing both by longs and shorts. The contract dipped to USD 5,419.5/mt with negative technical indicators, down 3.9%, the weekly biggest decline. LME copper railed after finding support at the lower band of Bollinger Bands. Positions reduced 22,000 due to large capital withdrawal and trading volumes fell 13,000 lots.

Capitals kept dominating China's commodity market this past week. Early the week, SHFE 1702 copper moved under pressure from tight liquidity and dropped along with falling 5-day moving average due to positions closing, and tested support at the 40-day moving average. China's central bank injected a net RMB 380 billion in total. This, together with solving of bonds scandal at Sealand Securities, eased market panic. SHFE 1702 copper remained on the downward track, but the decline slowed down. Market players preferred to take inter-day operations. The contract rallied after dropping below the 40-day moving average to RMB 44,130/mt. SHFE 1702 copper fell by a total of 3% in the week. Positions of all SHFE copper contracts increased 15,000 and trading volumes fell 300,000 lots. Despite the coming of year-end, SHFE copper market reported net capital inflows after China's central bank made cash injections into the market.

Forecast

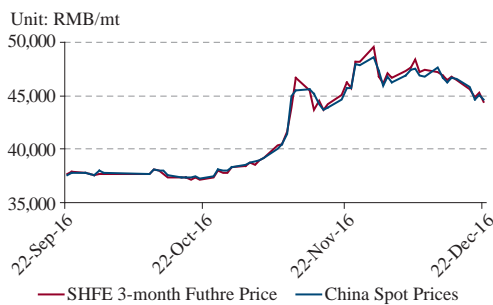
In the coming week, trading sentiment in base metal market is expected to be light due to Christmas holiday and year-end and year-end settlement at Chinese enterprises.

LME market will close on December 26 and 27 for Christmas holiday. After the holiday, market will see a light data calendar in US, only December's Conference Board's consumer confidence index and November's pending home sales. The figures are expected to remain positive, supporting US dollar index to stay at highs. Crude oil will fluctuate above USD 52/bbl and LME copper will swing widely with mixed factors.

LME copper inventory finished a 6-day rises and dropped this past week, and cancelled warrants rallied to 35.27% from 31.69% seen on Monday, indicating that copper inventory will drop further. Short covering will support LME copper. LME copper traded in a wide range this past week after dropping from highs and found support at the 5-day moving average but met strong resistance from other moving averages. Positions and trading volumes both dropped, leaving no improvement in trading. LME copper will trade between USD 5,400-5,620/mt in the coming week.

In China's domestic market, risk aversion sentiment and profits taking will dominate the market in the coming week due to year-end settlement at Chinese enterprises. After easing briefly this past week, capital will be impacted by MPA evaluation, personal demand for currency exchanges and pre-holiday cash demand, and China's central bank will keep reverse repos and MLF programme in the coming week, to ease capital pressure at the end of year. Profits at above-scale industrial enterprises will be introduced in the coming week, which is expected to be positive on a yearly basis. November's PPI growth increased 3.3% YoY, indicating that most profits were at production chain, and added value at above-scale industrial enterprises also increased on a yearly basis, a sign of enterprises' optimistic outlook toward operation. Effect from economic data will be not that big at the end of year. SHFE 1702 copper will keep swinging in the coming week with support at the 60-day moving average and resistance at the 5 and 40-day moving averages. SHFE 1612 copper will trade between RMB 44,000-45,500/mt in the coming week with taking profits by longs and negative technical indicators.

SHFE and China Copper Spot Prices



Source: SHFE, SMM

Copper Concentrate

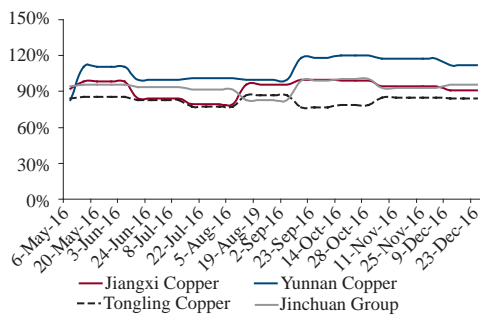
Spot TCs for clean imported copper concentrate were mainly quoted at USD 80-87/mt this past week, almost flat on a weekly basis. China Smelters Purchase Team (CSPT) members said TCs had fallen previously due to traders holding back goods. Negotiations on next year's term TCs by traders and smelters have been completed. Smelters have also built stocks for 2017 Chinese New Year holiday, so suppliers will increase in the near term. Smelters reported increased quotes by traders recently, mainly close to USD 90/mt. As such, spot TCs will rise in the near term.

The CSPT will hold a meeting December 30 to decide floor price for Q1 2017. The floor price is expected to be set at USD 90-92/mt.

Chinese mines that had closed planned to restart after copper prices rose noticeably in November. SMM learned small private mines decided to resume production after the 2017 Chinese New Year holiday. Domestic copper concentrate output will grow in Q2 2017 following restarts.

Prices of Chinese copper concentrate (Cu 20%) remained stable around 83-84% of copper prices for delivery to factory this past week, and those for Cu 25% concentrate were around 88% of copper prices for delivery to factory.

Capacity Utilization of China Major Copper Smelters



Source: SMM

Maintenance at Major Domestic Copper Smelters

| Company | Capacity (1,000 mt/yr) | Starting Time | Completion Time | Notes |
|--|------------------------|-----------------|-----------------|-------------|
| Chifeng Yuntong Nonferrous Metal Co., Ltd. | 100 | Early Jun. 2016 | 10 Jul. 2016 | Maintenance |
| Baiyin Nonferrous Metal (Group) Co., Ltd. | 200 | Late Jul. 2016 | Late Aug. 2016 | Maintenance |
| Zhongtiaoshan Non-ferrous Metals Co., Ltd. | 200 | Mid Jun. 2016 | Late Jul. 2016 | Maintenance |
| Zhejiang Fuye Group Co., Ltd. | 200 | 21 Aug. 2016 | 23 Sep. 2016 | Maintenance |
| Shandong Dongying Fangyuan Nonferrous Metals Co., Ltd. | 700 | Late Jul. 2016 | Late Aug. 2016 | Maintenance |
| Tongling Nonferrous Metals Group Holding (Jinchang) | 180 | Mid Jul. 2016 | Late Jul. 2016 | Maintenance |
| Hunchun City Zijin Copper Co., Ltd. | 100 | 28 Aug. 2016 | Late Sep. 2016 | Maintenance |
| Zhongjin Gold Corporation Limited | 200 | Early Sep. 2016 | Late Sep. 2016 | Maintenance |
| Minmetals (Hunan) Copper Co., Ltd. | 100 | Early Sep. 2016 | Late Sep. 2016 | Maintenance |
| Jiangxi Copper Company Limited. | 1000 | Oct. 2016 | Nov. 2016 | Maintenance |
| Jinchuan Group | 400 | Oct. 2016 | Nov. 2016 | Maintenance |
| Yantai Guorun Copper Industry Co., Ltd. | 120 | Oct. 2016 | Oct. 2016 | Maintenance |

Source: SMM

Refined Copper Supply

Cargo holders sold actively to generate cash at the year's end, and expanded spot discounts to RMB 280-150/mt this past week. Most SOEs suspended trading due to year-end settlement and completion of term contract delivery. Spot discounts of goods with December VAT invoice narrowed to RMB 200-80/mt because of supply tightness of such goods.

Statistics of China Crude Copper Capacity Expansion

Unit: 1,000 mt

| Company | New Crude Capacity | Total Capacity | Raw Materials | Production Time |
|--|--------------------|----------------|--------------------|-----------------|
| Zhongtiaoshan Nonferrous Metals Group | 50 | 150 | Copper concentrate | 2015 |
| China Gold Sanmenxia Co., Ltd. | 200 | 200 | Copper concentrate | May 2015 |
| Shandong Dongying Fangyuan Nonferrous Metals Co., Ltd. | 200 | 400 | Copper concentrate | Oct. 2015 |
| Xinjiang Xinhui Copper | 100 | 100 | Copper concentrate | 2015 |
| Hunchun City Zijin Copper Co., Ltd. | 100 | 100 | Copper concentrate | Sep. 2015 |
| Xiangbei Senlong Nonferrous Metals Co., Ltd. | 50 | 50 | Copper concentrate | 2015 |
| Hunan Shuikoushan Nonferrous Metals Group (Minmetals Copper (Hunan) Co., Ltd.) | 100 | 100 | Copper concentrate | Apr. 2016 |
| Shandong Humon Smelting Co., Ltd. | 140 | 200 | Copper concentrate | Jul. 2016 |
| Guangxi Nanguo Copper Co., Ltd. | 200 | 200 | Copper concentrate | 2016 |
| Total | 1140 | 1500 | | |

Source: SMM

Statistics of China Refined Copper Capacity Expansion

Unit: 1,000 mt

| Company | New Refined Capacity | Total Capacity | Raw Materials | Production Time |
|--|----------------------|----------------|------------------------------|-----------------|
| China Gold Sanmenxia Co., Ltd. | 20 | 20 | Copper concentrate | Mid-May 2015 |
| Xinhui Copper Co., Ltd. | 10 | 10 | Copper concentrate | 2015 |
| Tongling Nonferrous Metals Group (Zhangjiagang) | 10 | 30 | Scrap copper, blister copper | Apr. 2015 |
| Zhongtiaoshan Nonferrous Metals Group | 5 | 20 | Copper concentrate | 2015 |
| Shandong Dongying Fangyuan Nonferrous Metals Co., Ltd. | 20 | 70 | Scrap copper, blister copper | Oct. 2015 |
| Hunchun City Zijin Copper Co., Ltd. | 10 | 10 | Copper concentrate | Sep. 2015 |
| Shandong Humon Smelting Co., Ltd. | 12 | 17 | Copper concentrate | Jul. 2016 |
| Hunan Shuikoushan Nonferrous Metals Group (Minmetals Copper (Hunan) Co., Ltd.) | 10 | 10 | Copper concentrate | Apr. 2016 |
| Shandong Xianghui Copper Co., Ltd. | 10 | 10 | Scrap copper, blister copper | May 2016 |
| Guangxi Nanguo Copper Co., Ltd. | 20 | 20 | Copper concentrate | 2017 |
| Total | 127 | 217 | | |

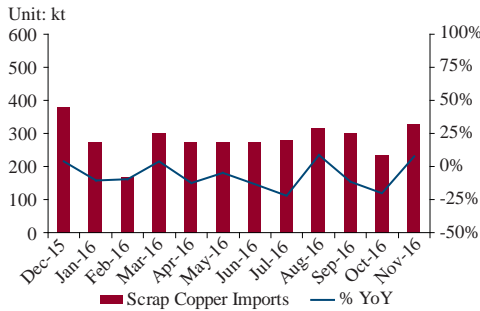
Source: SMM

Scrap Copper

Scrap copper supply remained in shortages during December 16-22. Shipments were restricted due to environmental protection factor. Meanwhile, cargo holders were reluctant to sell after copper prices fell. On the demand front, some scrap copper processors were forced to cease production. But those surviving environmental protection inspections witnessed inflows of orders. When combined with concerns over supply tightness, these scrap copper processors built stocks actively, leaving strong demand for scrap copper, despite nearing of low-demand season. Some scrap copper processors turned to refined copper given brisk orders and limited scrap copper supply. The price spread between refined and scrap copper narrowed RMB 511/mt to RMB 2,850/mt this past week. On Wednesday, all processors without environmental protection permits in Henan were forced to shut down against heavy air pollution, and production at local producers having environmental protection permits was also restricted.

CIF prices for #1 scrap copper were offered ¢17/lb below March Comex copper, and those for #2 scrap copper were offered ¢30/lb below March Comex copper.

China Scrap Copper Monthly Imports and Growth



Sources: SMM, China Customs

China Customs reported December 22 China's scrap copper imports were 327,700 mt in November, up 39.07% MoM and 7.98% YoY, the highest for the year. China stepped up environmental protection during the G20 Summit held in early September in Hangzhou, and this significantly affected domestic scrap copper dismantling, recycling and logistics. Large numbers of scraps were stockpiled at the Port of Ningbo due to strict Customs clearance, tightening scrap copper supply. Despite environmental protection issue, the peak-demand month of September helped offset negative effects from environmental protection inspections on scrap copper processors. Domestic scrap copper prices thus held firm. Besides, the import window for scrap copper opened during late August and late September. When combined with two months delivery period, scrap copper imports jumped in November. But with release of domestic scrap copper supply and yuan's sharp devaluation, import window closed again. As such, growth in scrap copper imports will unlikely sustain in the near term.

Price Spread Between Refined & Scrap Copper

Unit: RMB/mt

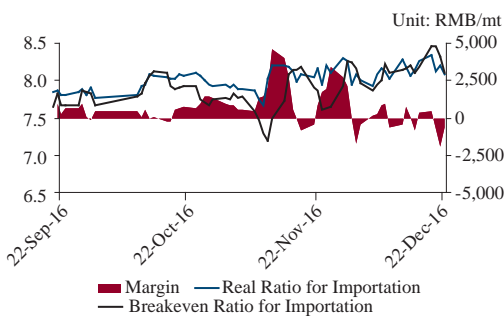
| Date | Refined Copper | #1 Scrap Copper | #1 Scrap Copper | Price Spread (A-B) | | Price Spread (A-C) | |
|-------------|------------------|------------------|------------------|--------------------|------------|--------------------|------------|
| | VAT Included (A) | VAT Included (B) | VAT Excluded (C) | Spread (A-B) | Reasonable | Spread (A-C) | Reasonable |
| 12.9-12.15 | 46821 | 40070 | 36670 | 6751 | 4431 | 10151 | 6620 |
| 12.16-12.22 | 45312 | 39150 | 35750 | 6162 | 4327 | 9562 | 6487 |

Source: SMM

Note: 1. Price spread (A-B) for copper rod producers. Price spread (A-C) for other scrap copper smelters.

2. If price spread between refined and scrap copper is less than the SMM Reasonable Price Spread, buyers will prefer to purchase refined copper.

China Copper Import Arbitrage Ratio



Sources: SMM, LME

Refined Copper Imports

Yangshan copper premiums fell slightly this past week, and were quoted at USD 58-68/mt as of Friday, with the average down USD 2/mt on a weekly basis. The SHFE/LME copper price ratio rose slightly, but import losses remained high.

Both inquiries and quotes were limited with the nearing of Christmas holiday, leaving trading slack. Traded prices for import premiums continued falling and were close to term premiums for 2017 at one point, but failed to boost trading. Transactions will unlikely improve in the near term. As of Friday, premiums were USD 68/mt for three high-quality Chilean brands, USD 63/mt for mainstream pyro-copper and USD 58/mt for hydro-copper, priced in January.

On the bill of lading front, quotes for three high-quality Chilean brands arriving around the 2017 New Year holiday in China fell from USD 70/mt to USD 62-63/mt, priced in January, because of soft demand. Supplies of goods arriving in mid-to-late January were also sufficient, and traded prices will be dragged down by soft demand in the foreseeable future.

Downstream Demand

More downstream buyers entered the market as SHFE copper stabilized this past week. Spot discounts expanded initially and then narrowed, and trading was mainly made among traders in the latter half of the week.

Aluminum — LME Aluminum to Trade at USD 1,700-1,730/mt, and Alumina Prices Remain Strong

Price Trends

Review

Base metals dropped across the board on last Friday's night trading. LME aluminum dropped 1.46% last Friday and then kept falling to around the 60-day moving average on Tuesday. The contract rallied to the 40-day moving average after dipping to USD 1,703.5/mt on Wednesday. LME aluminum mainly moved between USD 1,705-1,740/mt this past week. SHFE 1702 aluminum dived on Monday with falling LME aluminum due to large amount of positions opening by shorts, down 2.21% totally on Monday. The contract dipped to the weekly lowest level at RMB 12,530/mt on Tuesday and rallied with positions closing by shorts. The contract mainly ranged between RMB 12,600-12,900/mt this past week.

In China's domestic market, aluminum smelters limited sales, restricting supply. Downstream buyers increased purchases on Tuesday and Wednesday as spot aluminum dropped below RMB 30,000/mt. So, spot aluminum kept trading at premiums after reversing to premiums from discounts last Friday. Spot aluminum mainly traded at premiums of RMB 75-170/mt this past week.

