

Base metals ex-copper to continue to outperform

Commodities Research

Metals ex-copper to outperform on cyclical improvement

We continue to expect further base metals price differentiation over the next 12 months, with copper set to underperform relative to nickel, aluminium and zinc. While the directional views of our base metals forecasts are unchanged, we have raised our nickel, zinc and aluminium forecasts, reflecting a quicker-than-anticipated shift in the relative fundamentals of these commodities. Specifically, a cyclical upswing in demand in combination with low supply growth, following years of underinvestment in new capacity outside of China, has seen zinc and aluminium outperform in 1H14. Meanwhile nickel is being boosted by a large producer's attempts to encourage value-add capacity domestically.

Cost curves under pressure in an exploitation phase

While we have upgraded some base metals prices, major commodity markets such as copper, oil and iron ore remain impacted by the structural shift in their supply cycles – from an investment to an exploitation phase. These commodity markets have shifted into a period of strong supply growth and rising mining productivity following a decade of overinvestment in production capacity. As new capacity is exploited more efficiently, we expect industry cost curves to shift downward, reversing the cost inflation of recent years. We note that the previous exploitation phase saw commodity prices decline by c.50% in real terms over a 20-year period. In our view, this structural trend will provide the backdrop to commodity markets in the years to come. Indeed, reflecting the recent move lower in the copper cost curve, we have lowered our 2015/16 copper forecasts.

Conviction views: Bearish on iron ore, gold and copper, bullish on nickel, zinc, aluminium and palladium

We believe iron ore (-21%), gold (-20%) and copper (-12%) are the mining commodities with the greatest downside on a 12-month view. Conversely, the commodities where we are most bullish on a 12-month view are nickel (+16%), zinc (+6%), aluminium (+4%) and palladium (+3%).

Meanwhile, for the sake of simplicity, we now present LT price forecasts in 2014\$ rather than 2018\$ terms. In gold, we raise our LT real price forecast to \$1,200/oz in 2014\$ terms, on the back of longer-term cost work done by our global equities team. In bulk commodities, we downgrade our potash LT price forecast by c.20% to US\$350/t in order to better reflect the balance between pricing power and excess capacity; our iron ore, coal and mineral sands forecasts remain unchanged.

Max Layton

+44(20)7774-1105 max.layton@gs.com
Goldman Sachs International

Christian Lelong

+61(2)9321-8635 christian.lelong@gs.com
Goldman Sachs Australia Pty Ltd

Roger Yuan

+852-2978-6128 roger.yuan@gs.com
Goldman Sachs (Asia) L.L.C.

Damien Courvalin

(212) 902-3307 damien.courvalin@gs.com
Goldman, Sachs & Co.

Jeffrey Currie

(212) 357-6801 jeffrey.currie@gs.com
Goldman, Sachs & Co.

Amber Cai

+65-6654-5264 amber.cai@gs.com
Goldman Sachs (Singapore) Pte

Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html.

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Mining commodities: Some base metals to continue to outperform

We update our price forecasts for the mining commodities under our coverage (Exhibit 1). These forecasts continue to form the basis of our Global Investment Research mining equity models. *For the sake of simplicity, we now present LT price forecasts in 2014\$ rather than 2018\$ terms.*

We continue to expect further base metals price differentiation over the next 12 months, with copper set to continue to underperform relative to nickel, aluminium and zinc. While the directional views of our base metals forecasts are unchanged, we have raised our already bullish zinc, nickel and aluminium forecasts, and lowered our copper forecasts, reflecting a quicker-than-anticipated shift in the relative fundamentals of these commodities. Specifically, a cyclical upswing in demand in combination with low supply growth, following years underinvestment in new capacity outside of China, has seen zinc and aluminium outperform in 1H14, while nickel is being boosted by the attempts of a large producer (Indonesia) to encourage value-add capacity domestically.

In gold, we raise our LT price forecasts to \$1,200/oz in \$2014 terms from \$1,066 earlier. Over long time horizons, the gold price has been relatively stable in real terms, keeping pace with inflation. Accordingly we use a flat real gold price forecast assuming gold is an effective inflation hedge and increase in nominal gold prices should offset the impact from inflation. In bulk commodities, we downgrade our long-term potash price forecast by c.20% to US\$350/t in order to better reflect the balance between pricing power and excess capacity; our iron ore, coal and mineral sands price forecasts remain unchanged.

Exhibit 1: GS mining commodities price forecasts

Goldman Sachs Commodity Price Forecast Changes		2013A	2014E	2015E	2016E	2017E	Long Term (2014E Real)
Aluminium	US\$/t	1846 (1846)	1869 (1727)	2075 (1900)	2100 (2075)	2150 (2150)	2200 (2200)
Copper	US\$/t	7328 (7328)	6851 (6723)	6400 (6600)	6600 (7000)	7500 (7500)	6600 (6600)
Lead	US\$/t	2142 (2142)	2151 (2133)	2350 (2350)	2400 (2400)	2400 (2400)	2200 (2200)
Nickel	US\$/t	15021 (15021)	18676 (19335)	22000 (17000)	18000 (15000)	16000 (16000)	17000 (17000)
Zinc	US\$/t	1910 (1910)	2150 (2059)	2425 (2200)	2400 (2300)	2400 (2300)	2200 (2200)
Iron Ore ¹	US\$/t	135 (135)	107 (107)	80 (80)	82 (82)	85 (85)	80 (80)
Hard Coking Coal ²	US\$/t	148 (148)	120 (120)	133 (133)	140 (140)	145 (145)	168 (168)
Semi-soft Coal ²	US\$/t	103 (103)	84 (84)	90 (90)	95 (95)	95 (95)	100 (100)
PCI ²	US\$/t	120 (120)	99 (99)	105 (105)	110 (110)	115 (115)	122 (122)
Thermal Coal ³	US\$/t	84 (84)	75 (75)	78 (78)	80 (80)	80 (80)	77 (77)
Potash ⁴	US\$/t	405 (405)	332 (323)	310 (310)	320 (320)	340 (340)	350 (430)
Zircon ⁵	US\$/t	1233 (1233)	1125 (1125)	1200 (1200)	1250 (1250)	1300 (1300)	1464 (1464)
Rutile ⁵	US\$/t	1129 (1129)	875 (875)	900 (900)	925 (925)	950 (950)	980 (980)
Synthetic Rutile ⁵	US\$/t	983 (983)	750 (750)	775 (775)	800 (800)	825 (825)	815 (815)
Chloride Ilmenite ⁵	US\$/t	260 (260)	180 (180)	190 (190)	200 (200)	210 (210)	180 (180)
Chloride Slag ⁵	US\$/t	1008 (1008)	800 (800)	825 (825)	850 (850)	875 (875)	800 (800)
Sulphate Slag ⁵	US\$/t	854 (854)	675 (675)	700 (700)	725 (725)	750 (750)	680 (680)
Gold	US\$/oz	1413 (1413)	1195 (1195)	1200 (1200)	1200 (1200)	1200 (1200)	1200 (1066)
Platinum	US\$/oz	1481 (1481)	1439 (1451)	1425 (1506)	1500 (1575)	1575 (1650)	1500 (1500)
Palladium	US\$/oz	728 (728)	818 (785)	925 (851)	1000 (913)	1050 (1031)	900 (900)
Rhodium	US\$/oz	1066 (1066)	1041 (1091)	1100 (1200)	1200 (1250)	1200 (1300)	1100 (1100)
Oil (Brent)	US\$/bbl	109 (109)	107 (107)	100 (100)	100 (100)	100 (100)	100* (100)
Gas (Henry Hub)	US\$/MMBtu	3.71 (3.71)	4.50 (4.50)	4.25 (4.25)	4.50 (4.50)	4.50 (4.50)	4.50* (4.50)

Notes: (1) CFR China, 62% Fe fines; (2) FOB Australia (Queensland); (3) FOB Australia (Newcastle), 6,000kcal/kg NAR; (4) MOP, granulated, CFR Brazil; (5) Bulk, FOB Australia; *oil & gas long term forecasts are in nominal terms; **numbers in parentheses are previous forecasts.

Source: LME, IRESS, Bloomberg, Platts, McCloskey, TEX Report, TZMI, Johnson Matthey, Goldman Sachs Global Investment Research.

Base metals directional views broadly unchanged

Over the year to date, the LME copper price has fallen by 5%, a substantially weaker outturn than the 15% rally in LME zinc, c.23% increase in all-in aluminium prices (including a 15% increase in the LME price), and 35% increase in LME nickel prices. Looking ahead, we expect further base metals price differentiation over the next 12 months, with copper set to continue to underperform relative to nickel, aluminium and zinc, in line with the medium-term outlook we presented in our January 2014 "Mining commodities outlook".

The largest change we make to our forecasts is the upgrade to our 12-mo price forecast to \$22,000/t (from \$16,000/t) for nickel, as we push out the expected ore ban easing for those building smelters from the end of 2014, to 2H15. In copper we maintain our bearish view on the back of a once-in-20-year supply cycle and heavy exposure to the soft China property market, but push out our previous end of year forecast of \$6,200/t to mid-2015, owing to recent reported Strategic Reserves Bureau buying and low visible inventories. Our annual forecast changes are highlighted in Exhibit 1, and our short-term price changes are in Exhibit 2.

Exhibit 2: Summary of changes to our 3, 6 and 12-month base metal forecasts (\$/t)

	New	Copper	Aluminium	Nickel	Zinc	Lead
3-mo	6600	2000	22000	2250	2150	
6-mo	6600	2050	22000	2350	2300	
12-month	6200	2100	22000	2500	2400	
	Old					
3-mo	6600	1700	22000	2050	2150	
6-mo	6600	1700	22000	2050	2150	
12-month	6600	1900	16000	2200	2300	
	Change					
3-mo	0%	18%	0%	10%	0%	
6-mo	0%	21%	0%	15%	7%	
12-month	-6%	11%	38%	14%	4%	

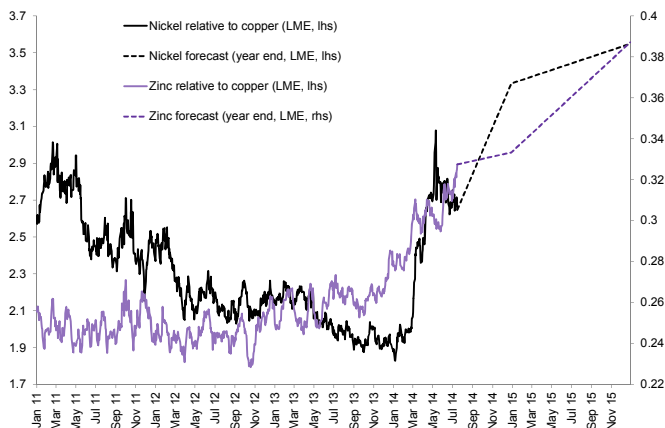
Source: Goldman Sachs Global Investment Research.

In our view the diverging base metals performance reflects copper entering a once-in-20-year price cycle, and copper's particularly large exposure to China's property market, both factors we expect will continue to affect prices in 2H14 and 2015. By contrast, in the face of a cyclical pick-up in demand, the aluminium, zinc and nickel markets have turned following 6-7 years of oversupply (resulting in lower Chinese and global investment in non-ferrous mining and smelting – Exhibit 5), and we are bullish on these commodities on a 12-month horizon. In particular, we forecast that the nickel price will rise by 32% relative to copper, and that the zinc price will increase by 20% relative to copper on a 12-month horizon (Exhibit 3).

Notably, the metals options market suggests that market participants remain cautious on the outlook for copper, but have become more bullish on the outlook aluminium, zinc and nickel prices (Exhibit 4). In the very near term, however, aluminium and zinc may consolidate following very strong price rallies ytd, and we would view any pullback as a medium-term buying opportunity.

Exhibit 3: LME nickel and zinc expected to continue to outperform copper (by +32% and +20% on a 12-month horizon)

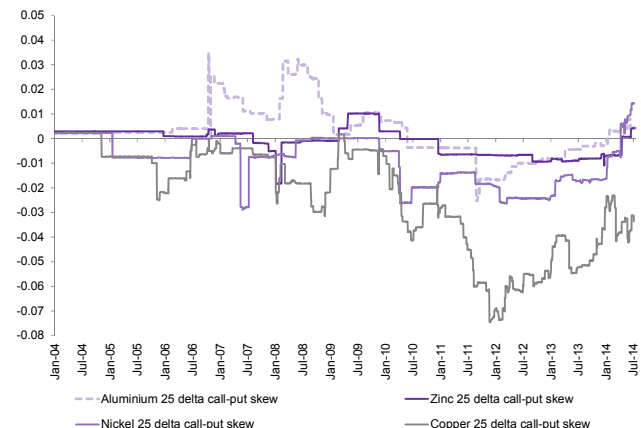
Ratio



Source: LME, Goldman Sachs Global Investment Research.

Exhibit 4: Base metals options markets imply investors remain cautious on copper but have turned bullish on zinc, aluminium and nickel

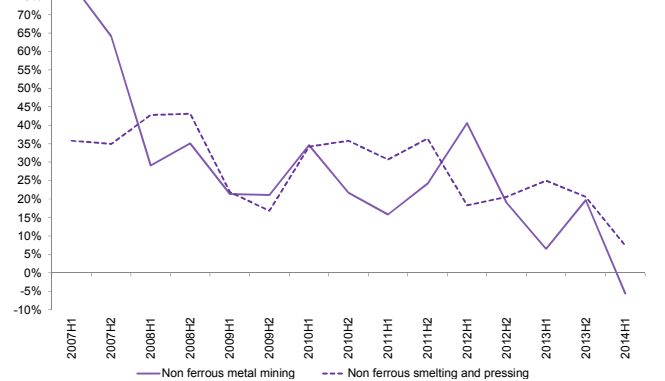
25 delta call-put skew



Source: Goldman Sachs Global Investment Research.

Exhibit 5: Investment in metals mining, smelting and processing is slowing down or declining in China

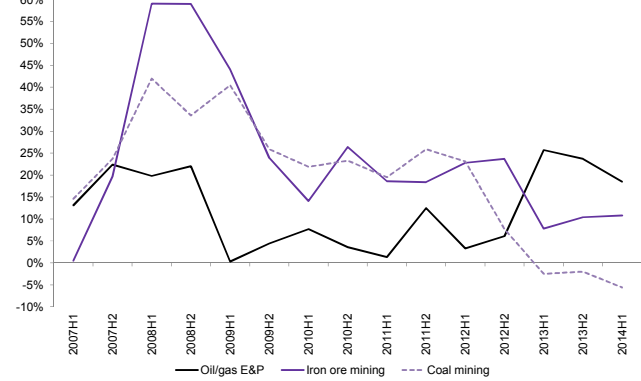
% change yoy



Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 6: Investment in oil, gas, E&P and iron ore still growing, while investment in coal mining is now falling

% change yoy



Source: CEIC, Goldman Sachs Global Investment Research.

Most commodities are in the early stage of an exploitation phase

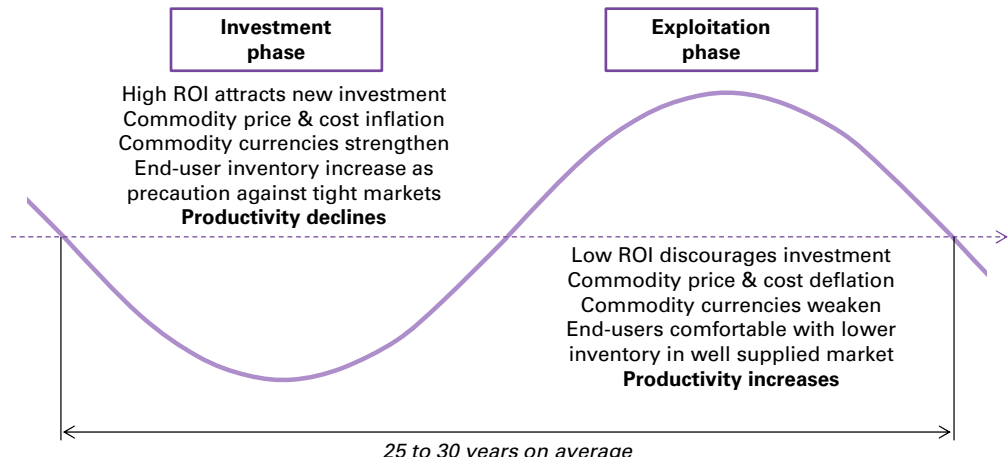
While we have upgraded some base metals prices, major commodity markets such as copper, oil and iron ore remain impacted by the structural shift in their supply cycles - from an investment to an exploitation phase.

The capital stock¹ of six key producers in the mining and energy sectors has increased by 220% over the period since 1990 to reach US\$2.5 trillion, with most of the increase taking place in the last decade. The supply side was initially unprepared for the surge in demand for labour and other inputs, and the new production capacity was not always used efficiently. Eventually, a sustained period of overinvestment gave way to an exploitation phase, completing the commodity cycle (Exhibit 7). Investment and exploitation phases are structural drivers of commodity prices that outlast the ebb and flow of business cycles. We believe that most commodity markets have shifted from an investment to an exploitation phase, or are about to.

¹ Capital stock refers to the value of fixed assets involved in the production of a commodity, such as oil rigs, smelters, excavators and rail infrastructure. The value of the capital stock varies according to the depreciation of existing assets and to the rate of new capital expenditure.