Forecast

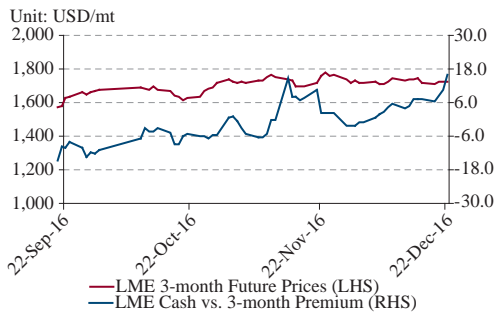
LME market will close on December 26 and 27 for Christmas in the coming week. LME aluminum will keep fluctuating as a whole with strong support at the 60-day moving average and resistance at the 40-day moving average. The contract is expected to range between USD 1,700-1,730/mt in the coming week. SHFE 1702 aluminum rallied briefly this past week due to limited selling news from aluminum smelters. The contract will meet strong resistance at RMB 13,000/mt and will move at RMB 12,500-13,000/mt with resistance at the 60-day moving average.

In China's domestic market, it is said that shipments from Xinjiang drop slightly while downstream buyers are active in purchases with prices below RMB 13,000/mt. Spot aluminum will remain premiums in the coming week, pushed by demand and supply, and is expected to trade at premiums of 80-160/mt.

Alumina

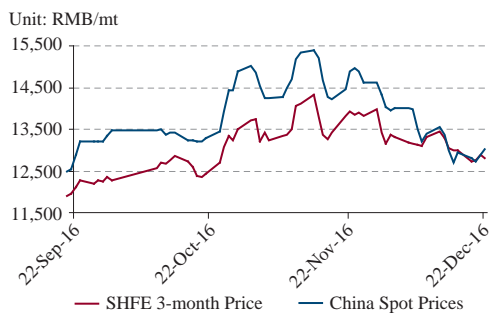
This past week, alumina prices in China's domestic market were stable, and trading was light. Prices in southwest China were still higher than other regions. SMM data showed the weighted average traded price in domestic four major alumina markets was RMB 2,970/mt on Thursday, and was RMB 2,969/mt for the week, up 0.14% on a weekly basis. Supported by firm prices of domestic alumina, FOB prices of West Australian alumina advanced USD 9/mt to USD 350/mt this past week.

LME Aluminum Prices and Premium



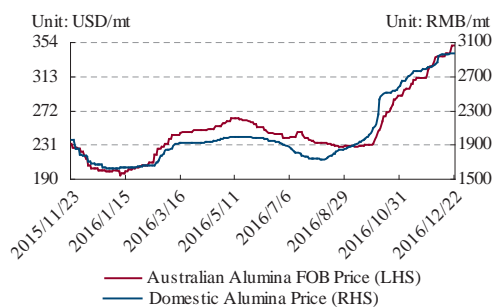
Source:LME, SMM

SHFE and China Aluminum Spot Prices



Source:SHFE, SMM

Prices of Domestic and Imported Alumina in China 2015-2016



Source: SMM

In the face of volatile aluminum price, high alumina price and squeezed profits, domestic aluminum producers will take a wait-and-see stance in raw material purchases. Release of alumina output is expected to be limited before 2016's year end, according to SMM data. It is learnt that East Hope Jinzhong Chemicals will put operation 800,000 mt-capacity in December, and Henan Pingdingshan Huiyuan Aluminum and Shandong Lubei Chemical is on the way to restart their capacities by 300,000 mt and 500,000 mt, respectively, and full recovery will not be reached until February 2017. On the other hand, aluminum capacities from newly-built or expanded projects will be continuing at the year end. SMM expects alumina prices to remain firm until Q1 2017.

Alumina Price

| | Dec. 15 th | Dec. 22 nd | +/- |
|----------------------|-----------------------|-----------------------|---------|
| West Australia (FOB) | 341 | 350 | +9 |
| At Port | 2960-3020 | 2980-3040 | +20/+20 |
| Domestic Goods | 2920-3050 | 2930-3070 | +10/+20 |

Source: SMM

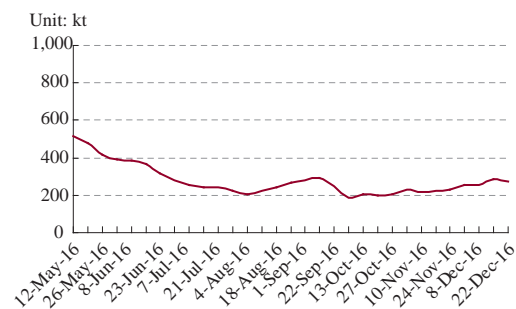
Aluminum Supply

As of December 22, aluminum ingot inventories were 85,000 mt in Shanghai, 113,000 mt in Wuxi, 75,000 mt in Nanhai, 42,000 mt in Hangzhou, and 16,000 mt in Gongyi, bringing total stocks in these five regions to 331,000 mt, up 1,700 mt on a weekly basis, growing for four weeks in a row.

The rise in inventories was due mainly to concentrate arrivals of goods and waning demand from aluminum processing enterprises, which saw orders falling, especially for construction extrusions. Meanwhile, some producers in Henan and Guangdong stopped buying aluminum ingot as environmental protection inspections in the two regions ceased production at casting lines. By region, outflows from Shanghai were the most as high spot premiums in south China attracted goods to Foshan, Guangdong. Inventories in Hangzhou were up significantly with growing shipments from Xinjiang, Gansu and Shandong. SMM learns that some aluminum producers increased shipments directly to aluminum processing enterprises, also explaining the changes in inventories at warehouses in east China.

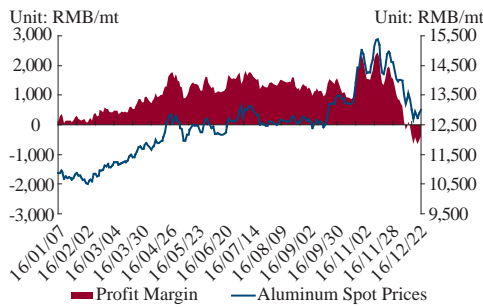
In other news, some smelters told SMM that shipments by aluminum producers from Xinjiang and Gansu were continuing falling due to maintenance at some railway lines after completing railway shipment target for 2016. And shipments of aluminum ingot are likely to increase as the 2017 railway shipment period will begin from December 25 in northwest railway line.

China Domestic Aluminum Inventories



Source: SMM

China Aluminum Smelters' Profit Margin



Sources: LME, SMM

Aluminum Costs

This past week, the average production loss was RMB 400-600/mt at domestic aluminum smelters surveyed by SMM. Prices of both alumina and prebaked anode remained high, while steam coal prices fell for seven weeks in a row to RMB 594/mt, helping aluminum producers equipped with power plants to reduce power costs. It is worth noting that coal prices will exert a small impact on power costs at aluminum producers in 4Q as producers using on-grid power did not raise power price in time. In the short term, production costs at aluminum smelters will not drop sharply due to two factors. First, power tariff in Guizhou and Henan will be raised after entering 1Q 2017. Second, supply tightness in alumina market will not ease in the short term, with prices expected to stay at highs.

Zinc — Zinc Prices to Stop Falling

Price Trends

Review

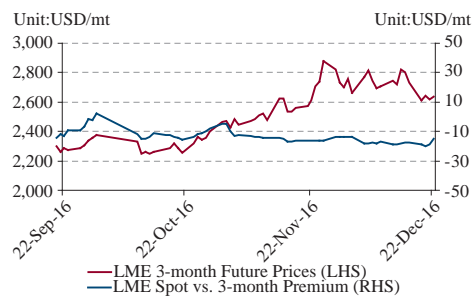
LME zinc edged down this past week. The US dollar index hit a 14-year high, weighing down base metals across the board. LME zinc fell USD 100/mt to USD 2,620 /mt, down over 4% on Monday. Longs and shorts left the market as the Christmas holiday nears. LME zinc dipped to USD 2,549/mt at one point and stayed above USD 2,600/mt level. As of Thursday, trading volumes were largely unchanged around 39,000 lots, and positions decreased 13,000 to 291,000.

The bond market fluctuated at lows early in the week due to Sealand Securities' alleged seal fraud. Market panic also affected commodity market. SHFE 1702 zinc fell around RMB 1,000/mt to below RMB 22,000/mt. With exodus of longs, SHFE 1702 zinc plummeted below RMB 21,000/mt at one point, dipping to as low as RMB 20,690/mt and then rallying to RMB 21,200/mt. As of Thursday, trading volumes on SHFE zinc were around 3.20 million lots, and positions increased 4,000 to 448,000, with short momentum stronger.

Spot discounts on #0 zinc prices in Shanghai inverted to premiums over SHFE 1702 zinc this past week, which expanded to RMB 110-130/mt. Spot discounts were RMB 30-0/mt over SHFE 1702 zinc early in the week. Downstream buyers purchased at lows as zinc prices slumped. Spot supply was limited in the latter half of the week due to low shipments from smelters. Traders thus held prices firm. Spot premiums of Jiulong, Huize and Qilin #0 zinc rose to above RMB 100/mt against SHFE 1702 zinc, and those of Shuangyan zinc were pushed up to RMB 260/mt due to scarce supply, but trading was quiet. Despite nearing of year-end settlement, some traders purchased for term contract delivery, leaving spot premiums firm. Downstream buying interest also improved.

Discounts on #0 zinc in Guangdong narrowed RMB 120/mt to RMB 150-130/mt over SHFE 1702 zinc this past week, and reached RMB 250/mt against Shanghai prices. Smelters continued selling under term contracts, and traders slowed sales and increased purchases

LME Zinc Prices and Premium



Sources: LME, SMM

in the latter half of the week. Downstream buyers purchased actively, improving trading.

Spot premiums on #0 zinc in Tianjin inverted to discounts of RMB 50/mt against Shanghai prices this past week. Smelters refrained from selling. Production at galvanizers in North China was restricted as China enhanced environmental protection inspections due to hazy weather, slowing sales by traders. Downstream demand remained weak, with trading lackluster.

Forecast

In the coming week, European and US markets will close on December 26 and 27 for Christmas and global economic data will also be light. Attention should be on profits at Chinese above-scale industrial enterprises in November, on a yearly basis, which is expected to recover, thanks to output reduction and rising profits after supply-side reform. And this will help capital flow into real economy. Tight end-year capitals will continue dominating market sentiment. People's Bank of China injected net RMB 102 million in total in 7 trading days since December 14-22, and bond market thus stopped falling and rebounded after a large amount of capital injection. Chinese central bank provided a large amount of capitals for tight liquidity at the end of year to stabilize market's sentiment, after Shibor rate advanced. But, base metals will keep fluctuating with high risk aversion sentiment at the year end.

The LME market will be closed December 26-27. A large number of investors left the market due to holiday factor. LME zinc is expected to move between USD 2,550-2,650/mt in the coming week, and SHFE 1702 zinc will fluctuate between RMB 20,700-21,800/mt.

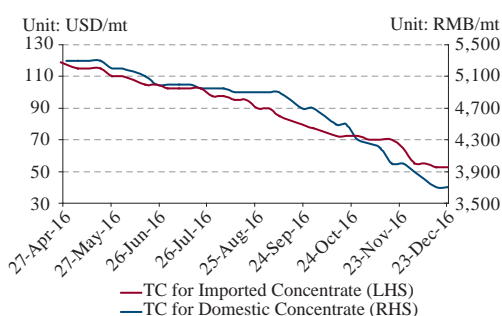
In China's spot markets, smelters hold back goods as zinc prices are low. Traders will soon complete delivery for term contracts. In this context, spot premiums will unlikely rise further. Downstream buyers will purchase as needed. Considering low inventories in Shanghai and maintenance at Hanzhong Zinc Industry, the price spread between Shuangyan and other brands will be around RMB 100/mt in the coming week. Spot premiums will be RMB 80-180/mt against SHFE 1702 zinc.

SHFE and China Zinc Spot Prices



Sources: SHFE, SMM

TC for Zinc Concentrate



Source: SMM

Zinc Concentrate

TCs of domestic zinc concentrate (50%) were traded at RMB 3,600-4,100/mt (zinc content) this past week, almost unchanged on a weekly basis. TCs for imported zinc concentrate (50%) were quoted at USD 35-40/dmt, with a few quotes at or below USD 30/mt.

Some mines completed annual production target. When combined with low temperatures, domestic mines suspended or cut production. Operations by traders were quiet. When combined with maintenance at some smelters and falling zinc prices, TCs of domestic zinc concentrate leveled out this past week.

Losses from imported ore expanded RMB 520/mt to RMB 1,380/mt (zinc content) compared with domestic ore this past week. Supplies were limited, with quotes mixed. Mainstream traded prices were USD 35-40/mt.

TCs of domestic zinc concentrate will slide further in the foreseeable future due to supply tightness.

Zinc Concentrate TC in Nov. -Dec. 2016

| | Nov. 2016 | Dec. 2016 | MoM Changes |
|-------------------|-----------|-----------|-------------|
| Imported (USD/mt) | 70-90 | 50-70 | -20 |
| Domestic (RMB/mt) | 4200-4400 | 3900-4200 | -250 |

Source: SMM

Note: 50-55% zinc content in both the imported and the domestic concentrate.

Imports and Exports of Refined Zinc

The SMM/LME zinc price ratio fell 0.09 to 8.16 this past week, expanding import losses by RMB 370/mt to RMB 1,260-1,400/mt. Traded prices for import premiums were USD 130/mt, with trading weakening.

A few quotes for Spanish and Brazilian zinc were reported early in the week. Goods available were mainly AZ zinc.

Discounts of imported zinc against the average SMM #0 zinc price expanded from RMB 50-0/mt to RMB 70-10/mt this past week.

The price spread between imported and domestic zinc was below RMB 50/mt. Inflows of imported zinc were still limited over the past few weeks, and gave limited impact on domestic zinc. Trading activity weakens at the year's end, and inflows of imported zinc will remain low in the coming week.

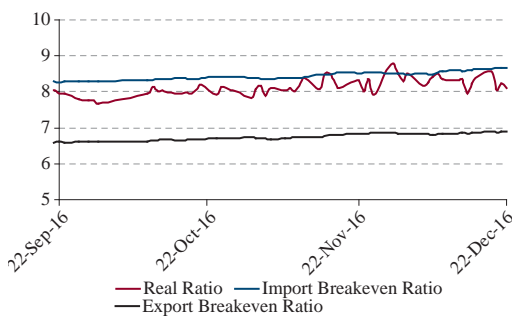
Refined Zinc Supply

Combined zinc inventories in Shanghai, Tianjin and Guangdong decreased 14,800 mt to 211,800 mt this past week. Inventories in Shanghai fell sharply due mainly to maintenance at some smelters and slowing shipments by smelters, which led to falling arriving shipments. Besides, downstream buyers purchased modestly at lows early in the week. Inventories in Guangdong fell slightly. The price spread between Shanghai and Guangdong was larger than freight charges between the two regions. This incentivized some smelters to increase shipments to Shanghai and in turn reduced arriving shipments in Guangdong.

Inventories in Tianjin were stable. Arriving shipments from smelters were normal. Outward shipments were limited as downstream buyers lacked buying interest. These downstream producers cut or suspended production due to environmental protection factor and falling orders.

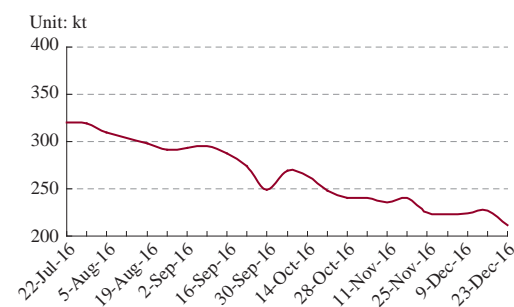
Some goods flowed to Shanghai due to expanding price spread between Shanghai and Guangdong. But availability of mainstream brands was scarce in Shanghai. Downstream buyers purchased as needed due to year-end cash tightness. In this context, total inventories in the three regions will stabilize in the coming week.

China Zinc Import & Export Arbitrage Ratio



Source: LME, SMM

China Zinc Domestic Stocks



Source: SMM

Major Zinc Smelters Ex-plant Quotation for #0 Zinc

Unit: RMB/mt

| Region | Company | 12/16 | 12/23 | Up/Down | Remark | Status quo |
|--------------|---|-------|-------|---------|-----------------------------------|------------------|
| Northeast | Liaoning Huludao Zinc Industry Company | 23700 | 21850 | -1850 | ex-works #0 zinc price | normal operation |
| Northwest | Hanzhong Zinc Industry Company | 22840 | 21460 | -1380 | #0 zinc traded price in Shanghai | maintenance |
| South China | Zhongjin Lingnan Nonfermet Company Limited | 23420 | 21940 | -1480 | #0 zinc traded price in Guangdong | normal operation |
| Cetral China | Zhuye Torch Metals | 23100 | 21820 | -1280 | #0 zinc traded price in Shanghai | normal operation |
| Southwest | Chihong Zn & Ge | 22840 | 21365 | -1475 | #0 zinc traded price in Shanghai | normal operation |
| Cetral China | Yuguang Zinc Industry Company | 22820 | 21365 | -1455 | #0 zinc traded price in Shanghai | normal operation |
| Southwest | Hechi Nanfang Non-ferrous Metal Smelt Co., Ltd. | 22625 | 21065 | -1560 | #0 zinc traded price in Guangdong | normal operation |
| Northwest | Shaanxi Dongling Industry Trade Group Company | 22820 | 21485 | -1335 | #0 zinc traded price in Shanghai | normal operation |
| North China | Chifeng NFC Zinc Industry Company | 22825 | 21200 | -1625 | #0 zinc traded price in Tianjin | normal operation |
| North China | Bayannur Zijin Nonferrous Metals | 22850 | 21350 | -1500 | #0 zinc traded price in Tianjin | normal operation |

Source: SMM

Domestic #0 Zinc Prices

Unit: RMB/mt

| Region | 16/12/16 | 16/12/23 | Up/Down | Inventory (kt) |
|----------|-------------|-------------|---------|----------------|
| Shanghai | 22780-22880 | 21300-21500 | -1430 | 82.4 |
| Nanchu | 22600-22650 | 21050-21080 | -1560 | 107.4 |
| Tianjin | 22800-24080 | 21200-21850 | -1915 | 22 |

Source: SMM

Operating Rates at Major Domestic Zinc Smelters

| Smelters | Capacity (kt p.a.) | Month | Remark |
|---|--------------------|---------|--------|
| Zhuye Torch Metals | 550 | 2016.10 | 80% |
| Chihong Zn & Ge | 440 | 2016.10 | 82% |
| Liaoning Huludao Zinc Industry Company | 390 | 2016.10 | 68% |
| Hanzhong Zinc Industry Company | 360 | 2016.10 | 89% |
| Hechi Nanfang Non-ferrous Metal Smelt Co., Ltd. | 300 | 2016.10 | 100% |
| Yuguang Zinc Industry Company | 250 | 2016.10 | 100% |
| Shaanxi Dongling Industry Trade Group Company | 210 | 2016.10 | 100% |
| Chifeng NFC Zinc Industry Co., Ltd. | 210 | 2016.10 | 100% |
| Zhongjin Lingnan Nonfermet Company Limited | 200 | 2016.10 | 99% |
| Bayannur Zijin Nonferrous Metals | 200 | 2016.10 | 100% |
| Sichuan Hongda | 200 | 2016.10 | 37% |
| Shaanxi Zinc Industry Company | 200 | 2016.10 | 100% |
| Baiyin Nonferrous Metals Company | 280 | 2016.10 | 83% |
| Xiangyun Feilong Industry Co., Ltd. | 180 | 2016.10 | 55% |
| Western Mining | 100 | 2016.10 | 48% |
| Yunnan Jinding Zinc Corporation | 140 | 2016.10 | 43% |
| Yuntong Zinc Industry Company | 135 | 2016.10 | 100% |
| Inner Mongolia Xing'an Copper & Zinc Smelting Company | 125 | 2016.10 | 96% |
| Yunnan Luoping Zinc & Electricity Co., Ltd. | 120 | 2016.10 | 67% |
| Sichuan Sihuan Electrolytic Zinc Company | 120 | 2016.10 | 70% |
| Hunan Taifeng Mining Group | 105 | 2016.10 | 17% |

| | | | |
|--|-----|---------|----------|
| Gansu Chengzhou Mining and Metallurgical Group | 100 | 2016.10 | 94% |
| Anhui Tongguan Non-ferrous Metals (Chizhou) Co., Ltd. | 100 | 2016.10 | 100% |
| Jiangxi Copper Lead & Zinc | 100 | 2016.10 | 100% |
| Hunan Sanli Group | 100 | 2016.10 | 60% |
| Hunan Shuikoushan Nonferrous Metals Group | 70 | 2016.10 | 100% |
| Mengzi Mining and Zinc Smelting Limited | 100 | 2016.10 | 66% |
| Xichang Heli Zinc | 60 | 2016.10 | 23% |
| Jinshan Indium & Germanium Metallurgy & Chemistry Industry | 60 | 2016.10 | Shutdown |
| Gansu Baohui | 60 | 2016.10 | 76% |

Source: SMM

New Capacity in 2016

| Company | Existing Capacity (10,000 mt) | New Capacity (10,000 mt) | Commissioning | Note |
|---|----------------------------------|---|---------------|--------------------|
| Mengzi Mining and Zinc Smelting Limited | 70 | Expand 70,000 to 100,000 mt | 2016Q2 | In operation |
| Hunan Sanli Group | 60 | 100(existing 60,000 mt/yr will be eliminated) | 2016Q1 | In operation |
| Inner Mongolia Xing'an Copper and Zinc Smelting Limited | 100 | 25 | 2016Q1 | In operation |
| Hunan Xuanhua Zinc Industry Co., Ltd. | 40 | 60 | 2016Q3 | trial production |
| Anyang Minshan Nonferrous Metals Co., Ltd. | 0 | 10 | 2016Q2 | In operation |
| GanSu Baiyin | 280 | 100 | 2016Q3 | trial production |
| Xiangyun Feilong Industry Co., Ltd. | 180 | 200 | Indeterminate | Being planned |
| Xinjiang Shache Hengchang Smelting Co., Ltd. | 0 | 100 | 2017 | Under construction |
| Sichuan Huili Lead & Zinc Mine | 0 | 100 | 2018 | Under construction |
| Xilin Gol Shanjin Zinc Industry Co., Ltd. | 0 | 100 | Indeterminate | To be constructed |
| Inner Mongolia Xing'an Boyuan Nonferrous Metals Company | 0 | 100 | Indeterminate | To be constructed |
| Zhongjin Lingnan | 200 | 200 | Indeterminate | To be constructed |
| Yunnan Tin Group | 20 | 100 | Indeterminate | To be constructed |
| Xichang Heli | 60 | 40 | Indeterminate | To be constructed |
| Hunan Huaxin Nonferrous Metals Company | 0 | 100 | Indeterminate | To be constructed |
| Xinjiang Jinwang Mining Company | 0 | 100 | Indeterminate | Under construction |

Source: SMM

Zinc Oxide

Quotes for zinc oxide fell RMB 1,010/mt to RMB 20,100-21,500/mt this past week. Environmental protection issue restricted production at zinc oxide plants in Hebei. But most galvanized tube/pipe producers in North China slashed or halted production. Galvanizers were unwilling to sell as zinc prices dropped.

Mainstream traded prices for zinc slag (95%) from galvanizers in North China were RMB 17,800-18,500/mt (including tax) this past week, and the price spread between zinc slag (95%) and SMM #0 zinc narrowed RMB 640/mt to RMB 3,480/mt.

Lead — LME Lead to Trade between USD 2,050-2,150/mt

Price Trends

Review

US's housing starts and building permits released last Friday both missed expectation in November, waning US dollar index. This past week, existing home sales hit a 10-year high, sending US dollar index up to around 103. Exchange rate of Chinese yuan once fell to 6.9633 and then rallied slightly. EIA crude oil inventory increased sharply unexpectedly, dragging down oil prices. LME lead dropped significantly for 5 days in a row, down as low as USD 2,100/mt.

SHFE 1702 lead dropped to around RMB 18,000/mt and then fluctuated. Treasury bond futures dipped to its daily downward limit and then hit the largest growth since listed. Tight capitals weighed down base metals in China's market. SHFE 1702 lead mainly moved between the 40 and 60-day moving averages with weekly lowest level at RMB 17,665/mt.

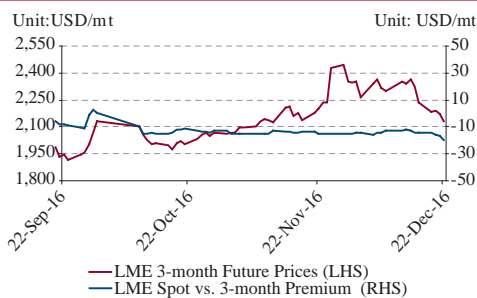
In China's domestic market, spot lead mainly traded at RMB 17,900-18,600/mt this past week. Traders in Shanghai's market sold goods actively with limited supply as SHFE 1702 lead continued falling. Spot premiums kept narrowing, against SHFE 1702 lead due to low purchase interest from battery producers at the end of year. Trading was sluggish.

Supply and demand were both quiet in Guangdong and trading was quiet. Lead smelters in Henan cut output due to environmental protection inspections, resulting in falling supply, and held back sales with low selling purchase. Moreover, downstream battery producers demand was also sluggish. Spot premiums dropped to RMB 0-50/mt, against SMM #1 average price. It is heard that lead smelters in Henan sold non-deliverable brand lead with widening premiums at RMB 300-500/mt, against SMM #1 average price. Trading remained sluggish. There were no spot goods traded in Jiangxi.

Forecast

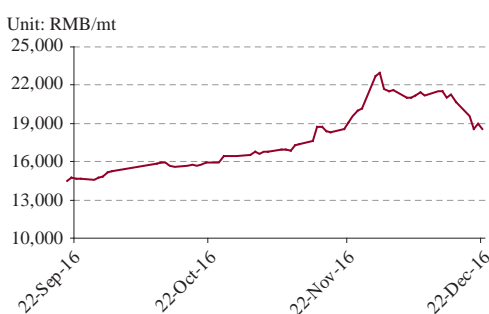
In the coming week, European and US markets will close on December 26 and 27 for Christmas and global economic data will also be light. Attention should be on profits at Chinese above-scale industrial enterprises in November, on a yearly basis, which is expected to recover, thanks to output reduction and rising profits after supply-side reform. And this will help capital flow into real economy. Tight end-year capitals will continue dominating market sentiment. People's Bank of China injected net RMB 102 billion in total in 7 trading days since December 14-22, and bond market thus stopped falling and rebounded after a large amount of capital injection. Chinese central bank provided a large amount of capitals for tight liquidity at the end of year to stabilize market's sentiment, after Shibor rate advanced. But, base metals will keep fluctuating with high risk aversion sentiment at the year end.

LME Lead Prices and Premium



Sources: LME, SMM

China Lead Spot Prices



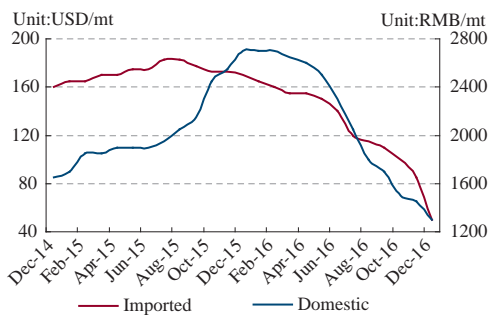
Source: SMM

LME lead will trade between USD 2,050-2,150/mt in the coming week with resistance from the moving averages and negative technical indicators.

Chinese government has shown its determination in reducing leveraging. This, combined with firm US dollar index, will weigh down SHFE lead in a short term. SHFE 1702 lead is expected to move at RMB 17,800-18,800/mt in the coming week.

In China's domestic market, trading will remain sluggish at the end of year. Spot premiums are predicted to keep narrowing and trading will not improve in a short term. Spot lead should trade at RMB 17,800-18,800/mt in the coming week.

TC for Imported and Domestic Lead Concentrate



Source:SMM

Lead Concentrate

TCs for Chinese 50% lead concentrate mainly traded at RMB 1,500-1,600/mt (Pb content) this past week. Imported concentrate (Pb 60%, Ag < 1,000g) staged small change this past week and mainly traded at USD 20-30/dmt, with limited offers down as low as USD 0/dmt, but no trading was heard.

The SMM/LME lead price ratio dropped slightly. More and more mines in north China suspended output with cold weather and finishing year's production target at some mines. Mines in south China couldn't restart operation due to strict environmental protection inspections. Those resulted in tight ore supply in China's market. TCs for domestic lead concentrate increased due to cash demand at mines and low purchase interest from lead smelters. Profits of imported lead concentrate narrowed with falling SMM/LME lead price ratio and rising TCs for domestic lead ore. Lead smelters thus reduced purchases, leading to quiet trading in China's market.

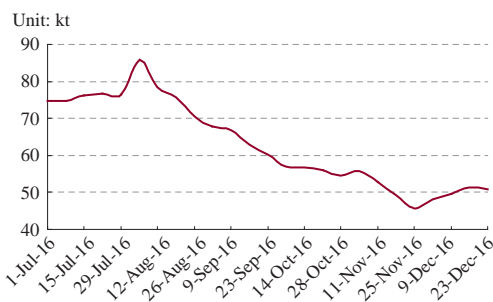
Lead Concentrate TC in Nov. -Dec. 2016

| | Nov. 2016 | Dec. 2016 | MoM Changes |
|-------------------|-----------|-----------|-------------|
| Imported (USD/mt) | 80-90 | 40-60 | -35 |
| Domestic (RMB/mt) | 1400-1500 | 1200-1400 | -150 |

Source: SMM

Note: 50% lead content in the imported concentrate. 60% lead content in the domestic concentrate.

China Domestic Lead Inventories



Source:SMM

Refined Lead Supply

Henan's environmental protection department called local primary lead smelters to cut output due to heavy air pollution with 30%-50% cut at crude lead production lines. Hence, refined lead output reduced slightly. Yunnan's government asked most local smelters to remove some blast furnaces, affecting most local smelters. Yunnan Zhenxing Industry Group is operating as normal, which plans to take unit maintenance at the end of year. It should be corrected that Yunnan Tin has suspended crude lead production line and refined lead production line is still under normal operation, but at lower output.

Secondary lead supply was tight in China's market this past week because traders held back sales even at high prices. Most small secondary lead smelters in Guangdong, Hebei and Yunnan shut

down after strict environmental protection inspections. Moreover, operating enthusiasm at some small secondary lead smelters reduced at the end of year, leading to slight decline of secondary lead output. In addition, Anhui Huaxin Lead Industry Group was heard to restart output on Friday.

Inventory

Primary lead inventory in Shanghai and Guangdong dropped by 1,900 mt to 51,400 mt over this past week. Downstream battery producers purchased with low interest at the end of year as SHFE 1702 lead dropped from highs this past week, leading to low outflows and inflows. Inventory reduced slightly this past week and will keep at current level in a short term.

Downstream Demand

Downstream distributors, fearing prices to fall, were wary on purchases this past week due to low demand in China's motive battery market and large decline of lead prices. Hence, orders at battery producers reduced. Moreover, distributors strengthened promotions both in wholesale and retailing market with sluggish demand in end-user market, such as leading brand's 48v20Ah falling to RMB 600/mt. Moreover, some battery producers reduced battery prices by RMB 20-30.

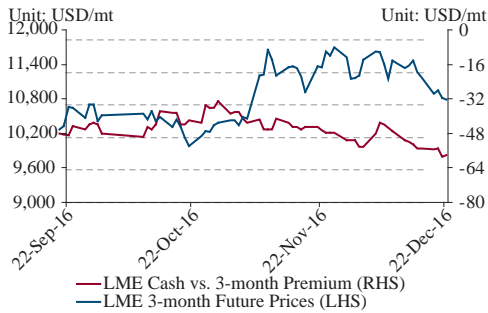
Ignition battery inventories at most distributors can be used for 2 months and some even can be used for 3 months with tough sell, resulted by quiet replacement demand in ignition battery market. Wholesale price of ignition battery reduced, such as 6-QW-45Ah dropping to RMB 260-300. Moreover, distributors' purchase interest fell sharply due to dipping lead prices. So, orders at most battery producers keep dropping with operating rate down 20%-30% and some battery producers even shut down. In other news, some battery producers in Hebei and Henan were called to cut, or suspended output due to environmental protection inspections.