Exhibit 7: Market dynamics are inverted when investment gives way to exploitation

Productivity growth along the investment/exploitation phases

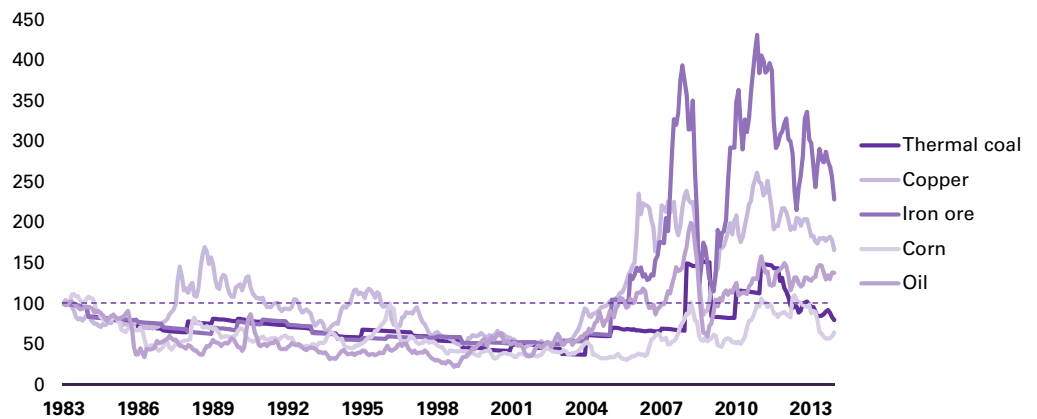


Source: Goldman Sachs Global Investment Research.

The previous exploitation cycle in the period up to the early 2000s saw commodity markets go through a 20-year period of declining prices in real terms. Considering a wide basket of commodities including agriculture, energy and basic materials, prices fell by half over the period between 1983 and 2003 (Exhibit 8). In our view, the current exploitation phase will coincide with a similar period of cost deflation; cost curves become flatter via the loss of marginal supply and shift lower via rising productivity and weaker commodity currencies. In other words, we expect that cyclical movements in commodity prices (which are correlated with business cycles) will coexist with a structural component of cost deflation and margin compression.

Exhibit 8: Commodity prices declined in real terms over a 20-year period

Commodity prices (US\$ real) indexed to 1983



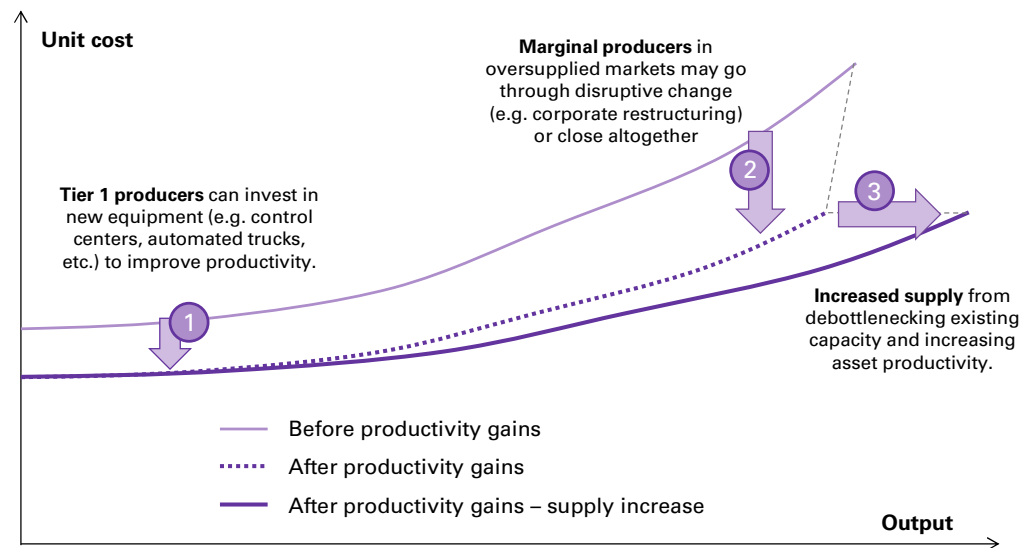
Source: CME, LME, NYMEX, Platts, McCloskey, International Energy Agency (IEA).

Rising productivity will be a mixed blessing for producers

Production volumes grow with a certain time lag behind the investment decision; in the mining industry the lag between investment approval and production at full capacity is typically between 5 and 10 years. As a result, the supply response to high returns is delayed. At the other end of the cycle, rising productivity at existing mines and the completion of projects approved in the previous investment phase result in production growth in spite of weaker prices. At the company level, a return to productivity growth could be viewed as a positive because it implies lower costs, better margins, higher sales volume and an enhanced competitive position relative to its peers. However, productivity growth at the industry level implies a downward shift across the cost curve and an expansion of the cost curve as rising productivity is translated into supply growth (Exhibit 9). The final outcome is a lower, flatter cost curve. In our view, this structural trend will provide the backdrop to commodity markets in the years to come.

Exhibit 9: Towards a lower and flatter cost curve

The impact of productivity growth on the industry cost curve



Source: Goldman Sachs Global Investment Research.

Copper: “Bottom up” set to continue to trump “top down”

With copper prices declining by c.30% over the past three years it remains tempting to call a turn in the market. This is especially the case given the bullish “top down” outlook for global demand growth – led by an acceleration in growth in the developed markets (Exhibits 11 and 20), which together with the recent LME stock draws and lack of contango continue to send a strong buy signal. Widely reported purchases of copper by China’s Strategic Reserves Bureau (SRB) potentially equal to over half of our full-year surplus forecast (200-300kt vs 2014E surplus of 353kt), together with recent supply disruptions – including an ongoing disruption to exports from Indonesia, and smelter outages in China, have also been supportive of pricing in recent months.

Despite these bullish macroeconomic and copper specific developments copper prices have *fallen* by 5% over the year to date, substantially underperforming other base metals prices, as well as the major equities indices (S&P 500, EM equities). In our view the outright price declines and copper’s underperformance reflect structural factors that are unlikely to ease over the next 12-18 months. Specifically:

- Relative to other base metals, copper is heavily exposed to Chinese property (Exhibits 13 to 16), on which our China Real Estate team is bearish in 2014 and 2015.
- Copper recently entered a once-in-20-year supply cycle (which started in 2H12 and is set to last through to 2016/17), following a decade of high capex investment in the industry, raising trend supply growth to c.4-5% from c.2% over the past decade (Exhibit 17).
- Copper prices have been affected by Chinese Copper Financing Deals (CCFDs), which have shifted visible inventory to Chinese bonded warehouses and off market, and this impact is expected to ease over the next 6-12 months (Exhibit 21).
- Marginal costs of copper production are falling as the industry moves to increase productivity and reduce costs in the face of weaker prices (Exhibit 22).
- There are limited upside risks to Chinese demand growth owing to already high FAI as a % of GDP (Exhibit 12) and highly leveraged Chinese corporate balance sheets.

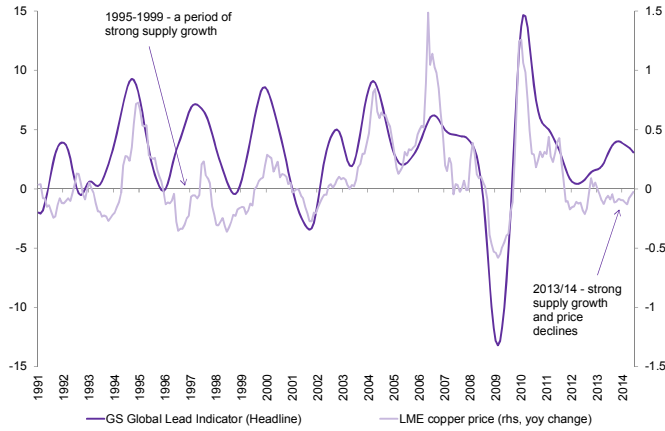
After incorporating strong ex-China demand growth assumptions and including a significant disruption allowance, our “bottom up” supply and demand balance work continues to point to a c.350-500kt surplus market in both 2014 and 2015. In line with this we forecast that the copper price will fall to \$6,600/t on a 3-mo horizon, \$6,600/t on a 6-mo horizon and \$6,200/t on a 12-mo horizon. Reflecting the SRB buying and low level of inventory visibility we have pushed out our end year forecast of \$6,200/t to mid-2015. This has the effect of lowering our 2015 average price forecast to \$6,400/t from \$6,600/t. Further, we lower our 2016 forecast to \$6,600/t from \$7,000/t, due to expectations of lower marginal production costs and early signs of a slightly easier balance in that year.

Exhibit 10: Global refined copper supply and demand balance ('000t)

	2010	2011	2012	2013	2014E	2015E	2016E	2017E
Global mine supply	16173	16083	16662	18065	18039	19081	20071	20769
% change	1.4	-0.6	3.6	8.4	-0.1	5.8	5.2	3.5
Including disruption allow. (%)	0.0	0.0	0.0	0.0	1.7	6.0	8.3	11.9
Global refined supply	18999	19650	19771	20597	21765	22806	23310	24126
% change	3.8	3.4	0.6	4.2	5.7	4.8	2.2	3.5
Global refined consumption	19258	19763	19666	20594	21412	22314	23243	24152
% change	10.2	2.6	-0.5	4.7	4.0	4.2	4.2	3.9
Of which China	7416	7941	8179	8997	9537	10014	10514	11040
% change	13.7	7.1	3.0	10.0	6.0	5.0	5.0	5.0
Of which World ex-China	11842	11823	11487	11597	11875	12301	12729	13112
% change	8.1	-0.2	-2.8	1.0	2.4	3.6	3.5	3.0
Balance	-259	-114	105	3	353	492	67	-26
LME Price (\$/t)	7544	8814	7948	7328	6851	6400	6600	7500
LME Price (c/lb)	342	400	361	332	311	290	299	340

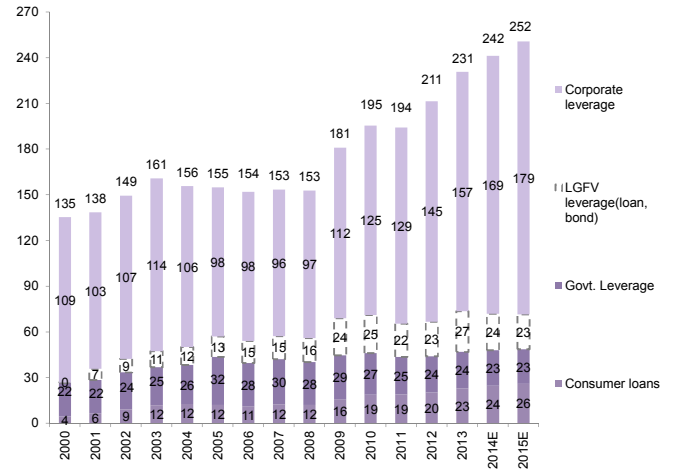
Source: Goldman Sachs Global Investment Research, CEIC, Wood Mackenzie, Reuters.

Exhibit 11: "Top down" developed world led outlook would suggest buying copper, but "bottom up" still points to further price weakness over the next 1-2 years
 GS Global Lead Indicator Index (lhs), yoy % change in LME copper price (rhs)



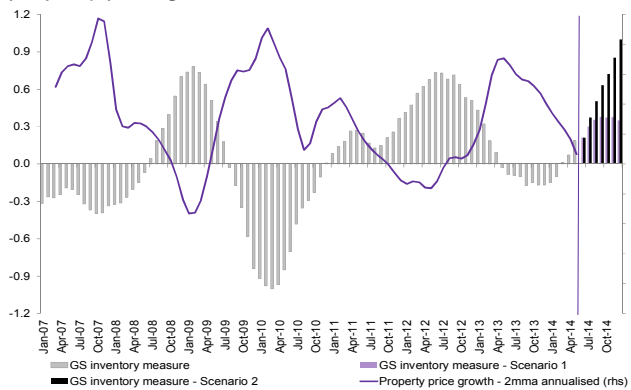
Source: LME, Goldman Sachs Global Investment Research.

Exhibit 12: Chinese debt, particularly corporate debt, is very high, limiting the upside to Chinese growth
 Total debt as a % of GDP



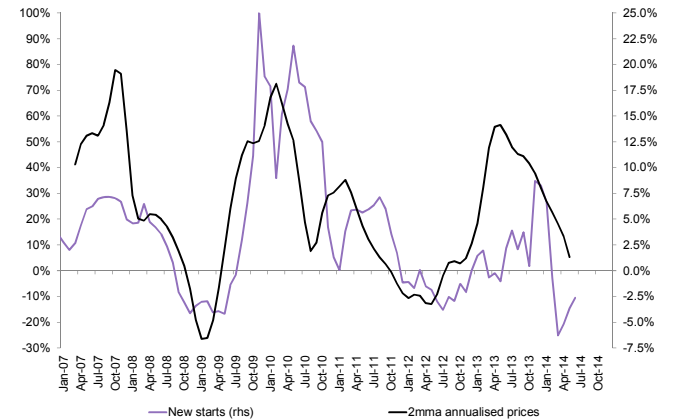
Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 13: China property inventories are set to remain under upward pressure in 2H14, keeping prices contained
 yoy change in GS property inventory indicator (lhs), 2mma property price growth (rhs)



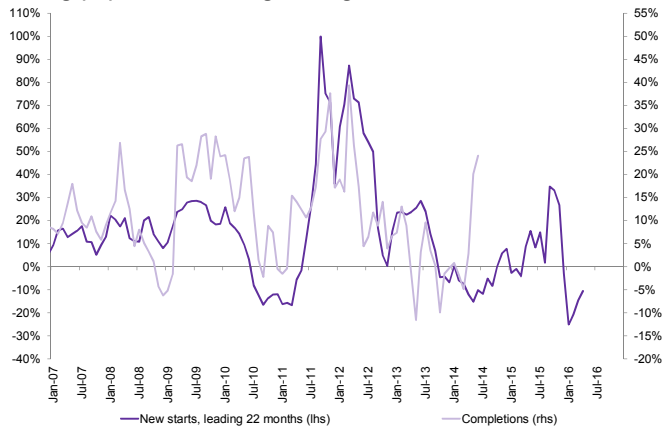
Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 14: Weak prices mean weak new starts...
 3mma new starts, yoy % change (lhs), 2mma property price growth (annualised, rhs)



Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 15: ...and falling new starts suggest weak late-cycle copper-intensive construction completions
 % chg yoy, 3-mo moving average



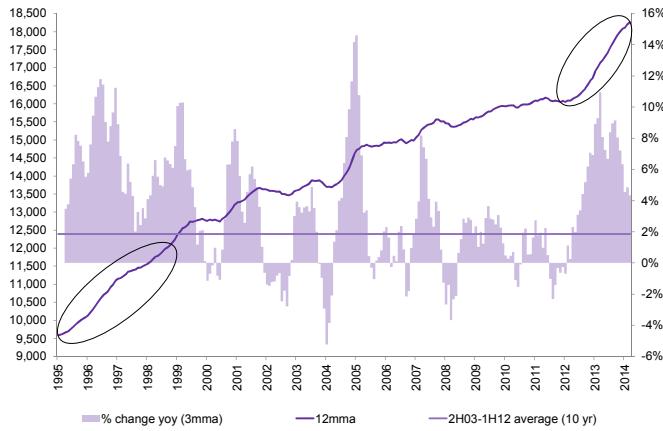
Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 16: Copper is very heavily exposed to China property – including related sectors = 50-60% % share

Housing & property (incl power infras., telecom., lighting)	+ 49%
Appliances	+ 12%
Power infrastructure - National/State/Southern Grid	13%
Industry equipment / machinery	7%
Automobile	5%
Rail, shipbuilding, aerospace	4%
Other	10%
Total	100%
Housing and property related	= 61%

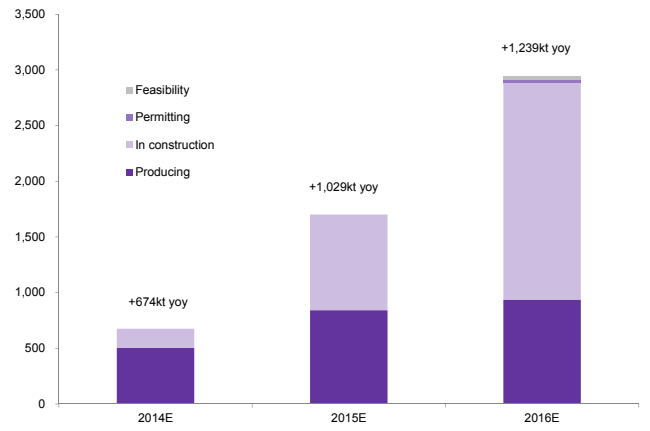
Source: Wood Mackenzie, Goldman Sachs Global Investment Research.

Exhibit 17: We are in the middle of a once-in-20-year supply cycle following 10 years of high capital
 Mine output, % change yoy, 3-mo moving average



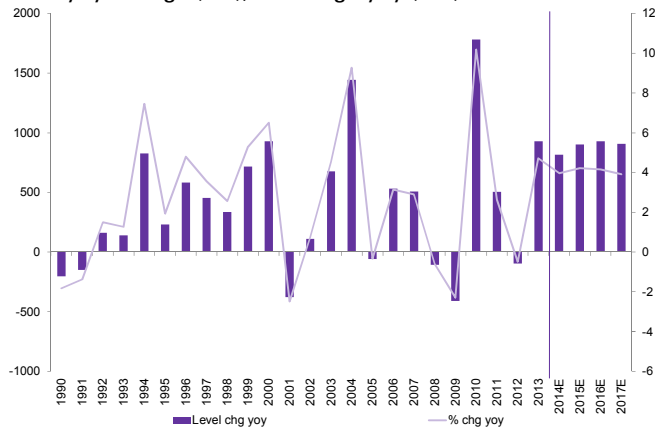
Source: ICSG, Goldman Sachs Global Investment Research.

Exhibit 18: Most near-term growth already under construction or ramping up
 GS Copper 70 projects volume delivery by status to 2016E (vs. 2013)



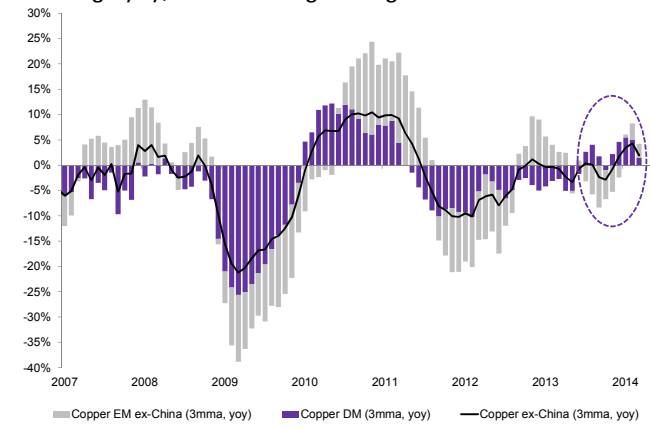
Source: Goldman Sachs Global Investment Research.

Exhibit 19: We incorporate very strong and sustained demand growth in our model...
 '000t yoy change (lhs), % change yoy (rhs)



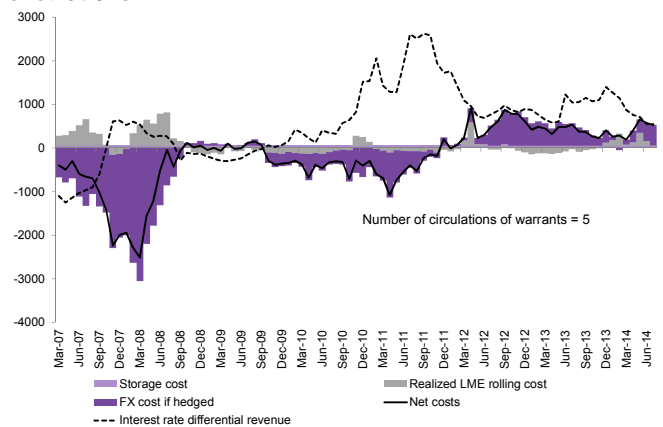
Source: Wood Mackenzie, Goldman Sachs Global Investment Research.

Exhibit 20: Ex-China demand has picked up in 2014, driven by DM countries
 % change yoy, 3-mo moving average



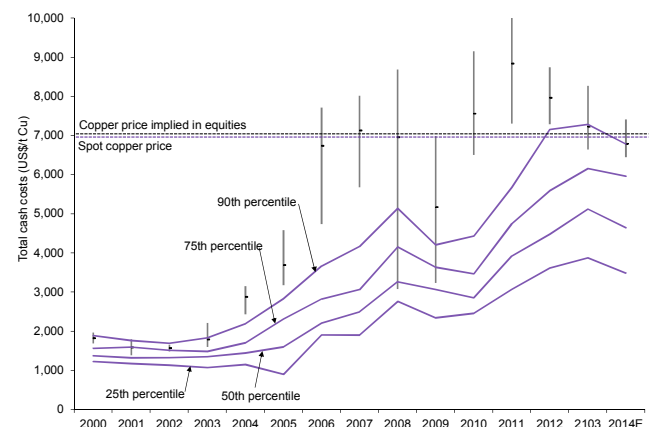
Source: WBMS, Goldman Sachs Global ECS Research.

Exhibit 21: Most Chinese copper financing deals have become unprofitable of late
 US\$/t earnings per year, assuming 5 Letter of Credit circulations



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 22: Copper production costs moderating for the first time since the 2008/09 financial crisis
 \$/t



Source: Wood Mackenzie, Goldman Sachs Global Investment Research.

Aluminium: The market shifts into deficit

The aluminium market has been in surplus for the bulk of the past 7 years, and we now view 2013 as the last year of surplus for the foreseeable future. We estimate that the global market has moved in to deficit this year, comprised of a moderate deficit ex-China and a small surplus in China. Low prices appear to have finally acted as a cure for low prices, by driving more than 50 aluminium smelter closures or curtailments outside of China since 2009. This has resulted in outright declines in ex-China smelter output over the past 3 years.

Together with a pick-up in ex-China demand in 1H14, these closures and curtailments have resulted in all-in aluminium prices (US Midwest, Europe and Japan) rising by more than 20% since the start of 2014 (see Exhibit 24). Indeed, prices outside of China have risen by more than our global aluminium cost of production indicator, pointing to a significant strengthening in producer margins (Exhibit 31). Further evidence of a tight ex-China market is provided by a US market in deficit (aluminium contango is less than full carry incentivizing financing deals to be unwound), a tight Brazilian market, and high and rising product (billet) premiums (over and above the ingot premia) in Europe.

In our view, all-in prices ex-China are rising in order to: a) attract metal from China in the form of semi-fabricated products and b) incentivise production restarts outside of China. With the profitability of exporting semi-fabricated products now c.20%, we have met criterion a), but arguably even at c. \$2,400/t all in ex-China we are yet to reach the price level that would result in sufficient capacity restarts ex-China.

Indeed, the cautionary note to the immediate case for further price rises is that Chinese aluminium prices remain relatively weak on the back of sustained and low-cost domestic supply growth (Exhibits 26 and 27), which we expect to continue for the next 6 months, before slowing down. This is likely to keep domestic prices under pressure in China and continue to incentivise exports of semi-fabricated products, in our view (Exhibit 29).

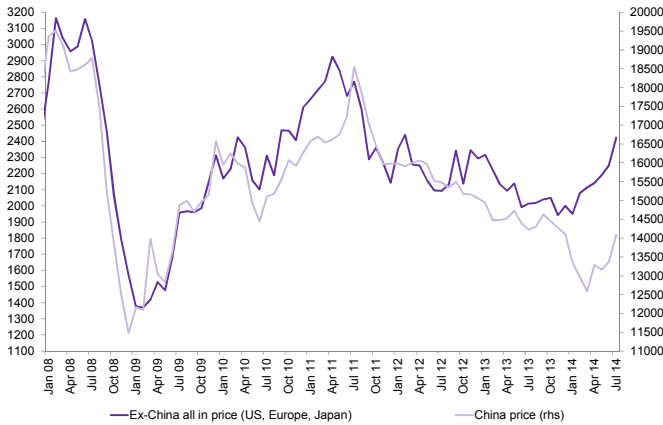
We forecast that 2H14 is likely to be a period of consolidation for all-in aluminium prices as the market digests the recent all-in price level of c.\$2,400/t (vs \$1950/t at the end of 2013), while in 2015 we expect higher prices on the back of a global deficit. Also, tempering the medium-term bullishness is the SRB overhang (777kt) – which unlike in copper the SRB has been known to sell after prices rise (i.e. in 2010). Note that in making our LME price forecasts we assume premiums ex-China are broadly unchanged over the forecast period.

Exhibit 23: Aluminium supply, demand and price forecasts
'000t

	2010	2011	2012	2013	2014E	2015E	2016E	2017E
Refined Production	41949	46383	47985	50574	53805	57605	61233	63929
% Change YoY	11.5	10.6	3.5	5.4	6.4	7.1	6.3	4.4
% Global capacity utilisation	80	84	82	78	76	79	82	83
Assumed cuts/delays/disruptions	0	0	0	0	-436	-388	-303	-314
Assumed creep / ramp up / restarts	0	0	0	0	0	300	1000	1400
Refined Consumption	40929	44890	47015	50410	54383	58223	61586	64539
% change	19.2	9.7	4.7	7.2	7.9	7.1	5.8	4.8
Of which China	17200	19800	21761	24675	28254	31312	33783	35426
% change	18.6	15.1	9.9	13.4	14.5	10.8	7.9	5.0
Of which ex-China	23729	25090	25254	25735	26130	26911	27803	29113
% change	19.6	5.7	0.7	1.9	1.5	3.0	3.3	4.7
Balance - (deficit)/surplus	1020	1493	970	164	-579	-619	-353	-611
Implied inventories - weeks consumption	13.5	12.6	13.2	13.7	12.9	11.4	10.1	9.3
LME Price (\$/t)	2172	2399	2019	1846	1869	2075	2100	2150

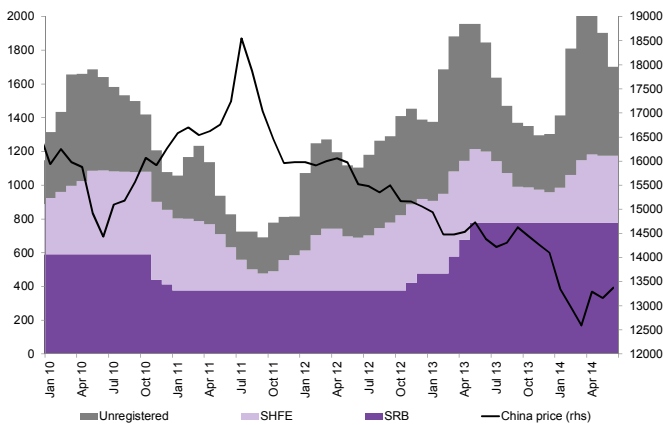
Source: LME, CRU, IAI, Wood Mackenzie, Goldman Sachs Global Investment Research.

Exhibit 24: Ex-China all-in prices have rallied 20% ytd while China prices are flat ytd
\$/t (lhs), RMB/t (rhs)



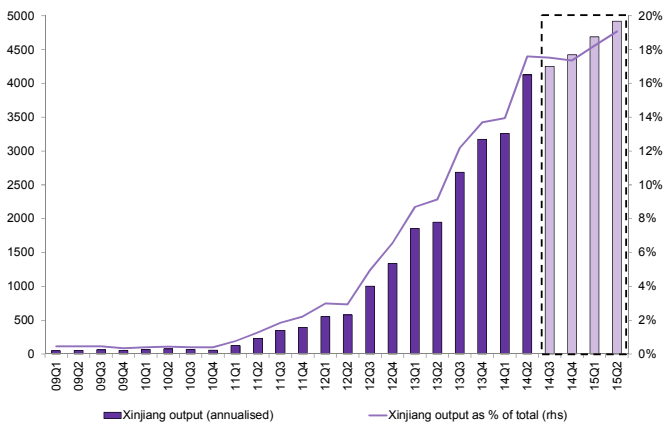
Source: Reuters, CRU, Goldman Sachs Global Investment Research.

Exhibit 26: China has balanced up somewhat in 2014, but prices remain flat over the year to date...
'000t (lhs), RMB/t (rhs)



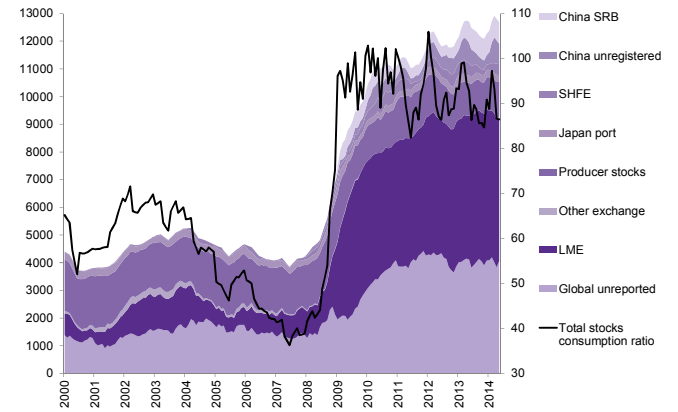
Source: CRU, Reuters, Goldmans Sachs Global Investment Research.

Exhibit 28: Xinjiang continues to deliver massive growth in aluminium supply – capacity >4mt now
'000t annualised output (lhs), % share China total (rhs)



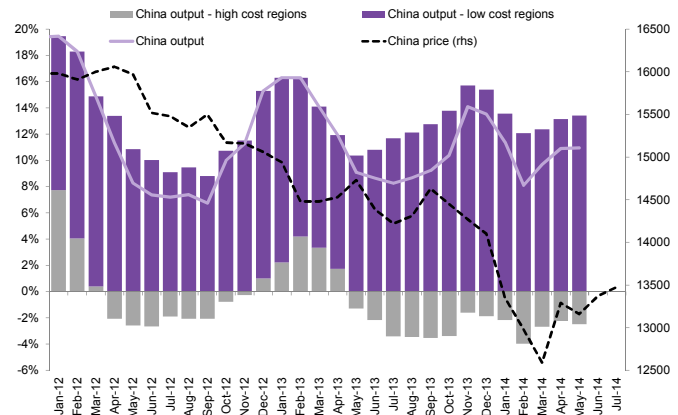
Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 25: Global aluminium inventories remain high, but appear to be grinding lower recently
'000t



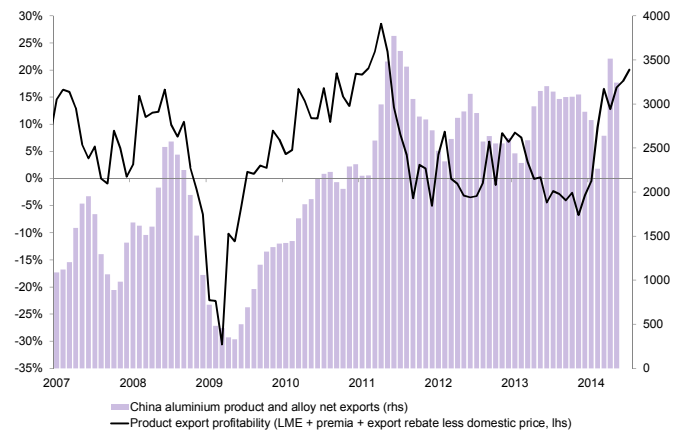
Source: CRU, Goldman Sachs Global Investment Research.

Exhibit 27: ...due to strong Chinese low-cost supply growth (which has more than offset falling output from high cost smelters, leaving supply growth at +10% yoy)
% yoy (lhs), RMB/t (rhs)



Source: Reuters, Bloomberg, Goldman Sachs Global Investment Research.

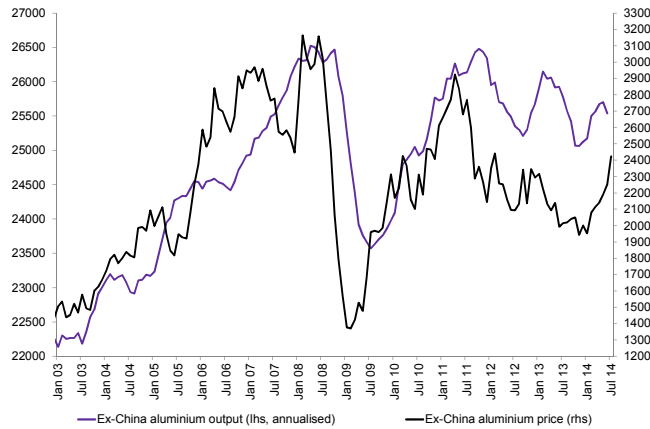
Exhibit 29: China export arbitrage for semi-fabricated products is now very attractive – we expect a response
% profit on semis exports from China, '000t net exports of semi-fabricated products and alloys



Source: LME, CRU, Reuters, Goldman Sachs Global Investment Research.

Exhibit 30: Ex-China supply down 3.6% over the past 3 years owing to weak prices has only recently tightened the market

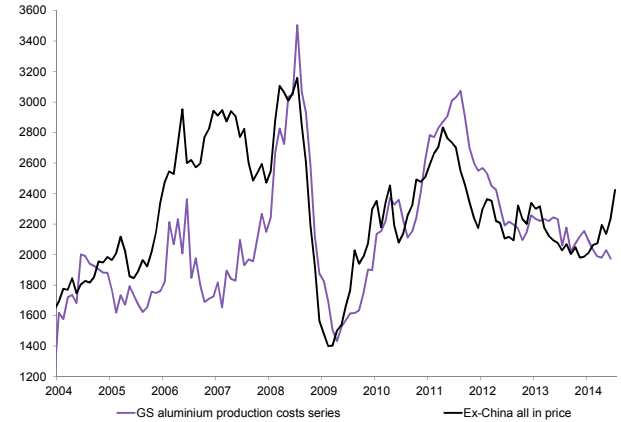
'000t annualised output (lhs), \$/t all-in price – average Europe, Japan, US Midwest (rhs)



Source: IAI, LME, CRU, Goldman Sachs Investment Research.

Exhibit 31: All-in prices ex-China have increased by significantly more than our global aluminium output cost measure in 1H14

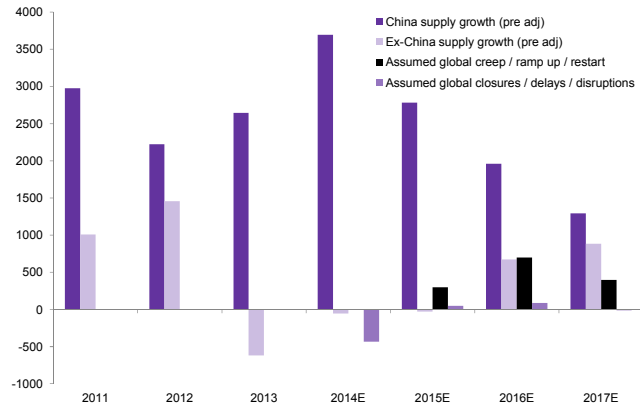
\$/t



Source: LME, CRU, Goldman Sachs Global Investment Research, Bloomberg, IHS Global.

Exhibit 32: Supply growth in 2014 and 2015 largely in China – need to incentivise Chinese exports to persist

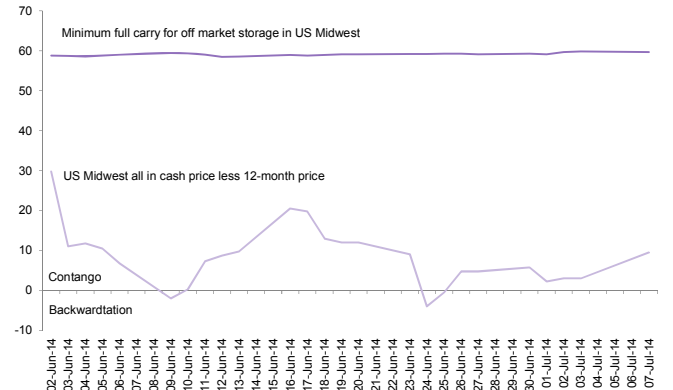
'000t yoy in supply growth



Source: Goldman Sachs Global Investment Research, CRU.