Nickel — LME Nickel to Trade at USD 10,400-10,900/mt

Price Trends

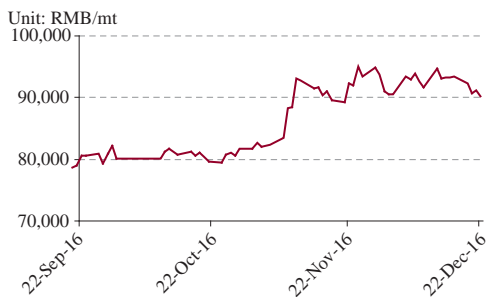
Review

LME Nickel Prices and Premium



Sources: LME, SMM

China Nickel Spot Prices



Source: SMM

LME nickel dropped below the 60-day moving average to USD 10,565/mt this past week, the lowest level since November 8. The 5-day moving average of LME nickel dropped and crossed the 60-day moving average on Friday. As of 15:00 Friday, LME nickel was USD 10,680/mt, down 4.47% week-on-week. LME market will close until December 27 for Christmas holiday. SHFE 1705 nickel fell this past week. The contract dropped below the 40-day moving average on Thursday and tested support at the 60-day moving average, down as low as RMB 89,620/mt. SHFE 1705 nickel mainly moved above the 60-day moving average on Friday. The contract closed Friday's mid-day trading at RMB 90,150/mt, down 5.38% on a weekly basis. Trading volumes fell 854,000 to 2.46 million lots and positions increased 17,000 to 550,000.

In China's domestic market, the average spot price of SMM #1 refined nickel was RMB 90,930/mt, down RMB 2,910/mt on a weekly basis. Prices of Jinchuan nickel traded at premiums of RMB 0-500/mt against Wuxi's 1701 nickel contract, and those of Russian nickel traded at RMB 250-0/mt lower against the same contract. With year-end coming, some traders showed low selling interest while others, having not reached year's target, were active in the market. Premiums of Jinchuan Nickel increased significantly, but Russia nickel only traded at lower discounts as market expected supply of Russian nickel to grow with the opening of import window after import losses of imported nickel reduced sharply this past week. The price gap between Jinchuan and Russia nickel widened to around RMB 500/mt. Downstream buyers increased purchases this past week after nickel prices dropped. This past week, Jinchuan Group adjusted ex-works prices 5 times and finally closed the week lower RMB 4,400/mt to RMB 89,800/mt on a weekly basis, the lowest level since November 10.

Forecast

| | Positive Factors | Negative Factors |
|-------------------------|---|--|
| 1 | Nickel ore inventories fell 230,000 wmt at major domestic ports. | The profitable import window is going to be opening, weighing down domestic market, and discounts of Russian nickel are estimated to grow. |
| 2 | Chinese yuan is continuing depreciating, supporting nickel price. | Thin demand will weigh down high-grade NPI price. |
| 3 | | Stainless steel prices are down. |
| | Price Range | Outlook |
| LME nickel price | USD 10,400-10,900/mt | down slightly |
| SHFE three-month nickel | RMB 88,000-92,500/mt | down slightly |
| China spot nickel price | RMB 87,200-91,200/mt | down slightly |
| High-grade NPI price | RMB 950-970/mtu | drop |
| Low-grade NPI price | RMB 3,000-3,100/mt | stable |

Source: SMM

Nickel Ore

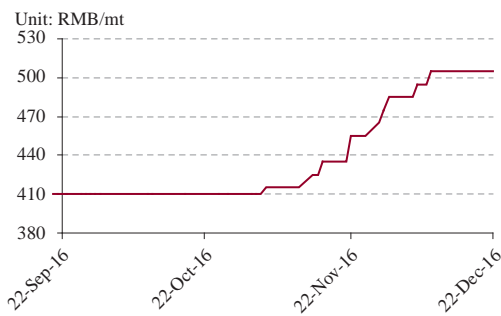
Nickel Ore Prices at China Major Ports

| Date | 0.9%-1.1% | 1.4%-1.6% | 1.6%-1.7% | 1.7%-1.8% | 1.8%-1.9% | 1.9%-2.0% |
|---------------|-----------|-----------|-----------|-----------|-----------|-----------|
| 2016/12/19 | 180-210 | 370-420 | 420-450 | 450-490 | 490-520 | 520-570 |
| 2016/12/20 | 180-210 | 370-420 | 420-450 | 450-490 | 490-520 | 520-570 |
| 2016/12/21 | 180-210 | 370-420 | 420-450 | 450-490 | 490-520 | 520-570 |
| 2016/12/22 | 180-210 | 370-420 | 420-450 | 450-490 | 490-520 | 520-570 |
| 2016/12/23 | 180-210 | 370-420 | 420-450 | 450-490 | 490-520 | 520-570 |
| Weekly Change | 0.00% | 1.54% | 0.00% | 0.00% | 0.00% | 0.00% |

Unit: RMB/wmt

Source: SMM

Spot Nickel Ore Prices



Source: SMM

Medium and High-Grade Nickel Ore to Hold Stable or Rise

This past week, prices for medium and high-grade nickel ore, for future delivery, held stable. The average weekly spot price of Ni 1.4%-1.6% ore was up 1.54% on a weekly basis, while that for Ni 1.8%-1.9% was stable.

Recently, a small amount of Ni 1.96% ore from Guatemala was traded at CIF price of USD 78/wmt, and traded prices offered no reference meaning due to small volumes. Currently, CIF prices for Ni 1.5% ore were offered at USD 52-53/wmt, and traded at USD 50-51/wmt. CIF prices for Ni 1.8% ore traded at USD 65-66/wmt.

Supply of Philippine ore was limited due to the monsoon season and environmental crackdowns. S.R. Languyan in Tawi-Tawi started loading and shipping, and three ships carrying medium and high-grade ore are scheduled to arrive in China in January 2017. Some traders were not sure about shipments for January 2017 due to unfavorable shipping conditions in the Philippines and congestion at ports.

Medium and high-grade ore supply is now in shortages, while domestic high-grade NPI producers show low buying interest due to on-hand inventories, with thin trading. SMM expects prices of medium and high-grade ore, for spot and future delivery, to hold stable or rise for the foreseeable future.

Low-Grade Nickel Ore Spot Prices to Inch up

This past week, prices for Ni 0.9% and Fe 49%, for spot and future delivery, held stable, with no deals reported. Currently, supply of low-grade ore for future delivery was extremely low, and low-grade NPI producers made moderate purchases, but overall trading was low. SMM expects low-grade nickel ore price, for future delivery, to hold stable in the coming week.

In the spot market, supply was mainly ore with low Ni and Fe content, and NPI producers show low buying interest in this kind of ore, with no deals reported. It was said that supply of Ni 0.9% and Fe 49% ore at port in Shandong was tight, with spot traded prices at RMB 220-230/mt, and this is estimated to push up low-grade nickel ore spot price.

FOB and CIF Prices for Philippine Nickel Ore

Unit: USD/wmt

| Date | Ni 1.5% | | Ni 1.8% | | Ni 0.9%, Fe 49% | |
|----------------------|---------|-------|---------|-------|-----------------|-------|
| | FOB | CIF | FOB | CIF | FOB | CIF |
| 2016/12/16 | 54-56 | 65-66 | 40-42 | 50-51 | 13.5-14.5 | 21-22 |
| 2016/12/23 | 54-56 | 65-66 | 40-42 | 50-51 | 13.5-14.5 | 21-22 |
| Weekly Change | 0 | 0 | 0 | 0 | 0 | 0 |

Source: SMM

Nickel Ore Inventories Fall 230,000 Wmt at Seven Major Chinese Ports

Nickel ore inventories at seven major Chinese ports were 8.84 million wmt this past week, down 230,000 wmt on a weekly basis, according to SMM data.

Over this past week, the Port of Lianyungang saw arrivals of 80,000 wmt of goods, and new arrivals of ore to the Port of Lanshan and Lianyungang are estimated at 50,000 wmt and 150,000 wmt in the coming week, respectively.

Based on inventories at the seven major ports, SMM estimates China's total nickel ore port inventories at around 11.79 million wmt, or 96,700 mt in Ni content.

Nickel Ore Inventories at Seven Major Chinese Ports

Unit: 1,000 wmt

| Date | Tianjin | Rizhao | Lanshan | Lianyungang | Jingtang | Yingkou | Lanqiao | Total |
|---------------|------------|------------|------------|-------------|----------|------------|------------|-------------|
| 2016/12/16 | 2050 | 500 | 1660 | 2150 | 570 | 1190 | 950 | 9070 |
| 2016/12/23 | 2000 | 480 | 1610 | 2100 | 570 | 1180 | 900 | 8840 |
| Change | -50 | -20 | -50 | -50 | 0 | -10 | -50 | -230 |

Source: SMM

Lateritic Stock at China Major Ports

Source: SMM

Note: The survey sample covers seven major nickel ore ports in China, including Tianjin, Rizhao, Lanshan, Lianyungang, Jingtang, Yingkou and Lanqiao.

Nickel Supply

This past week, import losses narrowed further to RMB 93.6/mt, and traders turned active in the market as a result, but offers were mixed. Actual transactions saw no obvious improvement at the year end. Import premiums are expected to edge up in the coming week with trading sentiment picking up.

Premiums for Imported Nickel

Unit: USD/mt

| Date | Russian Nickel | Sumitomo Nickel |
|------------|----------------|-----------------|
| 2016/12/16 | 110 | 140 |
| 2016/12/23 | 120 | 150 |

Source: SMM

Refined Nickel Inventories in South China

Unit: mt

| | 2016/12/23 | 2016/12/16 | Change |
|-------------|------------|------------|--------|
| Inventories | 462 | 415 | 47 |

Source: SMM

This past week, inventories of refined nickel were 462 mt in south China, up 47 mt on a weekly basis. In early week, goods purchased by traders arrived at the region, and downstream producers reduced purchases, sending up local inventories.

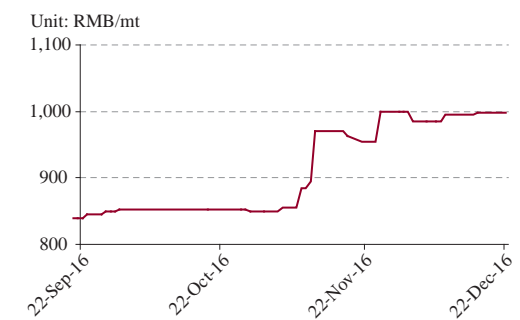
Nickel Pig Iron

China NPI Price (Ex-works, including tax)

| Date | Ni 1.6-1.7% (Unit: RMB/mt) | Ni 4-6% (Unit: RMB/mtu) | Ni 10-15% (Unit: RMB/mtu) |
|---------------|----------------------------|-------------------------|---------------------------|
| 2016/12/19 | 3000-3050 | 1020-1040 | 990-1005 |
| 2016/12/20 | 3000-3050 | 1020-1040 | 990-1005 |
| 2016/12/21 | 3000-3050 | 1020-1040 | 990-1005 |
| 2016/12/22 | 3000-3100 | 1020-1040 | 990-1005 |
| 2016/12/23 | 3000-3100 | 1000-1020 | 960-980 |
| Change | 1.17% | -0.39% | -0.35% |

Source: SMM

China Domestic Nickel Pig Iron Prices



Source: SMM

High-Grade NPI Price to Weaken

The average ex-works price for high-grade NPI fell RMB 3.5/mtu or 0.35% on a weekly basis this past week.

LME nickel fell this past week. High-grade NPI prices remained steady during Monday-Thursday due to no trading. Spot nickel prices in China fell with LME nickel, expanding price spread between high-grade NPI and refined nickel. Zhangjiagang Pohang Stainless Steel lowered bid price for high-grade NPI on Thursday, pushing down market prices on Friday. A few stainless steel plants also lowered their prices.

Trading for high-grade NPI was extremely sluggish this past week as nickel prices dropped. High-grade NPI plants were unwilling to sell at lows, while stainless steel plants also lacked buying interest.

Several thousands mt of spot NPI was available at one port of Liaoning's, but buyers showed little buying interest due to high quotes.

SMM expects ex-works price for high-grade NPI to weaken in the coming week due to anemic demand from lower economics of high-grade NPI against refined nickel.

Bid Price for High-Grade NPI (Price to factory, including tax)

| Company | Procurement Category | Purchase Frequency | Procurement Price (Unit: RMB/mtu) | Change (Unit: RMB/mtu) | Payment Term |
|-------------------------------------|----------------------|--------------------|-----------------------------------|------------------------|------------------|
| Zhangjiagang Pohang Stainless Steel | NPI(8~10%) | Weekly | 980/990 | -30/-40 | Cash on delivery |
| Inner Mongolia Thai Industry | NPI(8~10%) | Weekly | 970 | -30/-40 | Cash on delivery |

Source: SMM

Zhangjiagang Pohang Stainless Steel only purchased 1,000-2,000 mt of high-grade NPI this past week.

Economics of High-Grade NPI Strengthens Significantly over Refined Nickel

Premiums of high-grade NPI were RMB 82.7/mtu against refined nickel this past week, up RMB 25.6/mtu on a weekly basis. LME nickel prices declined this past week, weighing down spot nickel prices in China. As prices for medium and high-grade nickel ore stayed high, high-grade NPI prices were stable during Monday-Thursday. High-grade NPI prices dropped on Friday after stainless steel plants lowered their bid prices.

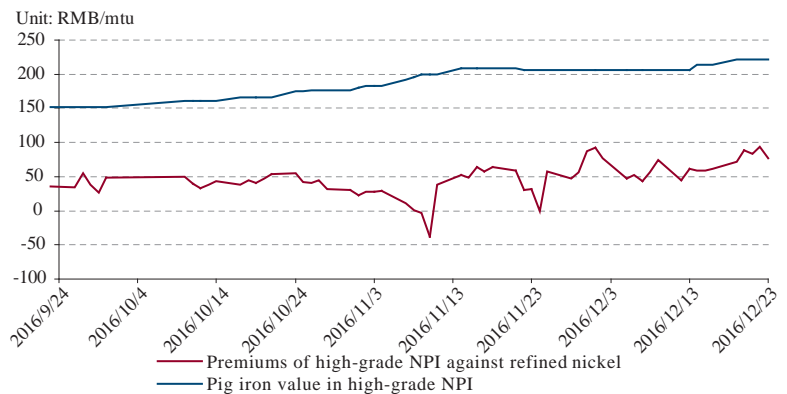
Premiums of high-grade NPI against refined nickel rose to nearly RMB 100/mtu at one point on Thursday. This incentivized some stainless steel plants to increase purchases for refined nickel.

Premiums/Discounts of High-Grade NPI against Refined Nickel

| Date | Average Weekly High-Grade NPI Price (RMB/mtu) | Average Weekly SMM #1 Nickel Price (RMB/mt) | Average Weekly SMM #1 Nickel Price (RMB/mtu) | Premium/Discount (RMB/mtu) |
|------------------|---|---|--|----------------------------|
| 2016/12/12-12/16 | 995.5 | 93840 | 938.4 | 57.1 |
| 2016/12/19-12/23 | 992 | 90930 | 909.3 | 82.7 |
| Change | -3.5 | -2910 | -29.1 | 25.6 |

Source: SMM

Economics of High-Grade NPI vs. Refined Nickel



Source: SMM

Profitability at High-Grade NPI Shrinks Noticeably

Prices for medium-grade spot ore and ore for future delivery bought 25 days earlier jumped this past week, greatly increasing ex-works cost at high-grade NPI plants.

As the average price for high-grade NPI fell on a weekly basis, high-grade NPI plants reported shrinking profit. Considering daily cost, EAF high-grade NPI plants in Inner Mongolia had thin profits, while other EAF high-grade NPI plants all suffered losses.

Table

| Product | Region | Technology | Costs (Unit: RMB/mtu) | Costs (Unit:USD/mt) | Profit Margin |
|-----------|----------------|------------|-----------------------|---------------------|---------------|
| NPI(8-9%) | Fujian | RKEF | 876 | 10641 | 13.21% |
| NPI(8-9%) | Shandong | RKEF | 899 | 10923 | 10.29% |
| NPI(8-9%) | Jiangsu | RKEF | 916 | 11127 | 8.27% |
| NPI(8-9%) | Inner Mongolia | EAF | 934 | 11348 | 6.16% |
| NPI(8-9%) | Jiangsu | EAF | 977 | 11867 | 1.52% |

Source: SMM

Note: 1. Cost (USD/mt, Ni content)=cost (RMB/mt, Ni content) *100/1.17/exchange rate/1.01(nickel import tax:1%)

2. Cost is cash cost and is based on prices of nickel ore bought 25 days earlier. 3. Cost at RKEF high-grade NPI producers is based on CIF price for nickel ore, while that at EAF high-grade NPI producers is based on spot nickel ore price at ports. 4. Above costs mean average weekly costs.

Low-Grade NPI Price to Stabilize

Ex-works price for low-grade NPI advanced this past week and was RMB 3,000-3,100/mt on Friday, with the average price up RMB 35/mt or 1.17% on a weekly basis.

Most low low-grade NPI plants remaining in production are integrated with stainless steel production. Those selling goods were mainly medium and small plants using blast furnaces. Their operating rates were low due to environmental protection inspections, leaving low-grade NPI supply limited.