Exhibit 33: CME contract for US Midwest cash-12 mo contango is less than full carry, pointing to deficit market

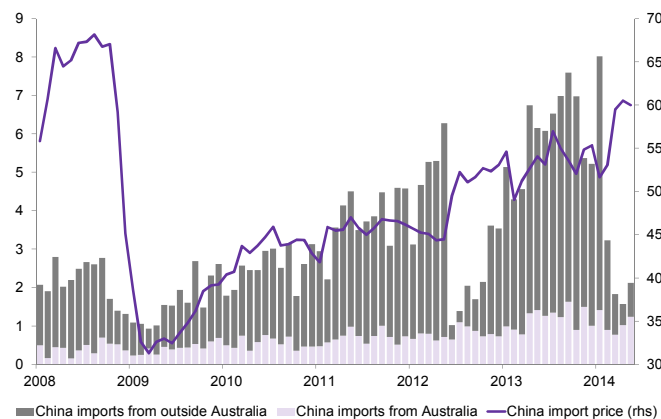
\$/t



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 34: Bauxite input costs set to rise further...

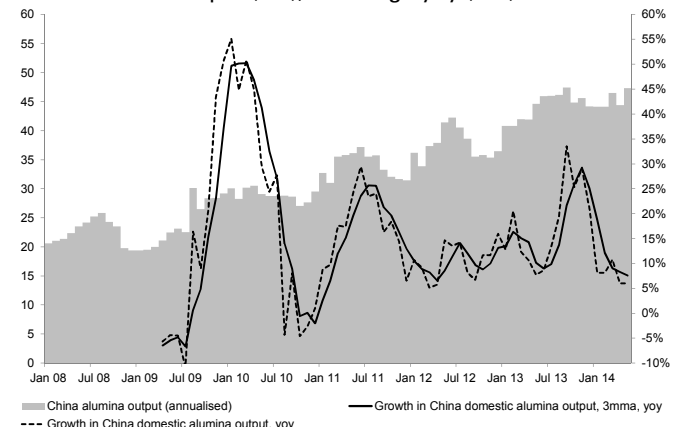
China bauxite imports - mt (lhs), \$/t China import price (rhs)



Source: CEIC, Goldman Sachs Global Investment Research.

Exhibit 35: ...slowing Chinese alumina output and eventually resulting in higher aluminium output costs

China alumina output (lhs), % change yoy (rhs)



Source: CEIC, Goldman Sachs Global Investment Research.

Nickel: Increasingly bullish, though long-term “end game” intact

In this note we extend our bullish 3-6 month view on nickel to a 12-18 month horizon. We maintain our 3-6 mo forecasts of \$22,000/t, but raise our 12-mo forecast to \$22,000/t from 16,000/t, as we push out our expectation of an easing of the Indonesian ore ban for those companies building smelters until 2H15.

Indonesia accounted for more than 20% of global nickel supply in 2013, and has banned the export of raw ores since the beginning of the 2014 due to the government’s desire to encourage value add capacity domestically. Despite a massive build out of capacity apparently getting under way in Indonesia – with c.287,000t of capacity currently under construction (Exhibit 37) – we believe a further c.300,000t+ of capacity will need to be incentivized to start construction before the Indonesian government is likely to consider easing the ban for those genuinely constructing smelters, in our view.

Eventually, we believe the “end game(s)” for Indonesia are to have a large scale nickel smelting industry, as well as maximize mining sector jobs and export revenues. Once c.600,000t of smelters are genuinely being built (=6-12mt of NPI capacity), which we believe is technically and at current prices economically feasible (assuming China builds 75mtpa of steel capacity and payback for Blast Furnace projects is c.3-6 months at current prices), we believe that the government is likely to ease its stance via a lowering of the processing threshold for those building smelters (through a Ministerial/Presidential decree) in order to put its miners back to work and raise tax revenues from ore exports during the construction period. Should this *not* occur, there are upside risks to our price forecasts, as prices would likely need to move to demand destruction levels of c.\$25-30,000/t.

In the meantime, nickel ore stocks have been falling, and we expect 4Q14 to be when China runs higher grade Indonesian ore stockpiles down to critical levels. We now forecast a 200,000t deficit in 2015.

Exhibit 36: Global refined nickel supply and demand balance

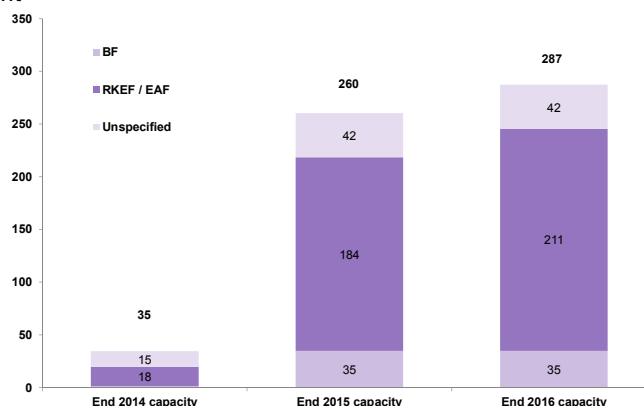
’000t

	2010	2011	2012	2013	2014E	2015E	2016E	2017E
Refined Production	1444	1665	1820	1998	1985	1887	2209	2342
Of which NPI	180	290	360	480	450	330	580	650
% change	8%	15%	9%	10%	-1%	-5%	17%	6%
Refined Consumption	1500	1620	1688	1848	1965	2088	2194	2307
% change	16%	8%	4%	9%	6%	6%	5%	5%
Of which China	582	712	760	915	997	1077	1142	1210
% change	20%	22%	7%	20%	9%	8%	6%	6%
Of which World ex-China	918	908	928	933	968	1010	1052	1097
% change	13%	-1%	2%	0%	4%	4%	4%	4%
Balance	-56	46	131	150	20	-201	15	35
Reported and bonded stocks in weeks	7.4	6.4	9.2	12.7	12.3	6.6	6.6	7.1
LME Price (\$/t)	21809	22831	17527	15021	18676	22000	18000	16000
LME Price (c/lb)	989	1036	795	681	847	998	816	726

Source: Goldman Sachs Global Investment Research, Wood Mackenzie, LME.

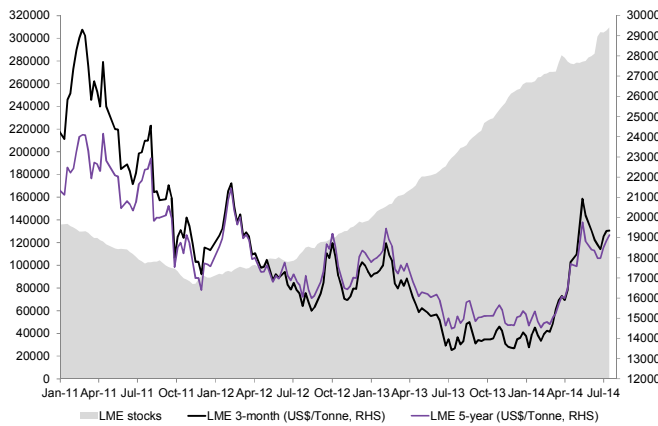
Exhibit 37: Capacity of Indonesian NPI plants currently under construction

’000t nickel content



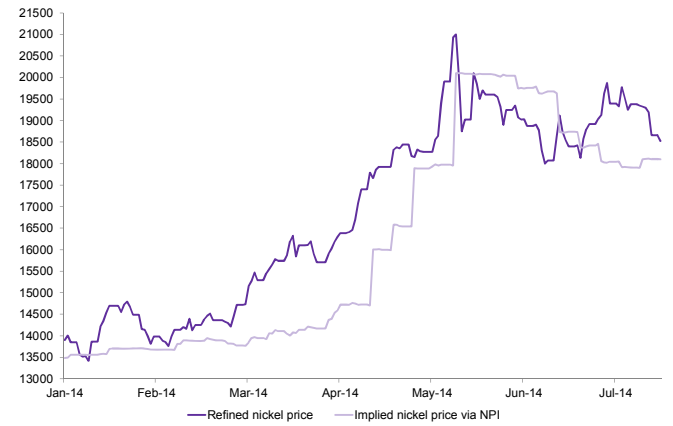
Source: Goldman Sachs Global Investment Research, Wood Mackenzie, CRU.

Exhibit 38: LME nickel inventories have risen by >200,000t over the past 3 years, to >310,000t \$/t (lhs), '000t (rhs)



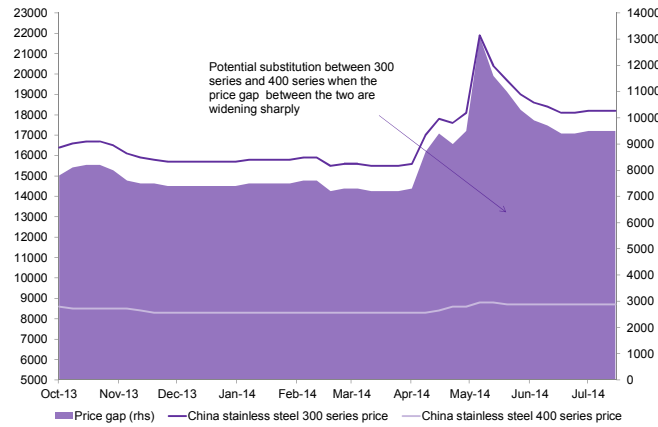
Source: LME, Goldman Sachs Global Investment Research.

Exhibit 39: 2014 price rally due to increase in marginal costs of production (i.e. higher NPI output costs due to higher nickel ore costs), not a deficit market US\$/t cash cost



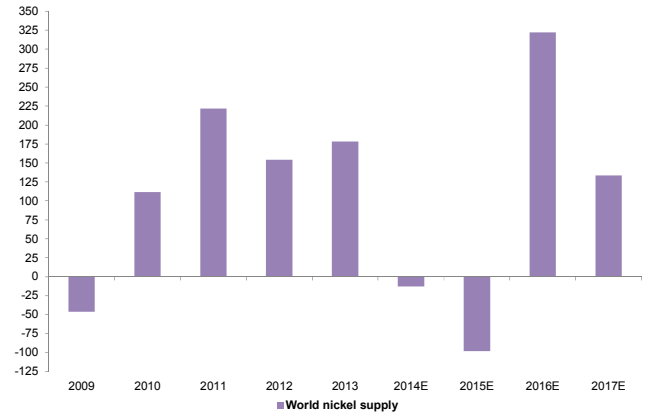
Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 40: There is already potential for demand substitution in China from 300 series to 400 series \$/t



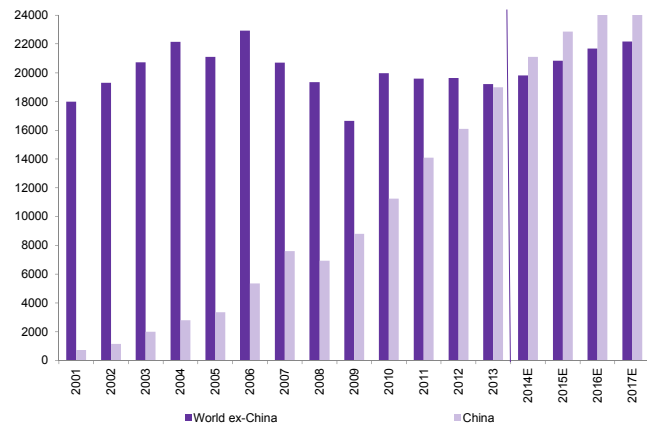
Source: Goldman Sachs Global Investment Research.

Exhibit 41: Overall supply growth to slow markedly in 2014 and 2015, driven by nickel pig iron losses '000t refined nickel



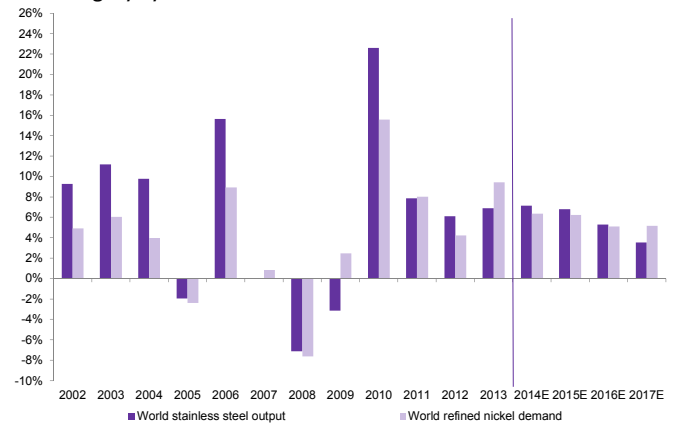
Source: Goldman Sachs Global Investment Research, Wood Mackenzie.

Exhibit 42: We expect ex-Chinese stainless steel demand to pick up and Chinese demand to grow solidly '000t



Source: World Bureau of Metal Statistics, ISSF, company data, Goldman Sachs Global Investment Research.

Exhibit 43: World stainless steel output growth forecasts and refined nickel demand forecasts % change yoy



Source: World Bureau of Metal Statistics, ISSF, company data, Goldman Sachs Global Investment Research, Wood Mackenzie.

Zinc: Still medium-term bullish, recommend buying any dips

While we have been relatively bullish on medium term outlook for zinc, the recent rally has moved prices to our 12-mo price target quicker than we had anticipated. Ex-China zinc demand has improved in 2014 (Exhibit 46), zinc is the most heavily exposed metal to Chinese infrastructure stimulus, zinc supply growth in China has slowed (Exhibit 47), and outside of China there has been a lack of investment in new capacity.

Nevertheless, the price increase is hard to fully explain even given these factors, and we see some evidence to support the view that zinc has increasingly been used for Chinese financing deals. This would, at least in part, explain the large reduction in exchange inventories, the high level of Chinese imports, and the large reported stock builds of refined zinc at bonded warehouses in China (Exhibits 48 and 49). As financing deals tend to put upward pressure on prices, combined with greater government scrutiny of the practice, this bullish factor may unwind at any time. Moreover, eventually this upward pressure on prices should ease as China opens up its capital account over the longer term.

At the same time, the outlook for zinc over the next 12-24 months is increasingly bullish, as we get closer to the Century mine closure due to depleted ore reserves, slated for mid-2015. Indeed, the combination of solid global growth in zinc demand and a significant slowing in mine supply growth in 2015 and 2016 should see zinc move into deficit over that period. The response of Chinese mines and smelters will be key in the initial instance; however, so far the LME rally has not been matched by Chinese domestic prices.

Indeed, having highlighted that we expect zinc prices to rise over the medium to long term, we see some modest very near-term downside risks to prices given the SHFE/LME import arbitrage has closed – usually a sign of unsustainability in an LME rally – following the recent strong rally in the zinc price (Exhibit 45).

Exhibit 44: Zinc supply, demand and price forecasts

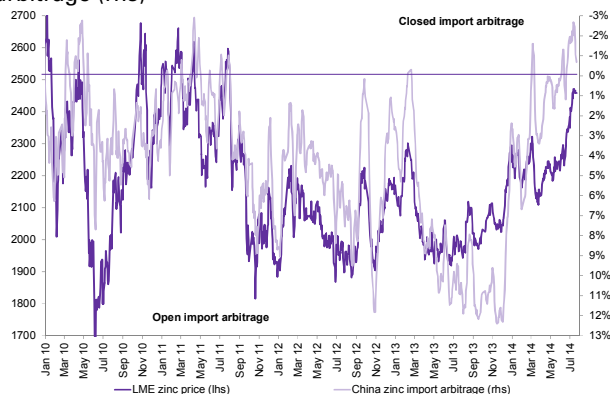
'000t

	2010	2011	2012	2013	2014E	2015E	2016E	2017E
Global mine supply	11817	12385	12665	13034	13351	13920	14514	15404
% change	7.2	4.8	2.3	2.9	2.4	4.3	4.3	6.1
Including disruption allow. (%)	--	--	0%	0%	1%	2%	3%	3%
Global refined supply	12288	12720	13020	13250	13700	14200	14750	15500
% change	12.9	3.5	2.4	1.8	3.4	3.6	3.9	5.1
Global refined consumption	11693	12375	12657	13186	13758	14354	14928	15522
% change	13.9	5.8	2.3	4.2	4.3	4.3	4.0	4.0
Of which China	4705	5081	5437	5926	6341	6722	7125	7553
% change	14.8	8.0	7.0	9.0	7.0	6.0	6.0	6.0
Of which World ex-China	6988	7293	7220	7259	7417	7633	7802	7969
% change	13.3	4.4	-1.0	0.5	2.2	2.9	2.2	2.1
Balance	595	345	363	64	-58	-154	-178	-22
LME Price (\$/t)	2162	2194	1948	1910	2150	2425	2400	2400

Source: WoodMackenzie, CRU, Goldman Sachs Global Investment Research.

Exhibit 45: China's zinc import arbitrage has closed, usually a sign of an LME overshoot, but trend has turned upwards in 2014

US\$/t (lhs), import arbitrage (rhs)



Source: Reuters, Goldman Sachs Global Investment Research.

Exhibit 46: Ex-China zinc demand has been gathering momentum

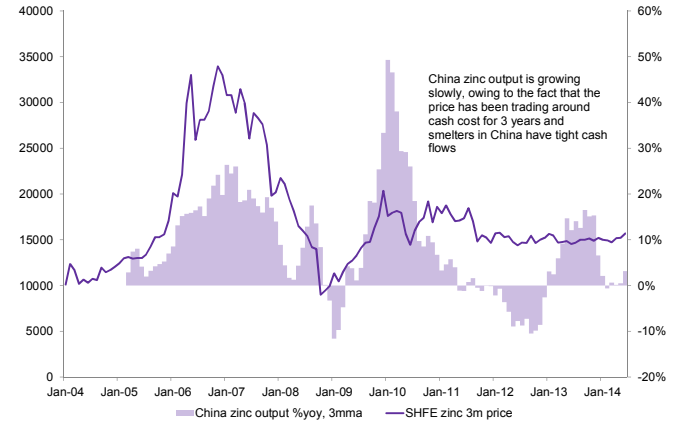
% change yoy, 3mma



Source: WBMS, Goldman Sachs Global Investment Research.

Exhibit 47: China zinc output growth has slowed sharply in 2014

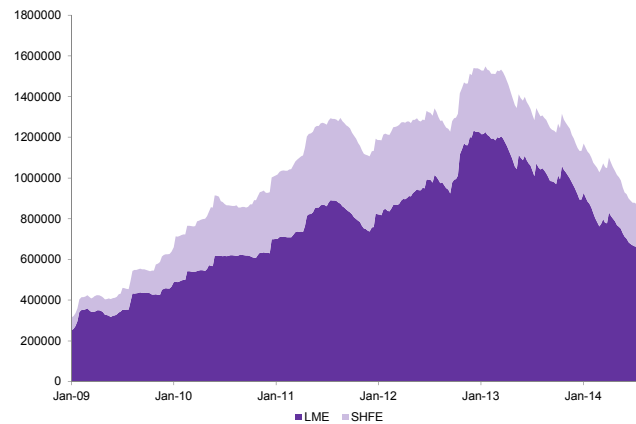
RMB/t (lhs), % change yoy 3mma (rhs)



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 48: Zinc exchange stocks have been falling since the beginning of 2013...

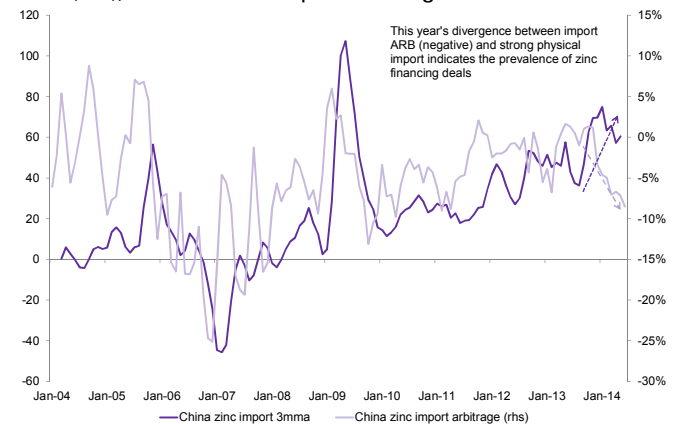
tonnes



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 49: ...though there is some evidence that some of the declines have shifted to Chinese bonded warehouses on the back of financing deals (shift from copper to zinc)

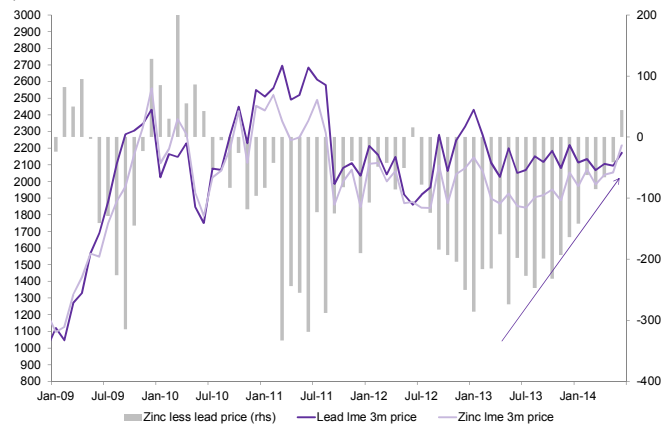
'000t (lhs), % China zinc import arbitrage



Source: Bloomberg, Goldman Sachs Global Investment Research.

Exhibit 50: Zinc has been outperforming lead over the past six months...

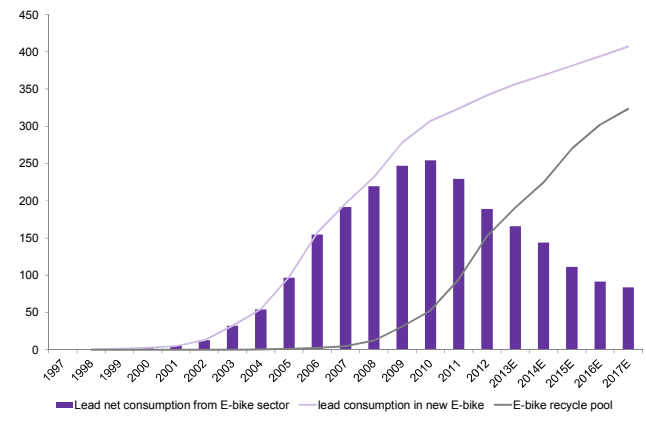
\$/t



Source: LME, Goldman Sachs Global Investment Research.

Exhibit 51: ..with the main driver being an increase in Chinese lead scrap from e-bikes, in our view

'000t



Source: Goldman Sachs Global Investment Research.

PGMs: Still prefer palladium but upside risks to platinum post strike

This section was authored by Eugene King, GS equity analyst

We started the year with a positive view of palladium as we saw a pre-investment demand deficit which would eventually exhaust above ground inventories while platinum, we forecast, would stay in a surplus pre-investment demand despite improving European auto demand and the 2015 introduction of the Euro 6 standard.

That view was published on 20 January – about a week before a 5-month strike by 70,000 AMCU-aligned workers that idled c.40% of South Africa’s (c.35% of global) platinum mining capacity as well as about 20% of global palladium supply. The strike was eventually settled by the companies agreeing a 3-year pay deal that will see cost-to-company labour costs increase by c.12% pa. Over 1mn platinum ounces of mined output (i.e. platinum in concentrate) was lost through the strike (c. 23% of South Africa’s annual output).

The most surprising outcome of the strike is that the platinum price barely moved through the strike (spot up 2% since 23 January at \$1,483/oz) – the reasons for which we discuss below. Palladium on the other hand has performed strongly up 23% ytd (18% since the strike).

The key reasons why the strike hasn’t impacted the platinum price yet include:

- A pre-strike build-up in inventories by the Big 3 (Anglo Plats, Impala and Lonmin) that were used to meet demand in the strike period;
- High end-user inventories and above ground stocks which filled in the gap; and
- Lower than anticipated demand in 1H14.

We have seen more momentum in the platinum price post the strike as investors have tried to capitalize or customers have become concerned about the following potential issues:

1. A potential slow restart following the strike as workers are slow to return, require medicals and safety training and potentially, the mines will have lost many workable mining panels due to the duration of the strike, requiring time-consuming rehab;
2. Mining companies using the restart in mining to rebuild depleted stockpiles rather than continuing to supply customers. Part of the concern of this is that as an industry the companies were incentivized to keep the market supplied and prices low for the negotiations but this may no longer hold true now that a deal has been agreed;
3. Demand is improving: Strong auto demand growth in Europe, the imminent implementation of Euro 6 emission standards is tightening the market; and
4. The combination of 1 through 3 is seeing increasing investment demand through ETF additions acting to further tighten the market for physical refined metal.

In summary, the strike has removed c.1mn mined platinum ounces from the inventory chain and that this metal has been delivered to the refined market from a combination of company, customer and above-ground refined stocks, thus depleting stock levels, but without moving the price.

Remaining cautious on platinum – but upside risks emerge post strike

The key question is whether mining returns to previous levels fast enough, together with remaining stock levels, to meet customer demand in 2H14 into 2015 or will a genuine deficit develop. On balanced, we remain cautious on the outlook for the platinum price post the strike as the incentives for publicly traded miners are to mobilise and restart mining as quickly as possible, as well as to continue to meet their customers’ requirements to avoid customers seeking alternatives. We expect platinum to trade in close correlation with gold in the short-term and once mining has been re-established close to the full-rate and for the platinum price to fall to \$1,450 / \$1,400 / \$1,425 / oz on a 3, 6 and 12-month horizon. Mining inflation will “push” the nominal price in outer years but we do not forecast a breakout.

We recognise that there are clearly more significant and apparent upside risks to our platinum price forecast than there were in January 2014 as the lingering impacts of the strike remain. Namely: 1) further labour disruption; 2) a slower than expected mining ramp-up due to employee training, panel rehabilitation etc; and 3) lower refined sales due to pipeline restocking. If platinum was to move into a genuine pre-investment demand deficit then the price could easily exceed our forecasts.

Palladium, which we forecast to be in a structural deficit, should continue to benefit from growth in gasoline markets and we forecast it to average c. \$900/oz in 2015 and \$1,000/oz in 2016.

Platinum not in a structural deficit, just a strike/investment induced one

Fundamentally, platinum market remains attractive in our view, with: 1) refined market remains under stress with mining activity still ramping up and companies expected to stockpile; 2) auto demand set to increase; and 3) Euro 6 norms to be introduced from 2015 which are expected to have a positive effect on platinum demand. However, we remain cautious on the platinum price in the short and medium term:

- We expect mining activity to ramp-up within next 3-6 months. This coupled with new capacity coming online should see primary supply rebound to 2010 levels by 2016. Also we expect limited stockpiling as companies seek to maintain profitability by maintaining metal sales.
- Engines are getting smaller for two reasons: 1) Higher petrol (gasoline) prices are making car buyers focus even more on fuel economy; and 2) Governments are increasingly taxing CO₂ emissions on environmental grounds. Smaller engines both use less fuel and produce less CO₂ and critically from a PGM demand point of view, this means lower PGM loadings per car.
- Fabricators such as Johnson Matthey, Umicore and BASF have found ways to use less PGM metal to meet emissions standards, effectively “thrifting” the amount of metal per car through improved technology.

Auto demand expected to rebound – but it’s not enough on its own

Auto demand is c.40% of total annual demand for platinum and over 60% of palladium. Platinum is significantly more exposed to Europe due to its required use in diesel engines and Europe being c.50% a diesel market. Palladium is more exposed to petrol (gasoline) markets such as the USA, China and Japan.

Our auto team is forecasting that European autos has reached its trough and will grow from here; EU passenger car sales for 1H came in at 6.623 mn units – up 6.5% which is a positive sign. Europe is a c.20mn unit auto market and vehicles have c.2.14g Pt/car (we expect higher loadings in 2014/15 as Euro 6 standards kick in from 2015) with a gross platinum demand of 1.4mn oz. We expect EU-27 auto demand to increase c.4% to 21.5mn units by 2015 and at a constant Pt loading/unit of 2.14g Pt additional demand would be c.150k oz, or only 2% increase in total platinum demand (historically platinum loadings have spiked when stricter norms have been introduced only temporarily and have trended down).

Supply will grow: Mine supply to rebound as mines ramp-up and new mines to come online; recycling increasing too

There has been much talk around possible restructuring and mine closures post the strikes which could lead to unprofitable ounces being taken off the market. We believe that there will be limited closures in the medium term (as any attempt to restructure will likely be met by resistance from both the unions and government, and companies in our view would probably want to avoid further confrontation at present) and expect mine capacity to rebound in 2015 as ramp-up is completed. Also the new mines coming online – PTM’s WBJV, Northam’s Booyendal and RBPlats’ Styldrift will add c. 350-400k Pt oz by 2017

which should see supply rebound to 2011 levels. Longer term we see a significant increase in platinum supply as newer projects like Anglo's Mogalakwena open pit mine will be doubled to c.600k Pt oz as well as new mines such as PTM's Waterberg, Ivanhoe Mines' Flatreef project (currently in PFS stage) reach commercial production.

Further, we see an increasing contribution from recycling. Recycling has increased by over 70% in the past 10 years and we expect a further 500koz (c.9% of total demand) growth as cars manufactured between 2003-2007, a time of peak PGMs/car, reach the end of their useable life and are recycled.

Platinum in pre-investment surplus from 2016; ETFs essentially refined inventory

When we look at the platinum market and exclude investment demand the market has been in a surplus and we expect much smaller surplus as investment demand plateaus. Investment demand in platinum and palladium had picked up after the launch of South African ETFs, which as in other cases, we expect to stabilise.

Some key points on ETFs: 1) ETFs are non-yielding with price appreciation the only source of return; 2) unlike gold which behaves more like a currency with financial demand the largest demand category (c.70%), the price of platinum is determined by the supply-demand and investment demand is only 5-10% of total demand; and 3) the over 2.5mn oz of platinum and palladium that are in the global ETFs are in effect above ground refined inventory that can come back to the market at any time but would do so typically when prices rise.

The potential implications are twofold: 1) if prices stay weak and there is no significant inflows into the global ETFs then platinum would remain in surplus; and 2) if prices continue to remain depressed there is a chance that the platinum ETF market could see a significant outflow similar to that seen in gold last year.

Marginal cost of production will set prices; ZAR weakness sustains lower USD prices

We believe that Platinum will be in a much smaller deficit fundamentally than what the market is anticipating. The NewPlat ETF launched in 2013 added c. 1Moz of investment demand. With no new investment demand and prices continuing to remain depressed we expect this to be a much smaller number and as such expect a much smaller deficit.

We believe that the price of platinum will be set by the marginal cost of production in rand terms in South Africa. We expect this to be US\$1,425/oz in 2015 at c.10.5:1 ZAR/USD.

A weaker South Africa rand against the USD could see this forecast lower in USD terms as the marginal cost of production is in rand terms, a weaker rand allows a lower USD figure to meet this marginal cost. One of the factors that has seen a weak USD platinum price since late 2010 has been the weakening rand which has moved from 7.5:1 to close to 11:1.

Customer stocks – a downside risk to price; Jewellery a price capping mechanism

We believe that customers have been building stocks as prices have fluctuated over the past few years and a majority of supply remains at risk. The risks to supply (e.g. strikes, power) are not new and customers, such as the catalyst fabricators and auto producers, have been building stocks. Dips in USD prices will have created opportunities for customers to build stocks and weather potential supply disruptions, in our view. The implication of this is higher than previous above-ground stocks could act as a buffer to higher prices for both platinum and palladium.

Jewellery demand has increased by c. 600koz from 2010 and we expect it to remain strong. However, we don't see this demand as a swing factor given it is highly sensitive to prices. As such we see it as more of a price capping mechanism (as we see increased buying when prices fall providing a floor and decreased buying when prices increase providing a ceiling for prices) than a price setting one.

Platinum: European auto demand improving but insufficient, Euro 6 could be a catalyst but USD price upside limited by weaker ZAR

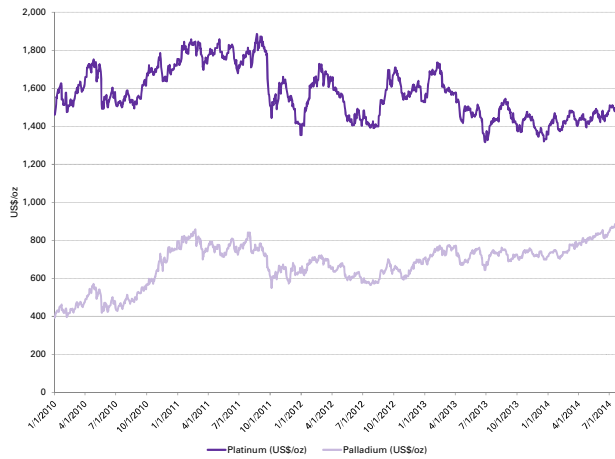
- Our auto team believes that European auto demand has troughed in 2014 and we will see c.6% yoy demand growth. However, they don't see it increasing to 2007 levels and as such we see only an incremental 100k oz demand for platinum.
- Euro 6 looks to be supportive of Platinum but the implementation cost is high (c.US\$400-US\$600/car) and this may see car companies put more resources into small capacity petrol (gasoline) cars, which is more beneficial for palladium.
- Recycling is likely to add c.500k oz (c.9%) to total demand between 2014 and 2018 as cars with high platinum loadings built between 2004-07 are recycled in the years ahead.
- We see the market in a small deficit in 2015 and in a structural surplus from 2016. We expect investment demand to be lower than 2013 which was high due to the launching of the NewPlat ETF in South Africa which added c.1,000k oz. With no new ETFs launching and the outlook for prices flat in USD terms we expect lower investment demand in 2014.
- With the market being in a fundamental surplus and a weaker rand we expect the USD for platinum to decline in 2015 to US\$1,425/oz rising in line with nominal inflation in the mining sector to US\$1,500/oz and US\$1,575/oz in 2016 and 2017E respectively.
- Upside risks to prices could come from production stoppages from industrial actions or power problems. Stockpiling, companies withholding sales and a strengthening ZAR also presents upside risk to our thesis.

Palladium: Markets in a sustained deficit; strong demand from gasoline vehicles and Russian supply a further upside risk

- A majority of growth in new vehicles will come from China and India which our global autos team expects to add 8.8 mn vehicles by 2017E. These markets are predominantly gasoline, favouring palladium.
- Emission regulation is tightening in the emerging markets and catching up with European and US standards, which should see palladium per vehicle increasing over time.
- The ongoing geopolitical tension in Russia/Ukraine also adds to upside pressure on palladium prices. Note that Norilsk is the source of c.45% of the world's palladium and any potential threat to this source would present a significant upside risk to our palladium prices. Additionally, there have been media reports (Reuters, May 16) that the Russian precious metals and gems repository, Gokhran, is looking to buy palladium from Russian producers – with Norilsk Nickel reported to be the likely seller.
- Russian stock sales have come down materially over last 10 years. Also the supply from other producers – Stillwater and Norilsk is capped and as such we expect little upside risk from there.
- Substitution of platinum in diesel vehicles by palladium continues as technology advances continue.
- Heavy-duty diesel (HDD) legislation changes in Europe are most likely to be supportive of higher palladium loadings as they were in the US in 2007.