Coke prices fell this past week. Based on cost for raw material bought 25 days earlier, cash cost at low-grade NPI plants was about RMB 3,020/mt, leaving extremely low profit. Falling coke prices will not help reduce cost at low-grade NPI plants any time soon.

SMM expects low-grade NPI prices to stabilize in the coming week as supplies are limited.

Stainless Steel

Cold-Rolled Stainless Steel Prices in Wuxi

Unit: RMB/mt

| Date | LH/2B Coil | 304/2B Coil | 430/2B Coil |
|------------|------------|-------------|-------------|
| 2016/12/16 | 10650 | 17900 | 10250 |
| 2016/12/23 | 10350 | 17600 | 10050 |
| Change | -300 | -300 | -200 |

Source: SMM

#300 and #400 Stainless Steel Prices to Fall on Slow Sales

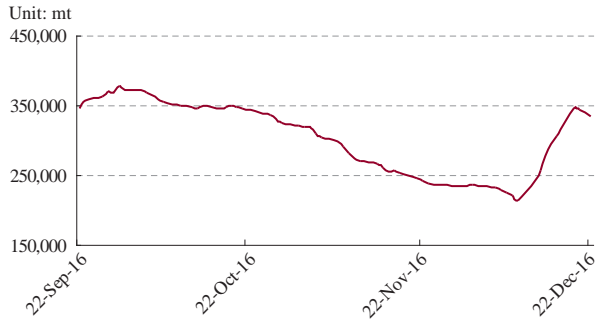
#200 stainless steel prices slid all the way this past week, and stabilized at RMB 10,350/mt at on Friday, down RMB 300/mt or 2.8% week-on-week. Angang Lianzhong Stainless Steel lowered prices for LH/2B by RMB 200/mt on Tuesday, and left prices unchanged for the rest of the week. Environmental protection inspections affected stainless steel and downstream industries recently, including kitchen and bathroom and decoration industries, leaving soft downstream demand for stainless steel. Meanwhile, traders sold off goods at due to year-end cash tightness. But with cost support, #200 stainless steel prices are expected to stabilize in the coming week, finding support from RMB 10,000/mt.

#300 stainless steel prices dropped all the way this past week. As of Friday, prices for cold-rolled #304/2B stainless steel dropped to RMB 17,600/mt, down RMB 300/mt week-on-week. Downstream buyers had hoarded stocks preciously against rising prices, so trading was quiet at present. When combined with arriving shipments of cheap resources and traders lowering prices to generate cash, #300 stainless steel prices are expected to fall further in the coming week.

#400 stainless steel prices decreased this past week. Traders sold at lower prices against weak downstream buying interest. Ferrochrome prices inched lower this past week. Raw material prices are expected to fall slightly further. When combined with quiet trading, prices for #400 stainless steel will continue falling in the coming week.

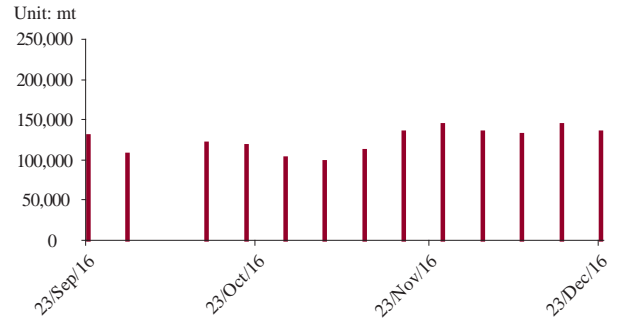
Appendix 1:

Total LME Copper Stocks



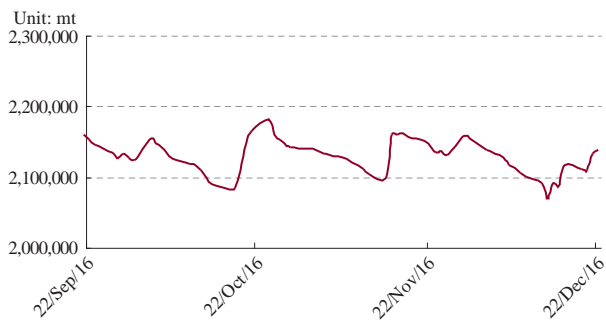
Source: LME

Total SHFE Copper Stocks



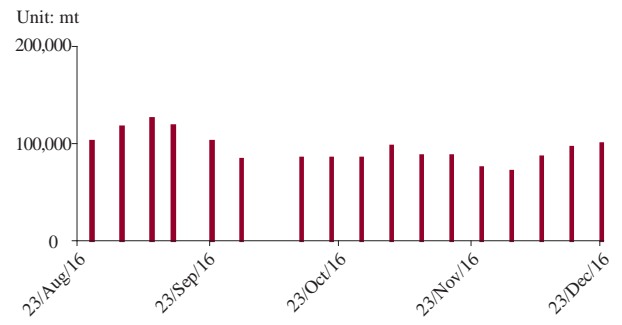
Source: SHFE

Total LME Aluminum Stocks



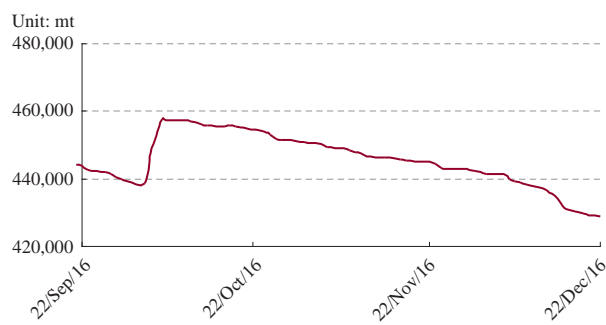
Source: LME

Total SHFE Aluminum Stocks



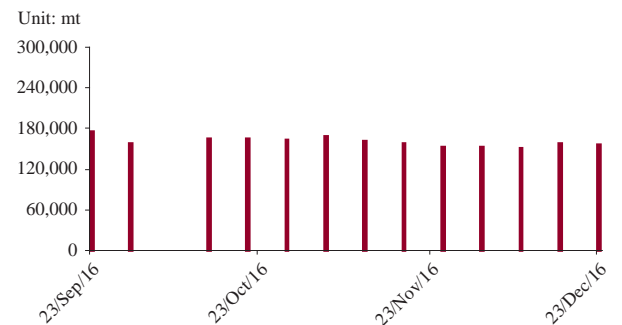
Source: SHFE

Total LME Zinc Stocks



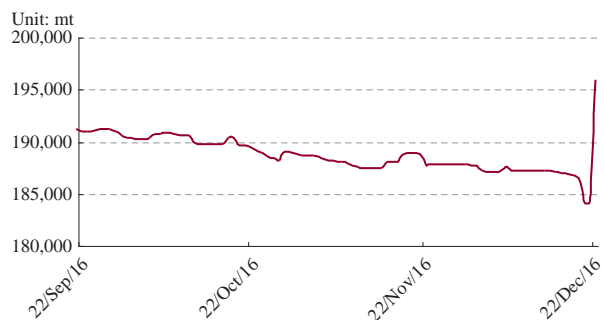
Source: LME

Total SHFE Zinc Stocks



Source: SHFE

Total LME Lead Stocks



Source: LME

Total SHFE Lead Stocks



Source: SHFE

Total LME Nickel Stocks



Source: LME

Appendix 2:

China's Copper Concentrate & Copper Apparent Consumption, Jan. 2015 - Oct. 2016 (Tons in Thousands, Percent)

| | Production | | | Import | | | Export | | | Net Imp/(Exp) | | | App. Con. | | | |
|--------------------|------------|-------|-------|--------|--------|-------|--------|-------|-------|---------------|-------|-------|-----------|-------|-------|------|
| | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | |
| Copper Concentrate | Jan 15 | 128.7 | 2% | -30% | 927.9 | -11% | -20% | 10.3 | N/A | N/A | 918 | -12% | -21% | 1,046 | -10% | -23% |
| | Feb 15 | 116.3 | 2% | -10% | 757.7 | -1% | -18% | 0.0 | N/A | N/A | 758 | -1% | -17% | 874 | 0% | -16% |
| | Mar 15 | 141.9 | -11% | 22% | 1322.6 | 41% | 75% | 0.0 | N/A | N/A | 1,323 | 41% | 75% | 1,464 | 34% | 68% |
| | Apr 15 | 139.5 | -10% | -2% | 1039.3 | 4% | -21% | 0.0 | N/A | N/A | 1,039 | 4% | -21% | 1,179 | 2% | -20% |
| | May 15 | 156.9 | -24% | 12% | 984.3 | 39% | -5% | 3.6 | N/A | N/A | 981 | 38% | -6% | 1,138 | 24% | -3% |
| | Jun 15 | 162.3 | -10% | 3% | 988.3 | 0% | 0% | 0.0 | N/A | N/A | 988 | 0% | 1% | 1,151 | -2% | 1% |
| | Jul 15 | 153.5 | -7% | -5% | 970.0 | 8% | -2% | 0.1 | N/A | N/A | 970 | 8% | -2% | 1,123 | 5% | -2% |
| | Aug 15 | 161.4 | -7% | 5% | 1151.9 | 20% | 19% | 0.0 | N/A | N/A | 1,152 | 20% | 19% | 1,313 | 16% | 17% |
| | Sep 15 | 155.0 | -15% | -4% | 1210.0 | -6% | 5% | 0.0 | N/A | N/A | 1,210 | -6% | 5% | 1,365 | -7% | 4% |
| | Oct 15 | 155.0 | -8% | 0% | 1052.7 | 10% | -13% | 0.0 | N/A | N/A | 1,053 | 10% | -13% | 1,208 | 7% | -12% |
| | Nov 15 | 153.2 | -16% | -1% | 1437.3 | 25% | 37% | 0.0 | N/A | N/A | 1,437 | 25% | 37% | 1,590 | 19% | 32% |
| | Dec 15 | 151.2 | -17% | -1% | 1477.3 | 27% | 3% | 0.0 | N/A | N/A | 1,477 | 27% | 3% | 1,629 | 21% | 2% |
| | Jan 16 | 122.0 | -5% | -19% | 1170.4 | 26% | -21% | 0.0 | N/A | N/A | 1,170 | 28% | -21% | 1,292 | 24% | -21% |
| | Feb 16 | 100.4 | -14% | -18% | 1458.2 | 92% | 25% | 0.9 | N/A | N/A | 1,457 | 92% | 25% | 1,558 | 78% | 21% |
| | Mar 16 | 149.9 | 6% | 49% | 1370.0 | 4% | -6% | 0.0 | N/A | N/A | 1,370 | 4% | -6% | 1,520 | 4% | -2% |
| | Apr 16 | 137.6 | -1% | -8% | 1262.4 | 21% | -8% | 0.0 | N/A | N/A | 1,262 | 21% | -8% | 1,400 | 19% | -8% |
| | May 16 | 140.2 | -11% | 2% | 1430.3 | 45% | 13% | 0.0 | N/A | N/A | 1,430 | 46% | 13% | 1,571 | 38% | 12% |
| | Jun 16 | 158.5 | -2% | 13% | 1351.1 | 37% | -6% | 1.7 | N/A | N/A | 1,349 | 37% | -6% | 1,508 | 31% | -4% |
| | Jul 16 | 153.7 | 0% | -3% | 1381.0 | 42% | 2% | 0.0 | N/A | N/A | 1,381 | 42% | 2% | 1,535 | 37% | 2% |
| | Aug 16 | 165.0 | 2% | 7% | 1450.5 | 26% | 5% | 0.0 | N/A | N/A | 1,451 | 26% | 5% | 1,616 | 23% | 5% |
| Sep 16 | 174.0 | 12% | 5% | 1385.2 | 14% | -5% | 1.5 | N/A | N/A | 1,384 | 14% | -5% | 1,558 | 14% | -4% | |
| Oct 16 | 175.8 | 13% | 1% | 1363.6 | 30% | -2% | 0.0 | N/A | N/A | 1,364 | 30% | -1% | 1,539 | 27% | -1% | |
| 2016 Annualized | 1,477.1 | 0% | N/A | 13622 | 31% | N/A | 4.3 | N/A | N/A | 13,618 | 31% | N/A | 15,095 | 27% | N/A | |
| Copper | Jan 15 | 623.4 | 23% | -25% | 300.2 | -24% | -5% | 28.7 | 11% | N/A | 272 | -27% | -6% | 895 | 2% | -20% |
| | Feb 15 | 573.9 | 5% | -8% | 211.6 | -24% | -30% | 11.5 | -26% | N/A | 200 | -24% | -26% | 774 | -5% | -14% |
| | Mar 15 | 636.4 | 7% | 11% | 306.7 | -5% | 45% | 17.6 | 26% | N/A | 289 | -7% | 44% | 925 | 2% | 20% |
| | Apr 15 | 603.5 | 3% | -5% | 329.6 | -3% | 7% | 23.5 | 9% | N/A | 306 | -4% | 6% | 910 | 1% | -2% |
| | May 15 | 652.4 | 6% | 8% | 275.4 | -3% | -16% | 23.9 | -15% | N/A | 252 | -1% | -18% | 904 | 4% | -1% |
| | Jun 15 | 695.1 | 11% | 7% | 255.1 | 0% | -7% | 14.6 | -63% | N/A | 240 | 12% | -4% | 936 | 12% | 4% |
| | Jul 15 | 663.5 | 5% | -5% | 259.7 | 6% | 2% | 14.9 | -48% | N/A | 245 | 13% | 2% | 908 | 7% | -3% |
| | Aug 15 | 665.0 | -2% | 0% | 262.7 | 12% | 1% | 12.9 | -35% | N/A | 250 | 16% | 2% | 915 | 2% | 1% |
| | Sep 15 | 680.2 | -5% | 2% | 352.0 | 22% | 34% | 12.5 | 9% | N/A | 339 | 22% | 36% | 1,020 | 3% | 11% |
| | Oct 15 | 693.2 | -5% | 2% | 343.5 | 12% | -2% | 10.8 | -27% | N/A | 333 | 14% | -2% | 1,026 | 0% | 1% |
| | Nov 15 | 740.0 | -2% | 7% | 358.7 | 12% | 4% | 19.7 | 0% | N/A | 339 | 13% | 2% | 1,079 | 2% | 5% |
| | Dec 15 | 771.5 | -7% | 4% | 423.2 | 34% | 18% | 20.9 | -21% | N/A | 402 | 39% | 19% | 1,174 | 5% | 9% |
| | Jan 16 | 581.1 | -7% | -25% | 323.9 | 8% | -23% | 9.0 | -69% | N/A | 315 | 16% | -22% | 896 | 0% | -24% |
| | Feb 16 | 702.9 | 22% | 21% | 328.6 | 55% | 1% | 10.8 | -6% | N/A | 318 | 59% | 1% | 1,021 | 32% | 14% |
| | Mar 16 | 703.9 | 11% | 0% | 458.1 | 49% | 39% | 23.4 | 33% | N/A | 435 | 50% | 37% | 1,139 | 23% | 12% |
| | Apr 16 | 693.7 | 15% | -1% | 341.7 | 4% | -25% | 32.4 | 38% | N/A | 309 | 1% | -29% | 1,003 | 10% | -12% |
| | May 16 | 680.5 | 4% | -2% | 319.3 | 16% | -7% | 85.0 | 256% | N/A | 234 | -7% | -24% | 915 | 1% | -9% |
| | Jun 16 | 685.9 | -1% | 1% | 305.3 | 20% | -4% | 42.6 | 192% | N/A | 263 | 9% | 12% | 949 | 1% | 4% |
| | Jul 16 | 721.5 | 9% | 5% | 251.2 | -3% | -18% | 75.0 | 402% | N/A | 176 | -28% | -33% | 898 | -1% | -5% |
| | Aug 16 | 743.2 | 12% | 3% | 232.1 | -12% | -8% | 57.3 | 344% | N/A | 175 | -30% | -1% | 918 | 0% | 2% |
| Sep 16 | 724.9 | 7% | -2% | 242.8 | -31% | 5% | 27.8 | 122% | N/A | 215 | -37% | 23% | 940 | -8% | 2% | |
| Oct 16 | 736.7 | 6% | 2% | 189.8 | -45% | -22% | 22.9 | 111% | N/A | 167 | -50% | -22% | 904 | -12% | -4% | |
| 2016 Annualized | 6,974.3 | 8% | N/A | 2,993 | 3% | N/A | 386.0 | 126% | N/A | 2,607 | -4% | N/A | 9,581 | 4% | N/A | |

Source: CNIA, China Customs, SMM Research & Consulting

The monthly output for January and February shown above is based on SMM estimates, because the NBS only released total output for the first two months. Of these, output of refined copper, copper semis, aluminum, alumina, refined lead, and refined zinc is estimated according to SMM operating rate surveys, and output of copper concentrate, aluminum semis, lead concentrate, zinc concentrate, refined nickel, refined tin and tin ore is calculated based on the number of days in the affected month.