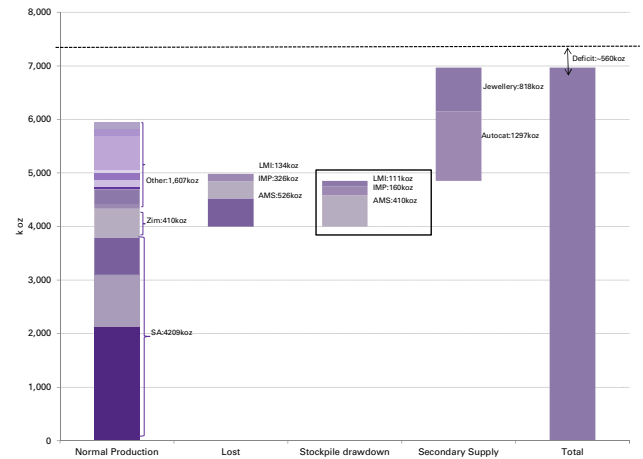
Given the increasing demand from gasoline markets – coupled with the fundamental deficit we believe the Palladium market is in – we expect a sustained increase in the prices and forecast palladium to average US\$925/oz in 2015 rising to US\$1,000/oz and US\$1,050/oz in 2016 and 2017 respectively.

Exhibit 52: Pt prices have been muted even as 40% of capacity was offline in 1H14; Pd though is up 23% YTD



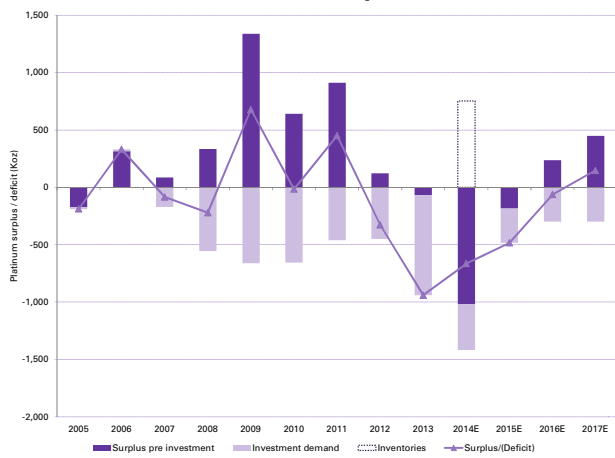
Source: Datastream.

Exhibit 53: ...which we believe is because of the refined market being in balance due to stockpile drawdown



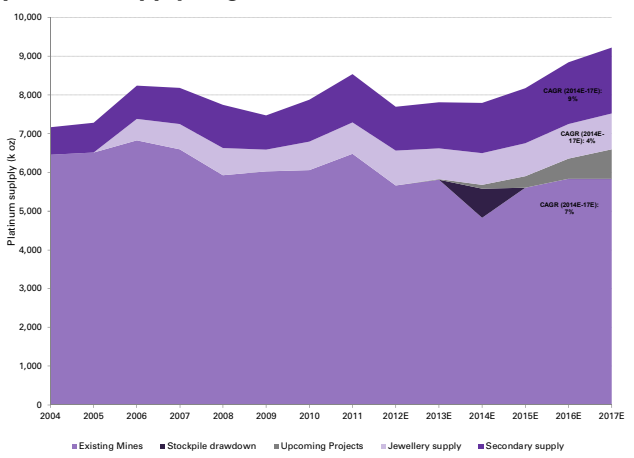
Source: Goldman Sachs Global Investment Research.

Exhibit 54: Pre-investment we expect platinum to be in a smaller deficit and to be in a surplus from 2016E



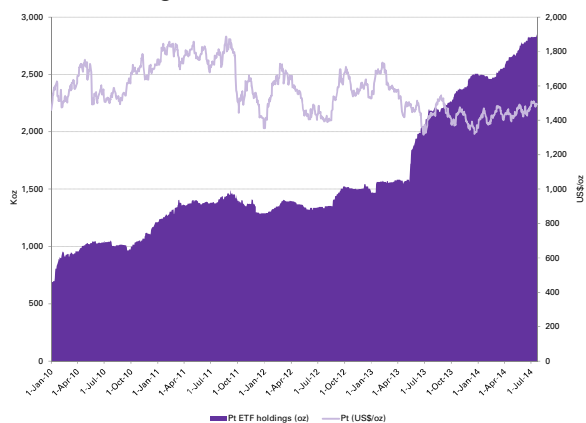
Source: Goldman Sachs Global Investment Research.

Exhibit 55: We forecast both primary and secondary platinum supply to grow



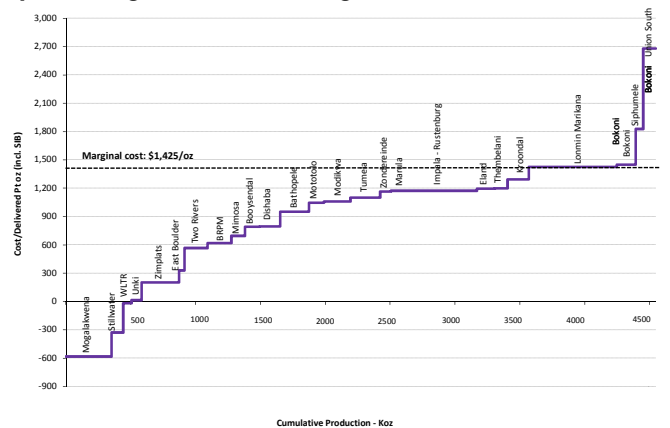
Source: Goldman Sachs Global Investment Research.

Exhibit 56: Pt ETFs have seen increased inflows since the strike, building on 2013 c.1mn oz increase



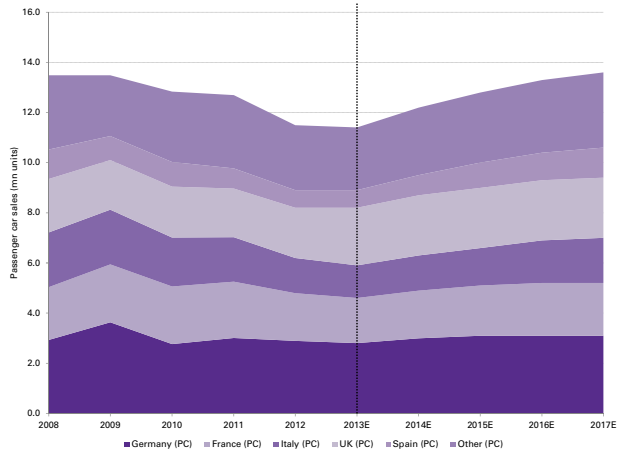
Source: Datastream, Bloomberg

Exhibit 57: We believe that the platinum price will be set by the marginal cost of mining at US\$1,425/oz



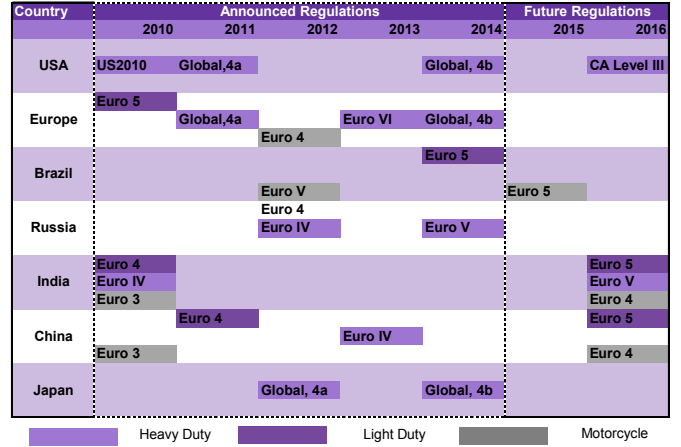
Source: Goldman Sachs Global Investment Research.

Exhibit 58: European auto sales are set to grow but insufficient to have a huge impact on Pt demand



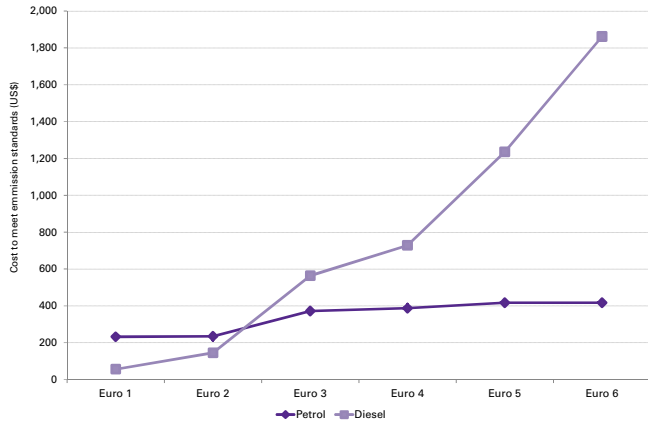
Source: Goldman Sachs Global Investment Research.

Exhibit 59: Proposed regulation changes are in gasoline markets and favour palladium



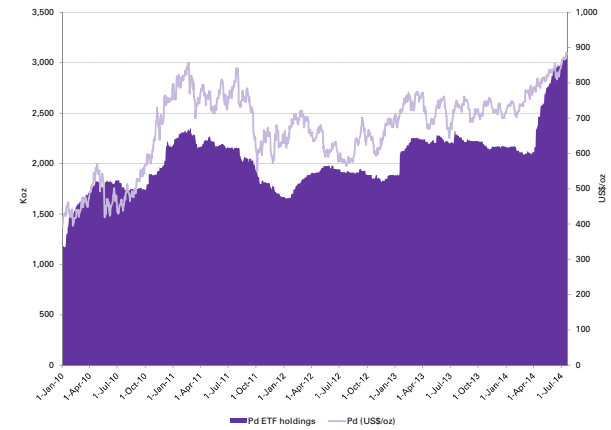
Source: Johnson Matthey.

Exhibit 60: Costs to meet Euro 6 emissions standard for diesel far greater than gasoline, negative for platinum



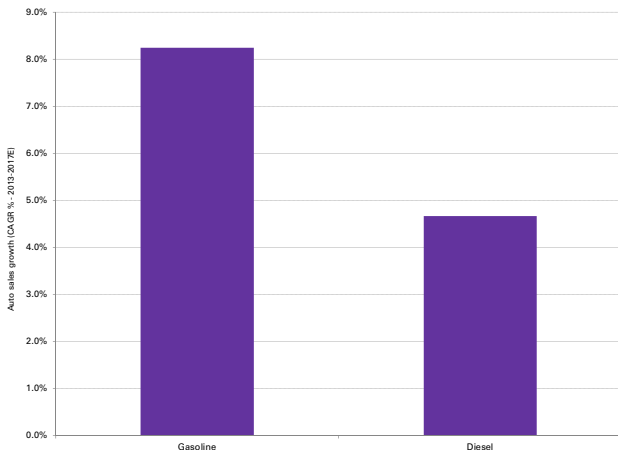
Source: The International Council of Clean Transportation (ICCT).

Exhibit 61: Pd ETFs have added c. 1.2Moz since on account of new SA Pd ETF; Pd prices are up 23% YTD



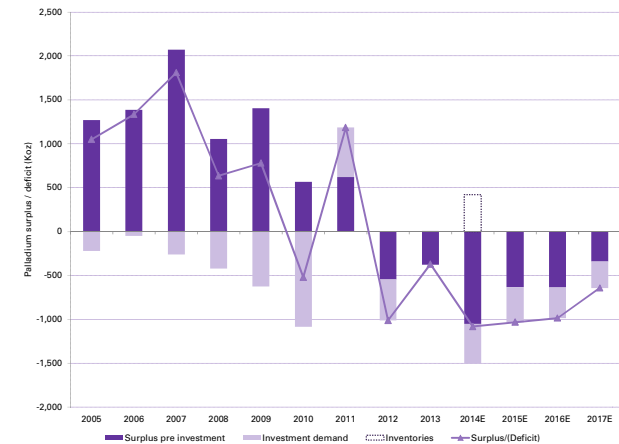
Source: Datastream, Bloomberg.

Exhibit 62: China, India– gasoline markets are expected to grow by >8%, while European market by 4.8%



Source: Goldman Sachs Global Investment Research.

Exhibit 63: Palladium has a far more convincing S-D balance – in a primary deficit since 2012



Source: Johnson Matthey; Goldman Sachs Global Investment Research.

Exhibit 64: Platinum supply-demand balance

K toz

Platinum Supply and Demand (k oz)														
'000 oz	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014E	2015E	2016E	2017E
South Africa	4,970	5,120	5,295	5,070	4,515	4,635	4,635	4,860	4,104	4,209	3,311	4,178	4,607	4,815
Russia	850	751	752	915	805	785	835	835	801	770	755	770	770	790
North America	385	365	345	325	325	260	200	350	315	315	325	348	349	354
Zimbabwe	83	155	169	170	170	230	280	340	337	410	414	475	501	501
Others	115	120	269	120	115	115	110	100	110	125	128	130	133	135
Mine Supply	6,460	6,511	6,830	6,600	5,930	6,025	6,060	6,485	5,667	5,829	4,932	5,901	6,360	6,595
Auto recycling	705	770	860	935	1,120	883	1,085	1,240	1,133	1,192	1,297	1,425	1,594	1,698
Jewellery recycling	0	0	555	650	700	565	735	810	895	790	818	853	890	928
Secondary supply	705	770	1,415	1,585	1,820	1,448	1,820	2,050	2,028	1,982	2,115	2,278	2,484	2,626
Total Supply	7,165	7,281	8,245	8,185	7,750	7,473	7,880	8,535	7,695	7,811	7,047	8,179	8,844	9,221
Demand by Application	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014E	2015E	2016E	2017E
Autocatalyst	3,490	3,795	3,905	4,145	3,660	2,185	3,075	3,185	3,186	3,116	3,245	3,470	3,670	3,770
Industrial	1,535	1,690	1,830	1,845	1,690	1,140	1,750	1,965	1,603	1,735	1,741	1,764	1,756	1,770
Jewellery	2,160	1,970	2,195	2,110	2,065	2,810	2,415	2,475	2,783	3,029	3,078	3,129	3,181	3,234
Total demand before investment	7,185	7,455	7,930	8,100	7,415	6,135	7,240	7,625	7,572	7,880	8,065	8,363	8,607	8,774
S-D balance pre-investment demand	-20	-174	315	85	335	1,338	640	910	123	-69	-1,017	-184	236	448
Investment demand	40	15	-15	170	555	660	655	460	450	871	400	300	300	300
Global mined platinum surplus/(deficit)	-60	-189	330	-85	-220	678	-15	450	-327	-940	-1,417	-484	-64	148
Stockpile drawdown											856			
Global refined platinum surplus/(deficit)	-60	-189	330	-85	-220	678	-15	450	-327	-940	-561	-484	-64	148

Source: Johnson Matthey; Goldman Sachs Global Investment Research.

Exhibit 65: Palladium supply-demand balance

K toz

Palladium Supply and Demand (k oz)														
'000 oz	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014E	2015E	2016E	2017E
South Africa	2,480	2,605	2,775	2,765	2,430	2,370	2,640	2,560	2,344	2,436	1,900	2,248	2,361	2,459
Russia	4,800	3,135	3,220	3,050	2,700	2,675	2,720	2,705	2,627	2,550	2,500	2,585	2,590	2,670
North America	1,035	910	985	990	910	755	590	900	903	980	972	1,017	1,020	1,037
Zimbabwe	0	125	135	135	140	180	220	265	263	318	324	371	391	391
Others	265	145	135	150	170	160	185	155	162	148	172	175	179	182
Mine Supply	8,580	6,920	7,250	7,090	6,350	6,140	6,355	6,585	6,299	6,432	5,867	6,396	6,540	6,739
Auto recycling	530	625	805	1,000	1,140	965	1,310	1,695	1,683	1,916	2,111	2,198	2,334	2,469
Others	0	365	425	550	475	465	540	690	638	619	720	800	850	850
Secondary supply	530	990	1,230	1,550	1,615	1,430	1,850	2,385	2,321	2,535	2,831	2,998	3,184	3,319
Total Supply	9,110	7,910	8,480	8,640	7,965	7,570	8,205	8,970	8,620	8,967	8,698	9,394	9,724	10,058
Demand by Application	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014E	2015E	2016E	2017E
Autocatalyst	3,790	3,865	4,015	4,470	4,465	4,050	5,580	6,155	6,667	6,908	7,200	7,575	7,960	8,050
Industrial	2,170	2,770	2,640	2,640	2,420	2,300	2,465	2,465	2,318	2,181	2,275	2,250	2,200	2,150
Jewellery	930	1,490	1,140	950	985	775	595	505	441	357	375	300	300	300
Total demand before investment	6,890	8,125	7,795	8,060	7,870	7,125	8,640	9,125	9,426	9,446	9,850	10,125	10,460	10,500
S-D balance pre-investment demand	2,220	-215	685	580	95	445	-435	-155	-806	-479	-1,152	-731	-736	-442
Sales from stock	0	1,485	700	1,490	960	960	1,000	775	260	100	100	100	100	100
Investment demand	200	220	50	260	420	625	1,085	-565	467	-8	450	400	350	300
Global Palladium surplus/(deficit)	2,020	1,050	1,335	1,810	635	780	-520	1,185	-1,013	-371	-1,502	-1,031	-986	-642
Stockpile drawdown											481			
Global refined palladium surplus/(deficit)	2,020	1,050	1,335	1,810	635	780	-520	1,185	-1,013	-371	-1,021	-1,031	-986	-642

Source: Johnson Matthey; Goldman Sachs Global Investment Research.

Gold: Updating LT price forecasts to \$1,200/oz (2014 \$)

This section was authored by Andrew Quail and Jitendra Pandey, GS equity analysts

We have updated our long-term real gold price forecast to \$1,200/oz in \$2014 terms (was \$1,066/oz) to make it more in-line with our marginal cost support level, see Exhibit 66. Currently gold is trading at a 9% premium to our LT real (inflation-adjusted) forecast but we believe on a long-term basis the price should revert back to the cost support level in-line with our estimates.

Exhibit 66: LT gold price forecast updated to \$2014 real terms; other forecasts unchanged
Gold price forecast – (\$/oz)

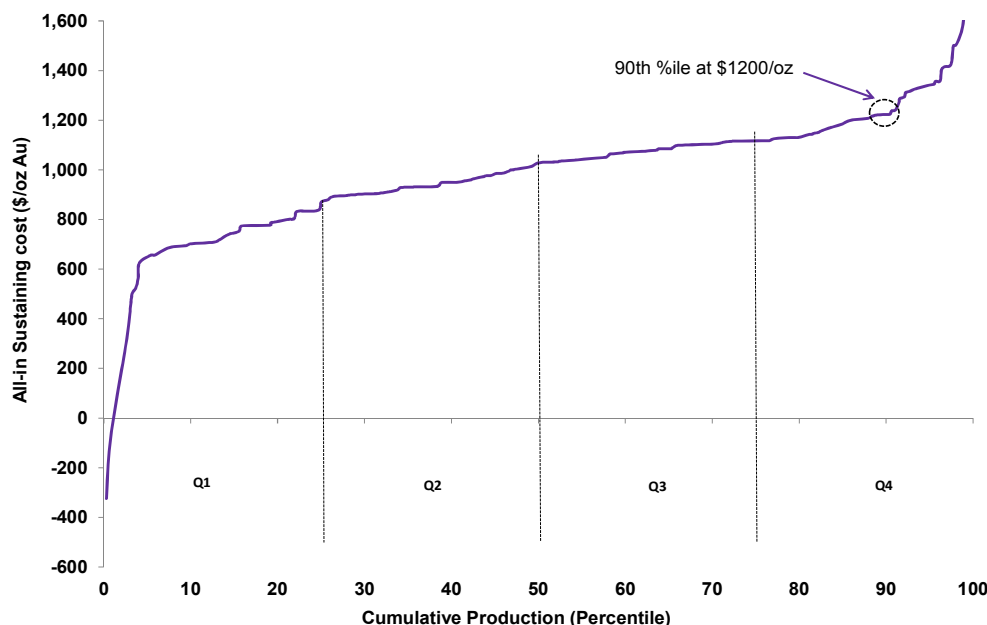
Gold price (\$/oz)	2014	2015	2016	2017	LT forecast (\$2014 real)
New	1,195	1,200	1,200	1,200	1,200
Old	1,195	1,200	1,200	1,200	1,066
Change	0%	0%	0%	0%	13%

Source: Goldman Sachs Global Investment Research.

Marginal cost support at \$1,200/oz level

In our view, the 90th percentile of all-in sustaining costs (defined as total by-product cash cost plus royalty expense, plus sustaining capex, exploration and corporate expenses) provides a good estimate of the floor price for gold, as it is the breakeven level for the marginal producer. At times of extreme declines in demand, it is possible for prices to fall below the marginal cost support level; however we believe such events are generally short-lived. Exhibit 67 shows our latest 2014 gold’s all-in sustaining cost curve.

Exhibit 67: 90th percentile is US\$1,200/oz...
Gold’s all-in sustaining cash cost curve (AISC)



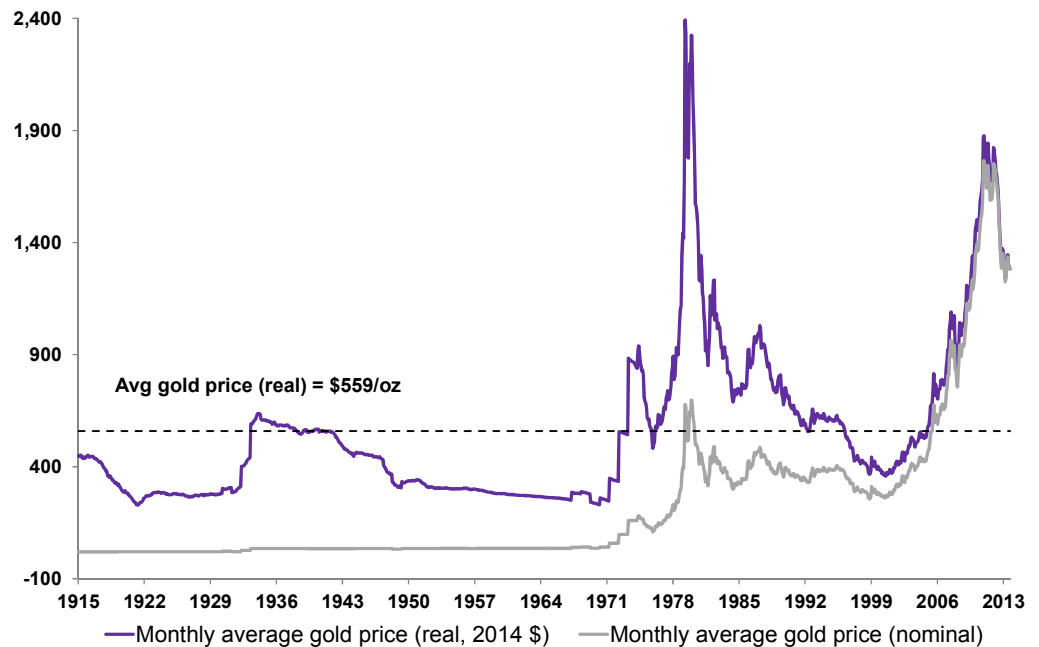
Source: Goldman Sachs Global Investment Research.

Gold price relatively stable over the long term

Over long time horizons, the real gold price has been relatively stable, keeping pace with inflation. Exhibit 68 illustrates that the real price of gold was fairly constant until the early 1970s, after which it became highly volatile. Although the real price has experienced significant volatility post the 1970s, we highlight its tendency to a mean reversion trend. The real gold price fell back to the 1950s level in 2001 after peaking in 1980, and it is currently in decline again after peaking in 2011.

Exhibit 68: Over long horizons, the real price of gold has been fairly stable

Gold price (real and nominal, \$/oz)



Source: FactSet, Haver, Goldman Sachs Global Investment Research.

We continue to remain bearish on gold in 2014

We expect gold prices to drop to \$1,050/oz by the end of 2014, maintaining our previous forecast. Acceleration in the US economic recovery story remains the key driver behind our lower gold price forecast. While weak economic data due to cold weather and the onset of the Crimea crisis led to a sharp rally in gold prices between January and mid-March, sequentially better US activity and easing tensions pushed gold prices lower by early April. Since then, US economic releases have continued to point to acceleration in growth while tensions in Ukraine have escalated, keeping gold prices range bound near \$1,300/toz.

Iron ore: Further downside as oversupply grows in 2015

We have consistently argued that the shift to structural oversupply in 2014 would see falling seaborne prices drive the closure of small, high-cost Chinese mines in coastal provinces but the cost support provided would be limited because the scale of production cuts in China is likely to surprise on the downside. The recent price declines for both imported and domestic material already provide sufficient pressure for marginal Chinese supply to close, and we believe the scale of the surplus in 2015 will also put high cost seaborne producers at risk.

Exhibit 69: GS iron ore supply and demand forecast

Million tonnes

	2009	2010	2011	2012	2013E	2014E	2015E	2016E	2017E	2018E
Global steel demand										
Crude steel production (incl. scrap)	1,221	1,409	1,536	1,510	1,578	1,646	1,701	1,760	1,799	1,840
Global iron ore demand										
China	871	913	985	1,015	1,115	1,142	1,158	1,175	1,191	1,208
RoW	658	781	816	799	775	818	859	905	927	951
Total	1,529	1,693	1,801	1,813	1,891	1,960	2,018	2,080	2,119	2,160
% growth	-1.7%	10.7%	6.4%	0.7%	4.3%	3.7%	2.9%	3.1%	1.9%	1.9%
Seaborne demand										
China	628	624	687	745	820	865	890	915	935	955
RoW	276	379	386	380	382	397	400	404	408	413
Total	904	1,003	1,073	1,126	1,202	1,262	1,290	1,319	1,343	1,368
% growth	6.5%	10.9%	6.9%	5.0%	6.8%	4.9%	2.2%	2.3%	1.8%	1.8%
Seaborne supply										
Australia	363	402	438	494	579	688	752	808	833	831
Brazil	266	311	331	327	330	347	400	430	479	519
RoW	281	314	317	293	307	298	313	325	335	342
Total	910	1,027	1,086	1,114	1,216	1,333	1,465	1,563	1,647	1,691
% growth	7.2%	12.9%	5.7%	2.6%	9.2%	9.7%	9.8%	6.7%	5.3%	2.7%
Seaborne balance										
Surplus/(deficit)	6	24	13	(12)	14	72	175	244	303	323
Price										
Fines 62% Fe CFR China (US\$/dmt)	\$ 81	\$ 145	\$ 168	\$ 130	\$ 135	\$ 107	\$ 80	\$ 82	\$ 85	\$ 80*

*2018E price forecast represents our LT forecast in US\$2014; forecast in other years are nominal.

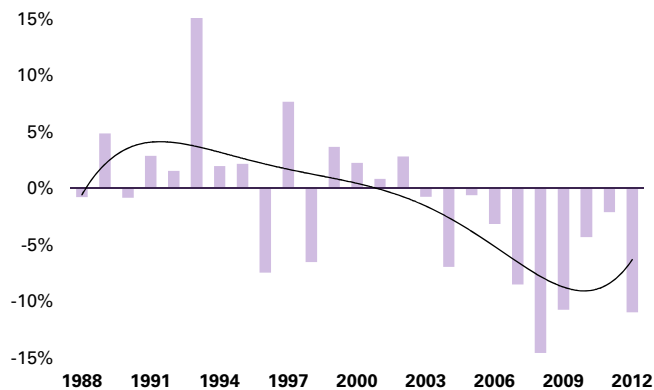
Source: World Steel Association, Wood Mackenzie, Goldman Sachs Global Investment Research.

Structural oversupply to widen in 2015

Productivity in the iron ore industry declined during the last investment phase, but in our view this decline is being unwound by producers who have shifted their focus from rapid growth to operating efficiency (Exhibit 70). In our view, rising productivity across an asset base that benefited from a decade of overinvestment will become an important engine of supply growth in the years ahead. At the same time, new production capacity continues to be developed in some supply regions, including the US\$10 billion Roy Hill in Australia. The pace of capital expenditure is slowing, and the capital intensity of future volume growth will decline because it will benefit from infrastructure already in place. However, the delivery of new projects will compound rising output from existing operations (Exhibit 71).

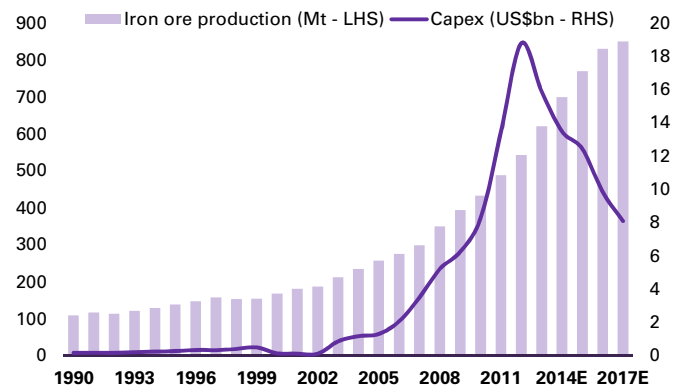
Meanwhile, seaborne demand is slowing down; we expect Chinese steel production growth to moderate to 3% in 2014 and 2% in 2015. In our view, the key question in the iron ore market is how producers will respond to the growing oversupply and in particular how the resulting competition between high cost mines in China and overseas will drive prices. We continue to believe that the market is underestimating the downside risk that China will not absorb every tonne of incremental seaborne supply, and a material amount of seaborne capacity will eventually have to close.

Exhibit 70: Iron ore yet to emerge from investment phase
Total factor productivity in the iron ore sector – Australia/Brazil/Canada/China average



Source: WSA, Western Australia government, ABS, Canadian government, NBS, NEREUS, Company data, Goldman Sachs Global Investment Research.

Exhibit 71: Australian iron ore output growing 10% yoy
Investment and output in the Australian iron ore sector

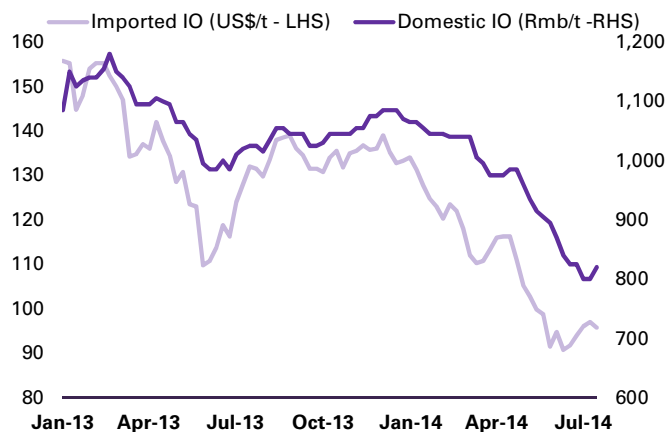


Source: WSA, ABS, Goldman Sachs Global Investment Research.

The displacement of marginal Chinese supply is under way

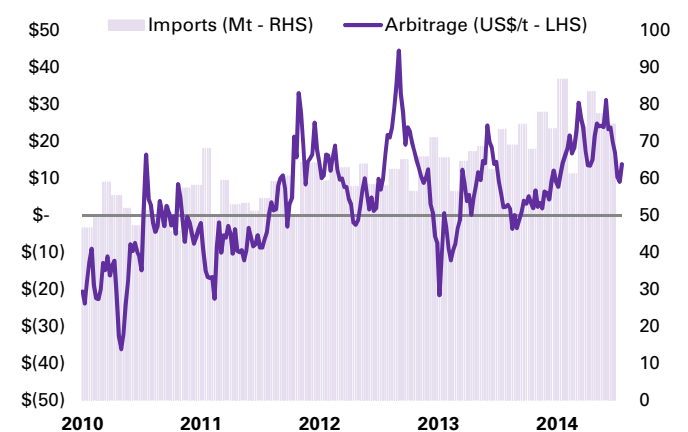
This year, seaborne prices are driving domestic prices (Exhibit 72). The decline for imported prices has been steeper in the year to date, but domestic prices are responding with a time lag. The price differential between the two markets has widened this year; in our view, it is no coincidence that the price discount for imported ore increased from an average of US\$2/t over the period 2010-13 to US\$20/t in 1H2014 and US\$14/t as of July 18 (Exhibit 73).

Exhibit 72: Domestic price declines with 6-week lag...
Seaborne and Chinese domestic iron ore prices



Source: Platts, MySteel.

Exhibit 73: ... as import ore discount widens to US\$20/t
Price differential between domestic and seaborne iron ore (CFR Tangshan, adjusted for Fe % and VAT)



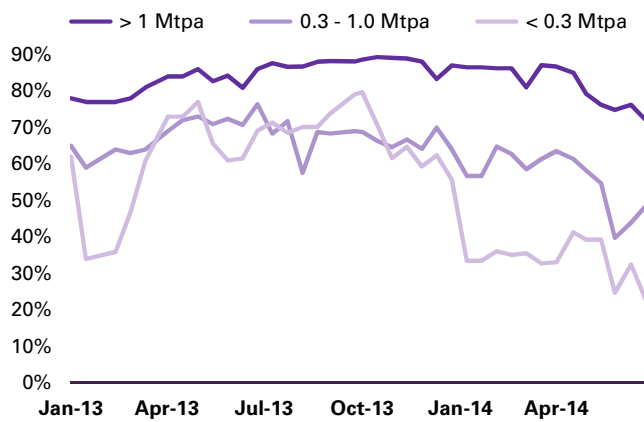
Source: MySteel, Platts, Goldman Sachs Global Investment Research.

Platts has recently reported on a wave of mine closures in China as a result of weaker prices. We expect most of the impact to be felt in Hebei because it is the largest producer in China and because we believe its marginal costs are higher than in most other provinces. In the previous market downturn in 2012, Hebei output declined in response to a price decline from Rmb1,200/t to Rmb1,000/t. According to the latest monthly production statistics, Hebei output continues to expand while prices of domestic concentrate have fallen to Rmb820/t. In our view, the closure of high-cost mines in coastal provinces will not be sufficient to fully absorb the growing surplus, leading to greater competition among seaborne producers going into 2015.

We believe that the competitiveness of Chinese iron ore producers is largely dependent on their scale and their ability to invest in mechanization; a large mine with highly productive mining method and efficient concentrator is likely to outlast smaller, more labor-intensive competitors. This assumption is borne out by biweekly data on mine utilization that shows small and medium mines responding to lower domestic prices via reduced production volumes (Exhibit 74). During the course of the year we expect further production cuts in China, even though these will be partly offset by ongoing investment in mine expansions and new projects.

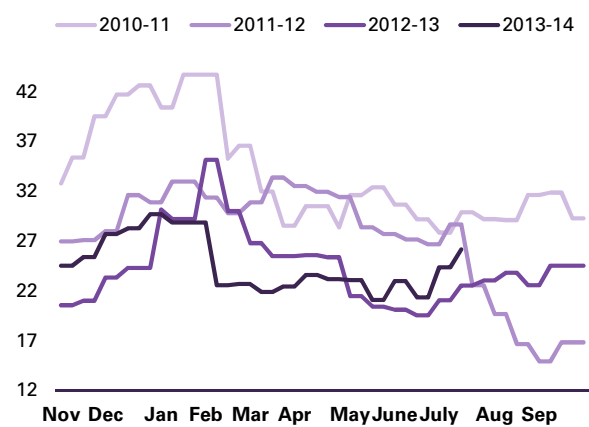
The inventory cycle is also set to keep marginal supply under pressure. The data suggest that iron ore inventory held at Chinese mines has been increasing this year. Further downstream, inventory held by small and medium mills is within the seasonal average, and the expectation of ample supply and downside price risk should encourage consumers to keep inventories at a low level (Exhibit 75). Meanwhile, port inventories remain near record high levels as **Chinese stockyards have played the role of market of last resort**. In our view, Chinese ports are unlikely to play that role indefinitely.

Exhibit 74: Smaller mines are more price-sensitive
Average mine utilization rates by mine size



Source: MySteel.