Appendix 3:

China's Bauxite&Alumina&Aluminum Apparent Consumption, Jan. 2015 - Oct. 2016 (Tons in Thousands, Percent)

| | Production | | | Import | | | Export | | | Net Imp/(Exp) | | | App. Con. | | |
|-----------------|------------|-------|-------|--------|-------|-------|--------|-------|-------|---------------|-------|-------|-----------|-------|-------|
| | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM |
| Bauxite | | | | | | | | | | | | | | | |
| Jan 15 | N/A | N/A | N/A | 2,588 | -68% | -20% | 0.0 | N/A | N/A | 2,588 | -68% | -20% | N/A | N/A | N/A |
| Feb 15 | N/A | N/A | N/A | 3,025 | -6% | 17% | 0.0 | N/A | N/A | 3,025 | -6% | 17% | N/A | N/A | N/A |
| Mar 15 | N/A | N/A | N/A | 4,443 | 143% | 47% | 0.0 | N/A | N/A | 4,443 | 143% | 47% | N/A | N/A | N/A |
| Apr 15 | N/A | N/A | N/A | 4,719 | 199% | 6% | 0.0 | N/A | N/A | 4,719 | 199% | 6% | N/A | N/A | N/A |
| May 15 | N/A | N/A | N/A | 3,832 | 81% | -19% | 0.0 | N/A | N/A | 3,832 | 81% | -19% | N/A | N/A | N/A |
| Jun 15 | N/A | N/A | N/A | 4,041 | 38% | 5% | 0.0 | N/A | N/A | 4,041 | 38% | 5% | N/A | N/A | N/A |
| Jul 15 | N/A | N/A | N/A | 5,062 | 64% | 25% | 0.0 | N/A | N/A | 5,062 | 64% | 25% | N/A | N/A | N/A |
| Aug 15 | N/A | N/A | N/A | 4,577 | 83% | -10% | 0.0 | N/A | N/A | 4,577 | 83% | -10% | N/A | N/A | N/A |
| Sep 15 | N/A | N/A | N/A | 6,814 | 139% | 49% | 0.0 | N/A | N/A | 6,814 | 139% | 49% | N/A | N/A | N/A |
| Oct 15 | N/A | N/A | N/A | 4,476 | 75% | -34% | 0.0 | N/A | N/A | 4,476 | 75% | -34% | N/A | N/A | N/A |
| Nov 15 | N/A | N/A | N/A | 5,417 | 111% | 21% | 0.0 | N/A | N/A | 5,417 | 111% | 21% | N/A | N/A | N/A |
| Dec 15 | N/A | N/A | N/A | 7,107 | 119% | 31% | 0.0 | N/A | N/A | 7,107 | 119% | 31% | N/A | N/A | N/A |
| Jan 16 | N/A | N/A | N/A | 5,303 | 105% | -25% | 0.0 | N/A | N/A | 5,303 | 105% | -25% | N/A | N/A | N/A |
| Feb 16 | N/A | N/A | N/A | 3,222 | 7% | -39% | 0.0 | N/A | N/A | 3,222 | 7% | -39% | N/A | N/A | N/A |
| Mar 16 | N/A | N/A | N/A | 5,109 | 15% | 59% | 0.0 | N/A | N/A | 5,109 | 15% | 59% | N/A | N/A | N/A |
| Apr 16 | N/A | N/A | N/A | 4,407 | -7% | -14% | 0.0 | N/A | N/A | 4,407 | -7% | -14% | N/A | N/A | N/A |
| May 16 | N/A | N/A | N/A | 3,848 | 0% | -13% | 0.0 | N/A | N/A | 3,848 | 0% | -13% | N/A | N/A | N/A |
| Jun 16 | N/A | N/A | N/A | 3,506 | -13% | -9% | 0.0 | N/A | N/A | 3,506 | -13% | -9% | N/A | N/A | N/A |
| Jul 16 | N/A | N/A | N/A | 3,634 | -28% | 4% | 0.0 | N/A | N/A | 3,634 | -28% | 4% | N/A | N/A | N/A |
| Aug 16 | N/A | N/A | N/A | 4,458 | -3% | 23% | 0.0 | N/A | N/A | 4,458 | -3% | 23% | N/A | N/A | N/A |
| Sep 16 | N/A | N/A | N/A | 4,467 | -34% | 0% | 0.0 | N/A | N/A | 4,467 | -34% | 0% | N/A | N/A | N/A |
| Oct 16 | N/A | N/A | N/A | 4,278 | -4% | -4% | 0.0 | N/A | N/A | 4,278 | -4% | -4% | N/A | N/A | N/A |
| 2016 Annualized | N/A | N/A | N/A | 42,231 | -3% | N/A | 0.0 | N/A | N/A | 42,231 | -3% | N/A | N/A | N/A | N/A |
| Alumina | | | | | | | | | | | | | | | |
| Jan 15 | 4,470 | 16% | 4% | 385.2 | -40% | -40% | 4.4 | -89% | 95% | 381 | -37% | -40% | 4,851 | 9% | -2% |
| Feb 15 | 4,037 | 16% | -10% | 329.7 | -29% | -14% | 4.1 | 326% | -9% | 326 | -30% | -14% | 4,363 | 10% | -10% |
| Mar 15 | 4,803 | 24% | 19% | 218.2 | -42% | -34% | 1.4 | -79% | -66% | 217 | -41% | -33% | 5,020 | 18% | 15% |
| Apr 15 | 4,780 | 29% | 0% | 315.9 | -47% | 45% | 1.5 | -62% | 7% | 314 | -47% | 45% | 5,094 | 19% | 1% |
| May 15 | 4,654 | 18% | -3% | 340.5 | 9% | 8% | 34.2 | -4% | 2172% | 306 | 11% | -3% | 4,961 | 18% | -3% |
| Jun 15 | 4,809 | 24% | 3% | 223.3 | -40% | -34% | 21.2 | 406% | -38% | 202 | -45% | -34% | 5,011 | 18% | 1% |
| Jul 15 | 4,651 | 18% | -3% | 545.2 | 18% | 144% | 2.0 | -67% | -91% | 543 | 19% | 169% | 5,194 | 18% | 4% |
| Aug 15 | 4,877 | 25% | 5% | 405.8 | 16% | -26% | 52.2 | 654% | 2528% | 354 | 3% | -35% | 5,231 | 23% | 1% |
| Sep 15 | 4,740 | 22% | -3% | 378.2 | 10% | -7% | 67.3 | 1981% | 29% | 311 | -9% | -12% | 5,051 | 20% | -3% |
| Oct 15 | 4,733 | 14% | 0% | 581.5 | 114% | 54% | 18.9 | 454% | -72% | 563 | 110% | 81% | 5,296 | 19% | 5% |
| Nov 15 | 4,798 | 15% | 1% | 386.0 | -13% | -34% | 78.1 | 1803% | 312% | 308 | -30% | -45% | 5,106 | 10% | -4% |
| Dec 15 | 5,002 | 16% | 4% | 544.1 | -15% | 41% | 7.2 | 218% | -91% | 537 | -16% | 74% | 5,538 | 12% | 8% |
| Jan 16 | 4,941 | 11% | -1% | 507.5 | 32% | -7% | 14.2 | 219% | 96% | 493 | 30% | -8% | 5,435 | 12% | -2% |
| Feb 16 | 4,622 | 14% | -6% | 372.4 | 13% | -27% | 1.4 | -66% | -90% | 371 | 14% | -25% | 4,993 | 14% | -8% |
| Mar 16 | 4,787 | 0% | 4% | 359.8 | 65% | -3% | 6.0 | 330% | 339% | 354 | 63% | -5% | 5,141 | 2% | 3% |
| Apr 16 | 4,865 | 2% | 2% | 102.6 | -68% | -71% | 18.1 | 1104% | 201% | 85 | -73% | -76% | 4,950 | -3% | -4% |
| May 16 | 4,954 | 6% | 2% | 175.4 | -49% | 71% | 3.9 | -89% | -78% | 171 | -44% | 103% | 5,126 | 3% | 4% |
| Jun 16 | 5,057 | 5% | 2% | 160.8 | -28% | -8% | 3.1 | -85% | -21% | 158 | -22% | -8% | 5,215 | 4% | 2% |
| Jul 16 | 5,044 | 8% | 0% | 219.9 | -60% | 37% | 4.6 | 133% | 49% | 215 | -60% | 37% | 5,259 | 1% | 1% |
| Aug 16 | 5,061 | 4% | 0% | 128.7 | -68% | -41% | 4.3 | -92% | -7% | 124 | -65% | -42% | 5,186 | -1% | -1% |
| Sep 16 | 5,183 | 9% | 2% | 142.5 | -62% | 11% | 26.9 | -60% | 527% | 116 | -63% | -7% | 5,298 | 5% | 2% |
| Oct 16 | 5,367 | 13% | 4% | 229.1 | -61% | 61% | 19.3 | 2% | -28% | 210 | -63% | 82% | 5,577 | 5% | 5% |
| 2016 Annualized | 49,883 | 7% | N/A | 2,399 | -36% | N/A | 101.8 | -51% | N/A | 2,297 | -35% | N/A | 52,180 | 4% | N/A |

Source: CNIA, China Customs, SMM Research & Consulting

The monthly output for January and February shown above is based on SMM estimates, because the NBS only released total output for the first two months. Of these, output of refined copper, copper semis, aluminum, alumina, refined lead, and refined zinc is estimated according to SMM operating rate surveys, and output of copper concentrate, aluminum semis, lead concentrate, zinc concentrate, refined nickel, refined tin and tin ore is calculated based on the number of days in the affected month.

China's Bauxite&Alumina&Aluminum Apparent Consumption, Jan. 2015 - Oct. 2016 (Tons in Thousands, Percent) (continue)

| | Production | | | Import | | | Export | | | Net Imp/(Exp) | | | App. Con. | | |
|-----------------|------------|-------|-------|--------|-------|-------|--------|-------|-------|---------------|-------|-------|-----------|-------|-------|
| | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM |
| Jan 15 | 2,439 | 23% | 12% | 5.2 | -90% | 181% | 0.6 | -94% | -37% | 5 | -90% | 397% | 2,444 | 21% | 12% |
| Feb 15 | 2,203 | 23% | -10% | 6.6 | -88% | 27% | 1.1 | -78% | 89% | 5.5 | -89% | 19% | 2,209 | 20% | -10% |
| Mar 15 | 2,563 | 29% | 16% | 10.6 | -74% | 61% | 15.6 | 75% | 1323% | -5.0 | -115% | -191% | 2,558 | 27% | 16% |
| Apr 15 | 2,587 | 37% | 1% | 17.5 | -50% | 65% | 1.6 | -85% | -90% | 15.9 | -34% | -419% | 2,603 | 36% | 2% |
| May 15 | 2,668 | 41% | 3% | 6.7 | -72% | -62% | 0.6 | -97% | -62% | 6.1 | 60% | -62% | 2,674 | 41% | 3% |
| Jun 15 | 2,756 | 41% | 3% | 7.1 | -52% | 5% | 0.9 | -84% | 43% | 6.2 | -31% | 2% | 2,762 | 41% | 3% |
| Jul 15 | 2,720 | 38% | -1% | 15.5 | 10% | 119% | 1.6 | -80% | 83% | 13.9 | 125% | 124% | 2,734 | 38% | -1% |
| Aug 15 | 2,749 | 36% | 1% | 21.8 | 157% | 41% | 0.7 | -94% | -54% | 21.1 | -550% | 52% | 2,770 | 37% | 1% |
| Sep 15 | 2,716 | 33% | -1% | 10.6 | 98% | -51% | 0.2 | -97% | -70% | 10.4 | -512% | -51% | 2,726 | 34% | -2% |
| Oct 15 | 2,675 | 28% | -1% | 34.9 | 507% | 228% | 1.2 | -66% | 433% | 33.8 | 1354% | 224% | 2,709 | 30% | -1% |
| Nov 15 | 2,683 | 26% | 0% | 11.7 | 138% | -67% | 2.6 | -4% | 125% | 9.0 | 319% | -73% | 2,692 | 26% | -1% |
| Dec 15 | 2,531 | 16% | -6% | 4.5 | 141% | -62% | 3.5 | 281% | 33% | 1.0 | 3% | -89% | 2,532 | 16% | -6% |
| Aluminum Jan 16 | 2,437 | 0% | -4% | 6.5 | 25% | 46% | 5.2 | 787% | 47% | 1 | -71% | 42% | 2,438 | 0% | -4% |
| Feb 16 | 2,280 | 3% | -6% | 4.3 | -35% | -34% | 3.0 | 172% | -42% | 1 | -76% | -2% | 2,281 | 3% | -6% |
| Mar 16 | 2,618 | 2% | 15% | 3.3 | -69% | -23% | 5.2 | -67% | 74% | (2) | -63% | -239% | 2,616 | 2% | 15% |
| Apr 16 | 2,569 | -1% | -2% | 4.9 | -72% | 47% | 0.2 | -91% | -97% | 5 | -70% | -355% | 2,573 | -1% | -2% |
| May 16 | 2,675 | 0% | 4% | 2.0 | -71% | -60% | 0.0 | -95% | -81% | 2 | -68% | -59% | 2,677 | 0% | 4% |
| Jun 16 | 2,686 | -3% | 0% | 13.9 | 96% | 604% | 1.1 | 21% | 3583% | 13 | 107% | 559% | 2,699 | -2% | 1% |
| Jul 16 | 2,659 | -2% | -1% | 18.8 | 21% | 35% | 1.1 | -31% | 4% | 18 | 27% | 38% | 2,676 | -2% | -1% |
| Aug 16 | 2,713 | -1% | 2% | 10.0 | -54% | -47% | 0.8 | 6% | -29% | 9 | -56% | -48% | 2,722 | -2% | 2% |
| Sep 16 | 2,751 | 1% | 1% | 13.0 | 22% | 30% | 0.2 | -21% | -78% | 13 | 23% | 39% | 2,764 | 1% | 2% |
| Oct 16 | 2,727 | 2% | -1% | 10.6 | -70% | -18% | 0.0 | -98% | -84% | 11 | -69% | -17% | 2,738 | 1% | -1% |
| 2016 Annualized | 26,115 | 0% | N/A | 87.4 | -36% | N/A | 16.7 | -31% | N/A | 70.7 | -37% | N/A | 26,186 | 0% | N/A |

Source: CNIA, China Customs, SMM Research & Consulting

The monthly output for January and February shown above is based on SMM estimates, because the NBS only released total output for the first two months. Of these, output of refined copper, copper semis, aluminum, alumina, refined lead, and refined zinc is estimated according to SMM operating rate surveys, and output of copper concentrate, aluminum semis, lead concentrate, zinc concentrate, refined nickel, refined tin and tin ore is calculated based on the number of days in the affected month.

Appendix 4:

China's Zinc Concentrate&Zinc Apparent Consumption, Jan. 2015 - Oct. 2016 (Tons in Thousands, Percent)

| | Production | | | Import | | | Export | | | Net Imp/(Exp) | | | App. Con. | | |
|------------------|------------|-------|-------|---------|-------|-------|--------|---------|-------|---------------|--------|-------|-----------|-------|-------|
| | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM |
| Zinc Concentrate | | | | | | | | | | | | | | | |
| Jan 15 | 338.5 | 8% | -26% | 286.9 | 29% | -11% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Feb 15 | 178.1 | -35% | -47% | 203.5 | 17% | -29% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Mar 15 | 428.9 | -12% | 141% | 237.3 | 54% | 17% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Apr 15 | 427.0 | -8% | 0% | 233.3 | 85% | -2% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| May 15 | 463.9 | -11% | 9% | 224.9 | 110% | -4% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Jun 15 | 489.4 | -14% | 5% | 239.8 | 51% | 7% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Jul 15 | 437.0 | -9% | -11% | 302.3 | 83% | 26% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Aug 15 | 444.3 | -9% | 2% | 291.5 | 102% | -4% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Sep 15 | 438.3 | -15% | -1% | 347.4 | 59% | 19% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Oct 15 | 388.2 | -19% | -11% | 320.5 | 44% | -8% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Nov 15 | 380.4 | -21% | -2% | 326.4 | 73% | 2% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dec 15 | 400.3 | -13% | 5% | 231.2 | -28% | -29% | #N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 2016 Annualized | 3,850 | -5% | N/A | 1,552.1 | -42% | N/A | #N/A | N/A | N/A | #N/A | #N/A | N/A | #N/A | #N/A | N/A |
| Zinc | | | | | | | | | | | | | | | |
| Jan 15 | 511.2 | 19% | -5% | 23.7 | -74% | 36% | 16.2 | 3723% | 7% | 7.5 | -92% | 221% | 519 | 0% | -4% |
| Feb 15 | 455.9 | 61% | -11% | 17.3 | -55% | -27% | 10.4 | 520000% | -36% | 6.9 | -82% | -8% | 463 | 44% | -11% |
| Mar 15 | 491.0 | 12% | 8% | 40.9 | -40% | 136% | 12.9 | #DIV/0! | 24% | 28.0 | -59% | 306% | 519 | 2% | 12% |
| Apr 15 | 521.7 | 15% | 6% | 51.2 | -21% | 25% | 12.7 | 5591% | -1% | 38.5 | -40% | 37% | 560 | 8% | 8% |
| May 15 | 531.5 | 15% | 2% | 44.6 | -8% | -13% | 7.5 | 1961% | -41% | 37.1 | -23% | -4% | 569 | 12% | 2% |
| Jun 15 | 559.5 | 14% | 5% | 19.8 | -71% | -55% | 11.2 | 212% | 50% | 8.6 | -87% | -77% | 568 | 3% | 0% |
| Jul 15 | 506.7 | -2% | -9% | 34.4 | -17% | 73% | 9.8 | -2% | -13% | 24.6 | -22% | 185% | 531 | -3% | -6% |
| Aug 15 | 531.0 | 9% | 5% | 33.7 | -42% | -2% | 5.9 | -72% | -40% | 27.8 | -26% | 13% | 559 | 7% | 5% |
| Sep 15 | 536.7 | 6% | 1% | 41.4 | 44% | 23% | 4.6 | -82% | -22% | 36.7 | 977% | 32% | 573 | 12% | 3% |
| Oct 15 | 528.9 | 2% | -1% | 72.3 | 189% | 75% | 2.3 | -91% | -50% | 70.0 | -9495% | 91% | 599 | 16% | 4% |
| Nov 15 | 536.5 | -2% | 1% | 69.6 | 268% | -4% | 1.9 | -94% | -20% | 67.8 | -758% | -3% | 604 | 12% | 1% |
| Dec 15 | 485.7 | -10% | -9% | 94.4 | 441% | 36% | 0.4 | -97% | -77% | 94.0 | 3936% | 39% | 580 | 7% | -4% |
| 2016 Annualized | 5,153 | 0% | N/A | 375.5 | -1% | N/A | 17.2 | -82% | N/A | 358.4 | 25% | N/A | 5,511 | 1% | N/A |
| Jan 16 | 476.5 | -7% | -2% | 59.3 | 150% | -37% | 1.0 | -94% | 133% | 58.3 | 679% | -38% | 535 | 3% | -8% |
| Feb 16 | 467.3 | 2% | -2% | 44.7 | 158% | -25% | 0.1 | -99% | -93% | 44.6 | 548% | -23% | 512 | 11% | -4% |
| Mar 16 | 501.6 | 2% | 7% | 77.0 | 88% | 72% | 3.6 | -72% | 4781% | 73.4 | 162% | 65% | 575 | 11% | 12% |
| Apr 16 | 503.9 | -3% | 0% | 39.1 | -24% | -49% | 2.1 | -84% | -41% | 37.0 | -4% | -50% | 541 | -3% | -6% |
| May 16 | 533.4 | 0% | 6% | 39.2 | -12% | 0% | 2.0 | -74% | -6% | 37.2 | 0% | 0% | 571 | 0% | 5% |
| Jun 16 | 541.1 | -3% | 1% | 32.6 | 65% | -17% | 2.4 | -79% | 22% | 30.2 | 251% | -19% | 571 | 1% | 0% |
| Jul 16 | 506.4 | 0% | -6% | 16.8 | -51% | -48% | 2.1 | -78% | -10% | 14.7 | -40% | -51% | 521 | -2% | -9% |
| Aug 16 | 516.7 | -3% | 2% | 25.3 | -25% | 50% | 1.3 | -78% | -39% | 24.0 | -14% | 64% | 541 | -3% | 4% |
| Sep 16 | 551.0 | 3% | 7% | 16.5 | -60% | -35% | 1.5 | -69% | 12% | 15.0 | -59% | -37% | 566 | -1% | 5% |
| Oct 16 | 554.9 | 5% | 1% | 25.0 | -65% | 52% | 1.2 | -49% | -18% | 23.8 | -66% | 59% | 579 | -3% | 2% |
| 2016 Annualized | 5,153 | 0% | N/A | 375.5 | -1% | N/A | 17.2 | -82% | N/A | 358.4 | 25% | N/A | 5,511 | 1% | N/A |

Source: CNIA, China Customs, SMM Research & Consulting

The monthly output for January and February shown above is based on SMM estimates, because the NBS only released total output for the first two months. Of these, output of refined copper, copper semis, aluminum, alumina, refined lead, and refined zinc is estimated according to SMM operating rate surveys, and output of copper concentrate, aluminum semis, lead concentrate, zinc concentrate, refined nickel, refined tin and tin ore is calculated based on the number of days in the affected month.

Appendix 5:

China's Lead Concentrate&Lead Apparent Consumption, Jan. 2015 - Oct. 2016 (Tons in Thousands, Percent)

| | Production | | | Import | | | Export | | | Net Imp/(Exp) | | | App. Con. | | | |
|------------------|------------|-------|-------|---------|-------|-------|---------|-------|-------|---------------|-------|-------|-----------|-------|-------|------|
| | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | |
| Lead Concentrate | Jan 15 | 165.8 | 10% | -42% | 130.9 | -12% | -23% | 0.0 | N/A | N/A | 130.9 | -12% | -20% | 297 | -1% | -34% |
| | Feb 15 | 66.3 | -51% | -60% | 121.5 | 39% | -7% | 0.0 | N/A | N/A | 121.5 | 39% | -7% | 188 | -16% | -37% |
| | Mar 15 | 191.0 | -18% | 188% | 151.6 | -3% | 25% | 1.0 | N/A | N/A | 150.6 | -4% | 24% | 342 | -13% | 82% |
| | Apr 15 | 211.9 | -6% | 11% | 126.9 | 31% | -16% | 2.0 | N/A | N/A | 124.9 | 29% | -17% | 337 | 5% | -1% |
| | May 15 | 265.8 | 3% | 25% | 132.9 | -5% | 5% | 3.0 | N/A | N/A | 129.9 | -7% | 4% | 396 | -1% | 17% |
| | Jun 15 | 250.2 | -21% | -6% | 103.7 | -34% | -22% | 4.0 | N/A | N/A | 99.7 | -36% | -23% | 350 | -26% | -12% |
| | Jul 15 | 224.5 | -18% | -10% | 130.5 | -21% | 26% | 5.0 | N/A | N/A | 125.5 | -23% | 26% | 350 | -20% | 0% |
| | Aug 15 | 221.3 | -21% | -1% | 132.3 | -14% | 1% | 6.0 | N/A | N/A | 126.3 | -16% | 1% | 348 | -19% | -1% |
| | Sep 15 | 229.3 | -22% | 4% | 231.6 | 14% | 75% | 7.0 | N/A | N/A | 224.6 | 13% | 78% | 454 | -8% | 31% |
| | Oct 15 | 177.6 | -33% | -23% | 205.0 | 16% | -11% | 8.0 | N/A | N/A | 197.0 | 15% | -12% | 375 | -14% | -17% |
| | Nov 15 | 181.4 | -35% | 2% | 246.2 | 53% | 20% | 9.0 | N/A | N/A | 237.2 | 53% | 20% | 419 | -4% | 12% |
| | Dec 15 | 181.7 | -36% | 0% | 188.9 | 11% | -23% | 10.0 | N/A | N/A | 178.9 | 10% | -25% | 361 | -19% | -14% |
| | Jan 16 | 124.6 | -25% | -31% | 94.9 | -27% | -50% | 0.0 | N/A | N/A | 94.9 | -27% | -50% | 219 | -26% | -41% |
| | Feb 16 | 90.2 | 36% | -28% | 130.3 | 7% | 37% | 0.0 | N/A | N/A | 130.3 | 7% | 37% | 221 | 17% | 1% |
| | Mar 16 | 217.2 | 14% | 141% | 110.5 | -27% | -15% | 0.0 | N/A | N/A | 110.5 | -27% | -15% | 328 | -4% | 49% |
| | Apr 16 | 185.4 | -13% | -15% | 93.1 | -27% | -16% | 0.0 | N/A | N/A | 93.1 | -27% | -16% | 279 | -18% | -15% |
| | May 16 | 195.1 | -27% | 5% | 104.3 | -21% | 12% | 0.0 | N/A | N/A | 104.3 | -21% | 12% | 299 | -25% | 7% |
| | Jun 16 | 214.7 | -14% | 10% | 144.1 | 39% | 38% | 0.0 | N/A | N/A | 144.1 | 39% | 38% | 359 | 1% | 20% |
| | Jul 16 | 190.8 | -15% | -11% | 102.9 | -21% | -29% | 0.0 | N/A | N/A | 102.9 | -21% | -29% | 294 | -17% | -18% |
| | Aug 16 | 198.7 | -10% | 4% | 152.5 | 15% | 48% | 0.0 | N/A | N/A | 152.5 | 15% | 48% | 351 | -1% | 20% |
| Sep 16 | 221.2 | -4% | 11% | 108.5 | -53% | -29% | 0.0 | N/A | N/A | 108.5 | -53% | -29% | 330 | -28% | -6% | |
| Oct 16 | 220.3 | 24% | 0% | 106.5 | -48% | -2% | 1.0 | N/A | N/A | 105.5 | -49% | -3% | 326 | -15% | -1% | |
| 2016 Annualized | 1,858.4 | -7% | N/A | 1,147.7 | -22% | N/A | 1.0 | N/A | N/A | 1,146.7 | -22% | N/A | 3,005 | -13% | N/A | |
| Lead | Jan 15 | 353.7 | -8% | 9% | 0.0 | -54% | 300% | 2.2 | 50% | -44% | -2.1 | 52% | -44% | 352 | -8% | 10% |
| | Feb 15 | 301.3 | 4% | -15% | 0.0 | 1025% | 275% | 3.0 | -12% | 40% | -3.0 | -13% | 38% | 298 | 4% | -15% |
| | Mar 15 | 340.2 | -10% | 13% | 0.0 | -94% | -93% | 5.6 | 125% | 87% | -5.6 | 129% | 90% | 335 | -11% | 12% |
| | Apr 15 | 332.0 | 2% | -2% | 0.0 | -63% | 0% | 6.4 | 86% | 15% | -6.4 | 87% | 15% | 326 | 1% | -3% |
| | May 15 | 357.4 | -5% | 8% | 0.0 | 117% | 333% | 4.9 | 114% | -25% | -4.8 | 114% | -25% | 353 | -6% | 8% |
| | Jun 15 | 382.2 | -6% | 7% | 0.0 | -58% | 38% | 4.4 | 69% | -9% | -4.4 | 71% | -9% | 378 | -6% | 7% |
| | Jul 15 | 319.7 | -9% | -16% | 0.0 | 8% | -22% | 4.1 | 3% | -7% | -4.1 | 3% | -7% | 316 | -9% | -16% |
| | Aug 15 | 318.6 | -8% | 0% | 0.1 | 1213% | 650% | 3.9 | 28% | -5% | -3.8 | 25% | -7% | 315 | -9% | 0% |
| | Sep 15 | 313.6 | -11% | -2% | 0.2 | 4240% | 107% | 5.3 | 116% | 36% | -5.1 | 108% | 34% | 309 | -12% | -2% |
| | Oct 15 | 322.1 | -10% | 3% | 0.1 | 178% | -71% | 2.3 | 91% | -56% | -2.2 | 89% | -56% | 320 | -11% | 4% |
| | Nov 15 | 340.8 | -11% | 6% | 0.2 | 920% | 219% | 2.4 | -49% | 2% | -2.2 | -54% | -4% | 339 | -10% | 6% |
| | Dec 15 | 313.8 | -3% | -8% | 0.3 | 9800% | 46% | 5.3 | 36% | 122% | -5.0 | 29% | 129% | 309 | -4% | -9% |
| | Jan 16 | 387.6 | 10% | 23% | 0.0 | -100% | -100% | 3.2 | 49% | -39% | -3.2 | 50% | -35% | 384 | 9% | 24% |
| | Feb 16 | 193.8 | -36% | -50% | 0.0 | -93% | #DIV/0! | 3.2 | 6% | 0% | -3.2 | 8% | -1% | 191 | -36% | -50% |
| | Mar 16 | 348.5 | 2% | 80% | 0.0 | 100% | 100% | 4.9 | -14% | 52% | -4.8 | -14% | 52% | 344 | 3% | 80% |
| | Apr 16 | 340.8 | 3% | -2% | 0.1 | 3333% | 1617% | 0.8 | -88% | -84% | -0.7 | -90% | -86% | 340 | 4% | -1% |
| | May 16 | 347.0 | -3% | 2% | 0.0 | 0% | -87% | 2.3 | -53% | 198% | -2.3 | -53% | 242% | 345 | -2% | 1% |
| | Jun 16 | 369.0 | -3% | 6% | 0.0 | -50% | -31% | 0.6 | -86% | -73% | -0.6 | -86% | -73% | 368 | -2% | 7% |
| | Jul 16 | 369.0 | 15% | 0% | 0.0 | -64% | -44% | 0.1 | -98% | -85% | -0.1 | -98% | -86% | 369 | 17% | 0% |
| | Aug 16 | 350.9 | 10% | -5% | 0.0 | -72% | 480% | 0.0 | -100% | -97% | 0.0 | -101% | -129% | 351 | 11% | -5% |
| Sep 16 | 358.2 | 14% | 2% | 0.1 | -76% | 83% | 0.1 | -98% | 3367% | -0.1 | -99% | -296% | 358 | 16% | 2% | |
| Oct 16 | 389.5 | 21% | 9% | 0.0 | -69% | -62% | 0.0 | -100% | -92% | 0.0 | -101% | -124% | 390 | 22% | 9% | |
| 2016 Annualized | 3,454 | 3% | N/A | 0.2 | -51% | N/A | 15.1 | -64% | N/A | -14.9 | -64% | N/A | 3,439 | 4% | N/A | |

Source: CNIA, China Customs, SMM Research & Consulting

The monthly output for January and February shown above is based on SMM estimates, because the NBS only released total output for the first two months. Of these, output of refined copper, copper semis, aluminum, alumina, refined lead, and refined zinc is estimated according to SMM operating rate surveys, and output of copper concentrate, aluminum semis, lead concentrate, zinc concentrate, refined nickel, refined tin and tin ore is calculated based on the number of days in the affected month.

Appendix 6:

China's Nickel Concentrate& Nickel Apparent Consumption, Jan. 2015 - Oct. 2016 (Tons in Thousands, Percent)

| | Production | | | Import | | | Export | | | Net Imp/(Exp) | | | App. Con. | | |
|-----------------|------------|-------|-------|--------|-------|-------|--------|-------|-------|---------------|--------|-------|-----------|-------|-------|
| | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM | kt | % YoY | % MoM |
| Nickel Ore | | | | | | | | | | | | | | | |
| Jan 15 | - | - | - | 1,153 | -84% | -53% | - | - | - | 1,153 | -84% | -53% | 1,153 | -84% | -53% |
| Feb 15 | - | - | - | 949 | -73% | -18% | - | - | - | 949 | -73% | -18% | 949 | -73% | -18% |
| Mar 15 | - | - | - | 1,733 | -24% | 83% | - | - | - | 1,733 | -24% | 83% | 1,733 | -24% | 83% |
| Apr 15 | - | - | - | 3,081 | 38% | 78% | - | - | - | 3,081 | 38% | 78% | 3,081 | 38% | 78% |
| May 15 | - | - | - | 3,247 | -20% | 5% | - | - | - | 3,247 | -20% | 5% | 3,247 | -20% | 5% |
| Jun 15 | - | - | - | 4,323 | 18% | 33% | - | - | - | 4,323 | 18% | 33% | 4,323 | 18% | 33% |
| Jul 15 | - | - | - | 4,980 | -2% | 15% | - | - | - | 4,980 | -2% | 15% | 4,980 | -2% | 15% |
| Aug 15 | - | - | - | 3,901 | -28% | -22% | - | - | - | 3,901 | -28% | -22% | 3,901 | -28% | -22% |
| Sep 15 | - | - | - | 3,987 | -14% | 2% | - | - | - | 3,987 | -14% | 2% | 3,987 | -14% | 2% |
| Oct 15 | - | - | - | 3,304 | -20% | -17% | - | - | - | 3,304 | -20% | -17% | 3,304 | -20% | -17% |
| Nov 15 | - | - | - | 2,775 | -3% | -16% | - | - | - | 2,775 | -3% | -16% | 2,775 | -3% | -16% |
| Dec 15 | - | - | - | 1,735 | -30% | -37% | - | - | - | 1,735 | -30% | -37% | 1,735 | -30% | -37% |
| Jan 16 | - | - | - | 1,042 | -10% | -40% | - | - | - | 1,042 | -10% | -40% | 1,042 | -10% | -40% |
| Feb 16 | - | - | - | 629 | -34% | -40% | - | - | - | 629 | -34% | -40% | 629 | -34% | -40% |
| Mar 16 | - | - | - | 1,493 | -14% | 137% | - | - | - | 1,493 | -14% | 137% | 1,493 | -14% | 137% |
| Apr 16 | - | - | - | 1,369 | -56% | -8% | - | - | - | 1,369 | -56% | -8% | 1,369 | -56% | -8% |
| May 16 | - | - | - | 3,081 | -5% | 125% | - | - | - | 3,081 | -5% | 125% | 3,081 | -5% | 125% |
| Jun 16 | - | - | - | 3,523 | -19% | 14% | - | - | - | 3,523 | -19% | 14% | 3,523 | -19% | 14% |
| Jul 16 | - | - | - | 3,285 | -34% | -7% | - | - | - | 3,285 | -34% | -7% | 3,285 | -34% | -7% |
| Aug 16 | - | - | - | 4,279 | 10% | 30% | - | - | - | 4,279 | 10% | 30% | 4,279 | 10% | 30% |
| Sep 16 | - | - | - | 4,956 | 24% | 16% | - | - | - | 4,956 | 24% | 16% | 4,956 | 24% | 16% |
| Oct 16 | - | - | - | 3,488 | 6% | -30% | - | - | - | 3,488 | 6% | -30% | 3,488 | 6% | -30% |
| 2016 Annualized | - | - | - | 27,145 | -11% | N/A | 0.0 | N/A | N/A | 27,145 | -11% | N/A | 27,145 | -11% | N/A |
| Nickel | | | | | | | | | | | | | | | |
| Jan 15 | 26.2 | 8% | -25% | 8.0 | -56% | 43% | 5.7 | 185% | -12% | 2.3 | -86% | -344% | 28 | -30% | -16% |
| Feb 15 | 27.5 | 25% | 5% | 10.5 | 33% | 31% | 3.6 | 36% | -38% | 6.9 | 32% | 202% | 34 | 26% | 21% |
| Mar 15 | 28.3 | -1% | 3% | 5.8 | -52% | -45% | 3.4 | -49% | -5% | 2.4 | -56% | -65% | 31 | -10% | -11% |
| Apr 15 | 29.0 | 1% | 2% | 18.2 | 12% | 216% | 6.7 | -22% | 99% | 11.5 | 49% | 382% | 41 | 11% | 32% |
| May 15 | 30.1 | 8% | 4% | 23.5 | 130% | 29% | 6.3 | -14% | -7% | 17.2 | 483% | 50% | 47 | 54% | 17% |
| Jun 15 | 33.9 | 2% | 12% | 38.8 | 244% | 65% | 1.0 | -95% | -85% | 37.8 | -656% | 119% | 72 | 171% | 51% |
| Jul 15 | 30.7 | -3% | -9% | 47.5 | 168% | 22% | 2.4 | -86% | 149% | 45.1 | 63377% | 19% | 76 | 140% | 6% |
| Aug 15 | 31.9 | -6% | 4% | 20.6 | 115% | -57% | 2.6 | -85% | 8% | 18.0 | -317% | -60% | 50 | 95% | -34% |
| Sep 15 | 28.4 | -16% | -11% | 32.8 | 278% | 59% | 2.5 | -75% | -4% | 30.3 | -2466% | 68% | 59 | 81% | 18% |
| Oct 15 | 31.0 | -10% | 9% | 33.7 | 651% | 3% | 3.9 | -59% | 57% | 29.8 | -691% | -2% | 61 | 106% | 4% |
| Nov 15 | 28.0 | -15% | -9% | 27.6 | 222% | -18% | 1.6 | -80% | -59% | 26.0 | 3942% | -13% | 54 | 61% | -11% |
| Dec 15 | 18.0 | -48% | -36% | 36.5 | 554% | 32% | 1.3 | -79% | -15% | 35.2 | -3849% | 35% | 53 | 56% | -2% |
| Jan 16 | 17.3 | -34% | -4% | 35.1 | 338% | -4% | 1.2 | -80% | -14% | 33.9 | 1384% | -4% | 51 | 80% | -4% |
| Feb 16 | 17.0 | -38% | -2% | 30.3 | 189% | -14% | 0.6 | -83% | -47% | 29.7 | 330% | -13% | 47 | 36% | -9% |
| Mar 16 | 21.6 | -24% | 27% | 43.2 | 649% | 43% | 0.7 | -78% | 20% | 42.5 | 1679% | 43% | 64 | 109% | 37% |
| Apr 16 | 22.1 | -24% | 3% | 49.0 | 169% | 13% | 0.3 | -95% | -58% | 48.7 | 323% | 15% | 71 | 75% | 11% |
| May 16 | 20.3 | -32% | -8% | 37.6 | 60% | -23% | 2.3 | -62% | 657% | 35.2 | 104% | -28% | 56 | 17% | -22% |
| Jun 16 | 20.1 | -41% | -1% | 37.1 | -4% | -1% | 1.1 | 10% | -55% | 36.1 | -5% | 2% | 56 | -22% | 1% |
| Jul 16 | 18.6 | -39% | -7% | 28.2 | -41% | -24% | 1.4 | -41% | 34% | 26.8 | -41% | -26% | 45 | -40% | -19% |
| Aug 16 | 17.6 | -45% | -5% | 29.8 | 45% | 6% | 2.0 | -24% | 40% | 27.8 | 54% | 4% | 45 | -9% | 0% |
| Sep 16 | 17.0 | -40% | -3% | 29.4 | -10% | -2% | 1.9 | -23% | -3% | 27.4 | -9% | -1% | 44 | -24% | -2% |
| Oct 16 | 16.2 | -48% | -5% | 15.0 | -55% | -49% | 1.1 | -72% | -43% | 13.9 | -53% | -49% | 30 | -50% | -32% |
| 2016 Annualized | 188.0 | -37% | N/A | 334.7 | 40% | N/A | 12.6 | -67% | N/A | 322.0 | 60% | N/A | 510 | 2% | N/A |

Source: CNIA, China Customs, SMM Research & Consulting

Appendix 7:

Figures

| | kt | Oct/16 | Sep/16 | MoM |
|------------------------|--------------------|--------|--------|--------|
| Copper | Production | | | |
| | Copper Concentrate | 175.8 | 174.0 | 1.0% |
| | Refined Copper | 736.7 | 724.9 | 1.6% |
| | Imports | | | |
| | Copper Concentrate | 1363.6 | 1385.2 | -1.6% |
| | Refined Copper | 189.8 | 242.8 | -21.8% |
| | Scrap Copper | 235.6 | 301.1 | -21.7% |
| | Exports | | | |
| | Refined Copper | 22.9 | 27.8 | -17.7% |
| Aluminum | Production | | | |
| | Alumina | 5,367 | 5,183 | 3.6% |
| | Aluminum | 2,727 | 2,751 | -0.9% |
| | Imports | | | |
| | Bauxite | 4,278 | 4,467 | -4.2% |
| | Alumina | 142.5 | 128.7 | 10.7% |
| | Aluminum | 10.6 | 13.0 | -18.4% |
| | Scrap Aluminum | 146.5 | 171.6 | -14.6% |
| | Exports | | | |
| Aluminum | 0.0 | 0.2 | -83.9% | |
| Aluminum Semi-Finished | 306.1 | 330.4 | -7.3% | |
| Zinc | Production | | | |
| | Zinc Concentrate | 403.4 | 444.5 | -9.3% |
| | Zinc | 554.9 | 551.0 | 0.7% |
| | Imports | | | |
| | Zinc Concentrate | 138.5 | 152.5 | -9.2% |
| | Zinc | 25.0 | 16.5 | 51.8% |
| Exports | | | | |
| Zinc | 1.2 | 1.5 | -18.5% | |
| Lead | Production | | | |
| | Lead Concentrate | 220.3 | 221.2 | -0.4% |
| | Lead | 389.5 | 358.2 | 8.7% |
| | Imports | | | |
| | Lead Concentrate | 106.5 | 108.5 | -1.8% |
| Exports | | | | |
| Lead | 0.0 | 0.1 | -92.3% | |
| Nickel | Production | | | |
| | Nickel | 16.2 | 17.0 | -4.7% |
| | Imports | | | |
| | Nickel Ore | 3,488 | 4,956 | -29.6% |
| | Nickel | 15.0 | 29.4 | -48.8% |
| Exports | | | | |
| Nickel | 1.1 | 1.9 | -43.0% | |

Source: SMM, China Customs, CNIA, NBS

Appendix 8:

China Steel Production, Export and Import (million mt)

| | Crude Steel | Iron Ore | | Finished Steel Quantity | | | | Finished Steel Growth Rate (YoY) | | | |
|-----------------|-------------|------------|---------|-------------------------|--------|--------|---------------|----------------------------------|--------|--------|---------------|
| | Production | Production | Import | Production | Import | Export | Net Imp/(Exp) | Production | Import | Export | Net Imp/(Exp) |
| 2001 | 148.93 | 217.54 | - | 157.45 | 17.22 | 4.74 | 12.48 | 20% | 8% | -24% | 28% |
| 2002 | 181.55 | 230.09 | 111.49 | 192.18 | 24.49 | 5.45 | 19.03 | 22% | 42% | 15% | 53% |
| 2003 | 220.12 | 257.50 | 148.20 | 235.82 | 37.17 | 6.96 | 30.21 | 23% | 52% | 28% | 59% |
| 2004 | 272.46 | 289.77 | 208.08 | 297.39 | 29.30 | 14.23 | 15.07 | 26% | -21% | 105% | -50% |
| 2005 | 349.36 | 396.75 | 275.24 | 371.17 | 25.82 | 20.52 | 5.29 | 25% | -12% | 44% | -65% |
| 2006 | 418.78 | 573.97 | 326.33 | 466.85 | 18.51 | 43.01 | (24.50) | 26% | -28% | 110% | n.a |
| 2007 | 487.83 | 698.03 | 384.16 | 560.09 | 16.88 | 62.61 | (45.73) | 20% | -9% | 46% | -87% |
| 2008 | 497.88 | 798.19 | 442.79 | 579.05 | 15.43 | 59.26 | (43.83) | 3% | -9% | -5% | 4% |
| 2009 | 566.40 | 874.65 | 628.35 | 689.40 | 17.40 | 24.19 | (6.79) | 19% | 13% | -59% | 85% |
| 2010 | 626.49 | 1,064.74 | 619.08 | 797.22 | 16.45 | 42.56 | (26.11) | 16% | -5% | 76% | -285% |
| 2011 | 684.28 | 1,314.98 | 686.99 | 878.46 | 15.58 | 48.91 | (33.33) | 10% | -5% | 15% | -28% |
| 2012 | 708.78 | 1,328.52 | 745.49 | 958.72 | 13.65 | 55.80 | (42.15) | 9% | -12% | 14% | -26% |
| 2013 | 774.58 | 1,436.35 | 820.30 | 1067.30 | 14.07 | 62.34 | (48.27) | 11% | 3% | 12% | -15% |
| 2014 | 813.29 | 1,497.75 | 933.11 | 1121.98 | 14.43 | 93.80 | (79.36) | 5% | 3% | 50% | -64% |
| 2015 | 800.53 | 1,375.00 | 953.32 | 1123.94 | 12.78 | 112.42 | (99.64) | 0% | -11% | 20% | -26% |
| Jan 15 | 68.59 | 87.76 | 78.57 | 88.31 | 1.15 | 10.29 | (9.14) | 1% | -15% | 52% | -69% |
| Feb 15 | 61.95 | 87.76 | 67.94 | 79.76 | 0.87 | 7.80 | (6.93) | -2% | -11% | 63% | -81% |
| Mar 15 | 69.48 | 105.10 | 80.51 | 97.56 | 1.21 | 7.70 | (6.49) | 3% | -3% | 14% | -18% |
| Apr 15 | 68.91 | 104.10 | 80.21 | 96.41 | 1.20 | 8.54 | (7.34) | 4% | -8% | 13% | -18% |
| May 15 | 69.95 | 117.66 | 70.87 | 98.48 | 1.05 | 9.20 | (8.15) | 2% | -14% | 14% | -19% |
| Jun 15 | 68.95 | 128.48 | 74.96 | 98.43 | 1.17 | 8.89 | (7.72) | 0% | 4% | 26% | -30% |
| Jul 15 | 65.84 | 126.19 | 86.10 | 92.30 | 1.05 | 9.73 | (8.68) | -3% | -14% | 21% | -27% |
| Aug 15 | 66.94 | 123.81 | 74.12 | 94.49 | 1.02 | 9.73 | (8.71) | -1% | -14% | 25% | -32% |
| Sep 15 | 66.12 | 131.56 | 86.12 | 94.69 | 1.01 | 11.25 | (10.24) | -1% | -26% | 32% | -43% |
| Oct 15 | 66.12 | 125.35 | 75.52 | 94.27 | 0.95 | 9.02 | (8.07) | -1% | -13% | 5% | -8% |
| Nov 15 | 63.32 | 117.53 | 82.13 | 93.96 | 0.92 | 9.61 | (8.69) | 2% | -19% | -1% | -1% |
| Dec 15 | 64.37 | 119.67 | 96.27 | 95.28 | 1.18 | 10.66 | (9.48) | -3% | -2% | 5% | -6% |
| Jan 16 | 62.55 | 83.64 | 82.19 | 83.84 | 0.93 | 9.74 | (8.81) | -5% | -19% | -5% | 4% |
| Feb 16 | 58.52 | 78.24 | 73.61 | 78.44 | 0.93 | 8.11 | (7.18) | -2% | 7% | 4% | -4% |
| Mar 16 | 70.65 | 98.16 | 85.77 | 99.23 | 1.27 | 9.98 | (8.71) | 2% | 5% | 30% | -34% |
| Apr 16 | 69.42 | 102.57 | 83.92 | 96.68 | 1.10 | 9.08 | (7.98) | 0% | -8% | 6% | -9% |
| May 16 | 70.50 | 107.54 | 86.75 | 99.46 | 1.09 | 9.42 | (8.33) | 1% | 4% | 2% | -2% |
| Jun 16 | 69.47 | 121.06 | 81.63 | 100.72 | 1.14 | 10.94 | (9.80) | 2% | -3% | 23% | -27% |
| Jul 16 | 66.81 | 115.74 | 88.40 | 95.94 | 1.13 | 10.30 | (9.17) | 4% | 8% | 6% | -6% |
| Aug 16 | 68.57 | 115.07 | 87.72 | 97.91 | 1.11 | 9.01 | (7.90) | 4% | 9% | -7% | 9% |
| Sep 16 | 68.17 | 118.93 | 92.99 | 98.09 | 1.13 | 8.80 | (7.67) | 4% | 12% | -22% | 25% |
| Oct 16 | 68.51 | 119.29 | 80.80 | 97.68 | 1.08 | 7.70 | (6.62) | 4% | 14% | -15% | 18% |
| Nov 16 | 66.29 | 116.68 | 91.98 | 95.40 | 1.11 | 8.12 | (7.01) | 2% | 21% | -16% | 19% |
| 2016 Annualized | 806.68 | 1283.90 | 1020.83 | 1138.24 | 13.11 | 110.40 | -97.29 | 1% | 3% | -2% | 2% |

Source: SMM

Note: Iron ore production means output of ROM, while Iron ore import means import volume of concentrate.

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SMM Research Team

Hotline: +86-21-5155-0322

Fax: +86-21-5155-0345

Email: service.en@smm.cn

Add: 8th FL in North Section, Building 9, Lujiazui Software Park, No. 20, Lane 91, E'Shan Road, Pudong New Area, Shanghai, 200127, China.

Web: <http://www.metal.com>

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