Exhibit 75: Steel mill inventories are adequate
Average small/medium steel mill inventory – days of use



Source: MySteel.

Metallurgical coal: Marginal producers to stay in the red until 2016

The closure of the Norwich Park mine in mid-2012 marked the beginning of a supply response to falling metallurgical coal prices that continues to this day. Over the past 18 months, we estimate that approximately 21Mt of coking coal production capacity has closed in the US (52%), Australia (24%), and other regions (24%). Given the time lag between a company's decision to suspend mining operations and the final shipment of finished product, we believe the impact of production cuts will become stronger during 3Q 2014, and this should mark the beginning of a recovery towards a more balanced market. However, the recovery will be gradual, and more production cuts are likely because the supply trends behind weaker prices are structural rather than cyclical.

Exhibit 76: GS metallurgical coal supply and demand forecast

Million tonnes

	2009	2010	2011	2012E	2013E	2014E	2015E	2016E	2017E	2018E
Global demand										
Crude steel output (incl. scrap)	1,221	1,409	1,536	1,510	1,578	1,646	1,701	1,760	1,796	1,834
Coking coal consumption	768	881	936	976	1,016	1,057	1,091	1,127	1,149	1,173
% growth	3.0%	14.7%	6.3%	4.3%	4.1%	4.0%	3.2%	3.4%	2.0%	2.0%
Seaborne demand										
OECD	93	120	124	127	128	131	138	141	143	145
non-OECD	87	96	89	101	131	134	132	138	145	147
Total	181	216	214	229	258	265	270	279	288	292
% growth	-0.4%	19.8%	-1.2%	7.1%	12.9%	2.6%	2.0%	3.1%	3.1%	1.7%
Seaborne supply										
Australia	111	133	112	120	140	153	160	166	170	173
US	32	48	59	59	56	48	43	41	41	40
RoW	32	43	44	52	64	66	67	73	78	80
Total	175	224	216	231	260	267	271	280	288	293
Seaborne balance										
Surplus/(deficit)	(5)	8	2	2	2	3	0	1	0	0
Price										
Premium HCC FOB Australia (US\$/t)	\$ 172	\$ 191	\$ 289	\$ 191	\$ 148	\$ 120	\$ 133	\$ 140	\$ 145	\$ 168*

*2018E price forecast represents our LT forecast in US\$2014; forecast in other years are nominal.

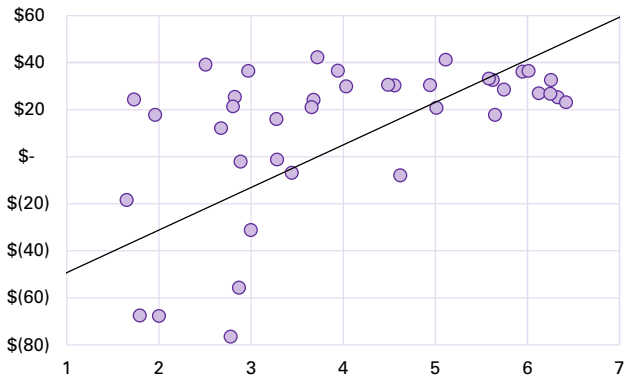
Source: International Energy Agency, McCloskey, Platts, Goldman Sachs Global Investment Research

Challenging China outlook provides limited upside to seaborne coal

China accounts for nearly 60% of global consumption and for 25% of seaborne demand, but imports only provide 11% of Chinese consumption. Although the link between import volumes and price differential with domestic coal is not as clear as it is in thermal coal, Chinese metallurgical coal imports are price sensitive to some degree (Exhibit 77). Given the link between the seaborne and Chinese markets, it is not surprising that metallurgical coal prices in both markets have declined in tandem. The causality may not be obvious, but both markets are faced with oversupply and slower demand growth. A c.40% decline in domestic prices has pushed a significant share of domestic producers into a loss, but output has not been significantly impacted; ytd production in the key metallurgical coal provinces of Shanxi and Shandong is up 2% on 2013.

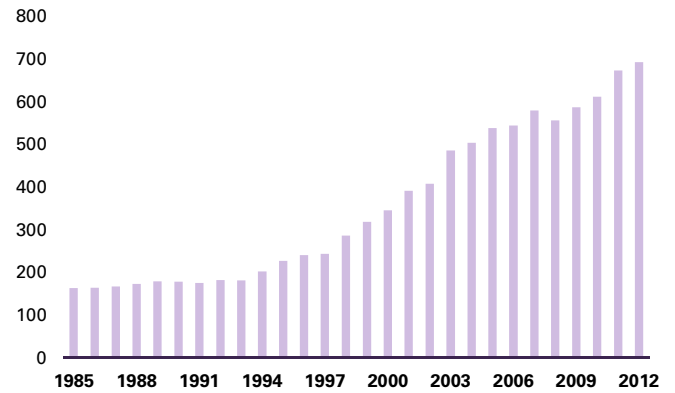
Production growth in China is partly driven by the completion of growth projects that were approved when prices were more attractive. From the perspective of the project owner, bringing a new project online in a depressed market is often a better option than keeping a half-built project that does not generate any cash. Meanwhile, production cuts have been more limited than in the thermal coal sector. In our view, this reflects the fact that SOEs play a larger role in metallurgical coal and they tend to be less price-sensitive than privately-owned producers. Importantly, this period of capacity growth and limited closures of marginal supply contributes to the ongoing trend of increased mechanization in the Chinese coal sector; whereas the output per employee in most other regions has steadily declined over the past decade, in China it has nearly doubled (Exhibit 78).

Exhibit 77: China import volumes are price sensitive
 Chinese metallurgical coal imports (Mt, x-axis) and import price differential (US\$/t, y-axis) with a 2-month lag – 2010-14



Source: Platts, SxCoal, McCloskey.

Exhibit 78: Chinese coal is increasingly mechanised
 Labour productivity in Chinese coal sector – t per employee



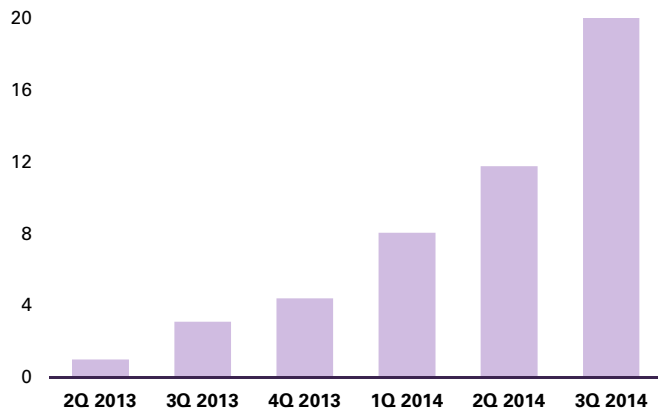
Source: NBS.

An oversupplied Chinese market will hinder rather than support the eventual recovery in seaborne prices. In our view, the seaborne price weakness over 2013-2014 is due in no small part to the fact that ongoing investment and productivity growth are boosting domestic production in the Chinese coal sector at a time when demand growth from the steel sector is slowing down sharply; we expect Chinese seaborne import volumes to decline from their 2013 peak.

The pace of mine closures has recently picked up

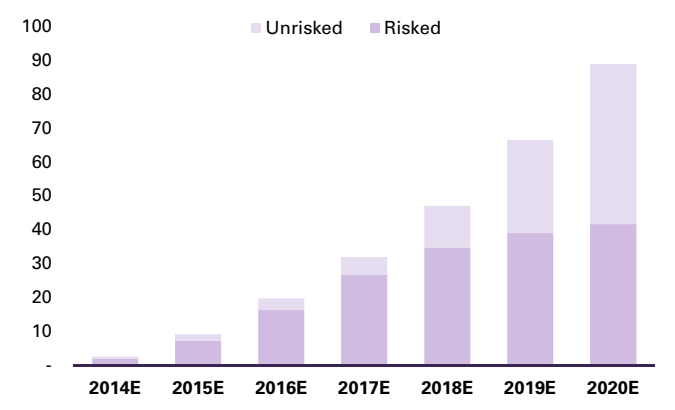
Starting in 2012, a sustained period of low prices has forced over two dozen metallurgical coal mines to either downsize or idle production. These capacity cuts amount to 21Mtpa over the past 18 months, equivalent to 8% of seaborne supply; importantly, the pace of closures has increased this year and we expect the impact on seaborne supply to be felt more strongly during 3Q 2014 (Exhibit 79). However, additional mine closures will be needed to offset the growth in Australian export volumes and the expected completion of new projects in key supply regions (Exhibit 80); the recovery back to sustainable prices will be more gradual than previously expected.

Exhibit 79: The delayed impact on supply will hit in 3Q14
 Quarterly impact of closures to date (Mtpa, as of June 2014)



Source: Company data, Goldman Sachs Global Investment Research.

Exhibit 80: More supply growth in the pipeline
 Seaborne supply growth from new projects - Mt



Source: Company data, Goldman Sachs Global Investment Research.

Thermal coal: The window for new investment has closed

In principle, thermal coal should have a bright outlook: not only it is a cheap source of energy, but with 1.2 billion people still lacking proper access to electricity it also has a large untapped market. Moreover, addressing energy poverty is considered a key development goal because a reliable supply of electricity has a major impact on health, education and economic development. In practice, we believe that coal demand will grow at a modest rate and prices will remain near the level of marginal production costs.

Exhibit 81: GS thermal coal supply and demand forecast

Million tonnes

	2009	2010	2011	2012	2013E	2014E	2015E	2016E	2017E	2018E
Global demand										
Energy sector	3,913	4,084	4,302	4,277	4,507	4,626	4,730	4,822	4,914	5,019
Other sectors (e.g. cement, etc)	1,177	1,327	1,375	1,537	1,534	1,578	1,630	1,687	1,743	1,802
Total	5,090	5,411	5,677	5,814	6,041	6,204	6,360	6,509	6,657	6,821
% growth	1.4%	6.3%	4.9%	2.4%	3.9%	2.7%	2.5%	2.3%	2.3%	2.5%
Seaborne demand										
OECD Europe	144	130	138	160	156	151	149	148	146	143
China	58	92	102	144	150	146	125	105	90	75
India	65	81	98	126	145	160	180	200	215	230
Japan	107	123	120	133	138	144	146	148	148	150
RoW	248	270	283	280	291	304	324	341	352	366
Total	622	697	742	843	879	905	924	942	951	964
% growth	4.7%	12.0%	6.5%	13.6%	4.4%	2.9%	2.2%	1.9%	1.0%	1.4%
Seaborne supply										
Indonesia	229	287	315	349	379	392	398	405	408	411
Australia	139	141	148	171	188	197	202	208	213	218
RoW	254	269	276	321	312	320	324	329	333	336
Total	623	697	738	841	880	909	924	942	954	965
Seaborne balance										
Surplus/(deficit)	1	0	(4)	(2)	0	4	(0)	1	3	1
Price										
6,000kcal NAR, FOB Newcastle (US\$/t)	\$ 84	\$ 91	\$ 121	\$ 95	\$ 84	\$ 75	\$ 78	\$ 80	\$ 80	\$ 77*

*2018E price forecast represents our LT forecast in US\$2014; forecast in other years are nominal.

Source: International Energy Agency, McCloskey, Goldman Sachs Global Investment Research.

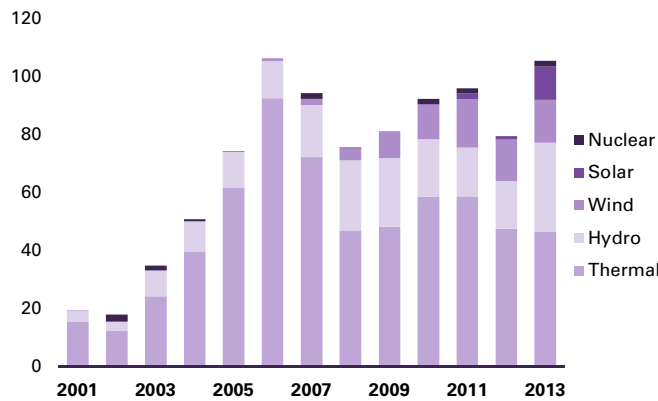
Seaborne demand growth to moderate as China peaks

The demand outlook for thermal coal is gradually changing. In the recent past, seaborne demand was booming as China switched from a net exporter to the world's largest importer in a relatively short period of time. Now that China faces domestic oversupply and a more diverse fuel mix, India and other Asian markets should become the key drivers of demand over our forecast period to 2018. However, thermal coal continues to face structural headwinds from environmental regulation, increased energy efficiency, and growing competition from renewable energy. We expect moderate seaborne demand growth of c.2% per annum to be met largely from rising productivity, keeping prices near the level of marginal production costs.

China has been the key driver of seaborne demand over the past five years, but this is changing for several reasons. On the supply side, domestic coal production is more competitive than previously as a result of significant investment in the consolidation and mechanisation of Chinese mines. Faced with a well-supplied domestic market, Chinese power plants continue to import coal, but only when the seaborne price is competitive with domestic coal. On the demand side, a clear shift has occurred in the fuel mix of new capacity, as the traditional reliance on coal-fired plants is giving way to a more diverse mix where renewable energy plays a greater role. In 2013, thermal generation capacity (including gas) accounted for a smaller share of new capacity than hydro, wind and solar power (Exhibit 82). As concerns around pollution intensify, we believe this trend to lead to

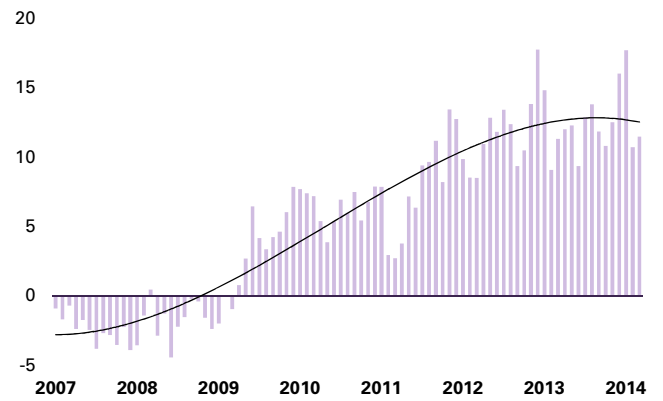
a gradual deceleration in coal-fired generation. In our view, a more competitive Chinese coal sector combined with a lower rate of demand growth from the power sector will result in a peaking in import volumes, followed by a decline. Compared with the period 2009-12 when annual imports increased by 33Mt on average per year, ytd imports 2014 are largely flat on the previous year (Exhibit 83).

Exhibit 82: China is changing: a more diverse fuel mix...
Increase in power generation capacity by type - GW



Source: CEIC.

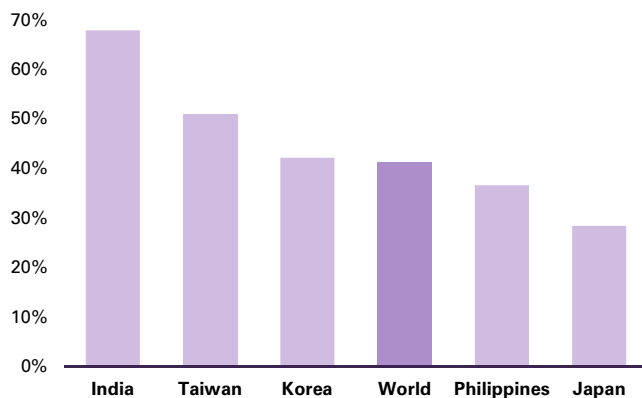
Exhibit 83: ... and a peak in import volumes
Net Chinese seaborne thermal coal imports - Mt



Source: McCloskey.

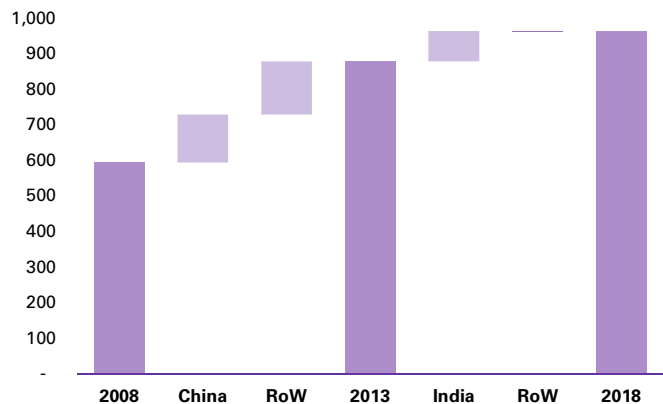
As China gives up the role of key growth market for seaborne coal, the focus migrates to other Asian markets. In Japan, coal-fired generation is helping to fill the gap left by idle nuclear power. In Korea, the size of the coal-fired fleet is expanding from 25GW in 2013 to 39GW in 2018. Given the high cost of LNG relative to gas prices in other regions and the lack of domestic energy sources, it is not surprising that East Asia stands out among OECD economies as one of the few growth markets left for coal-fired generation. However, the biggest growth market is India. Not only is India's power sector highly dependent on coal (Exhibit 84), but its domestic coal sector has been unable to keep up with demand – unlike China. India still has a large electricity deficit with over 300 million people still lacking access to the grid. In spite of a slowing economy, we expect Indian import growth to continue for the next 5 years at a similar pace to that of the previous 5 years, turning India into not only the biggest single market for seaborne coal but also its biggest growth driver (Exhibit 85).

Exhibit 84: India is highly dependent on coal...
Share of coal in the fuel mix (2012)



Source: World Bank, IEA.

Exhibit 85: ... and will be the key growth market to 2018
Seaborne thermal coal imports by region - Mt



Source: McCloskey, IEA, Goldman Sachs Global Investment Research.

However, the world has changed, and demand growth is less widespread than it used to be. There are growth markets in other regions outside Asia, but this is offset by the gradually shrinking base of coal-fired generation in Europe and the expected decline in imports into China.

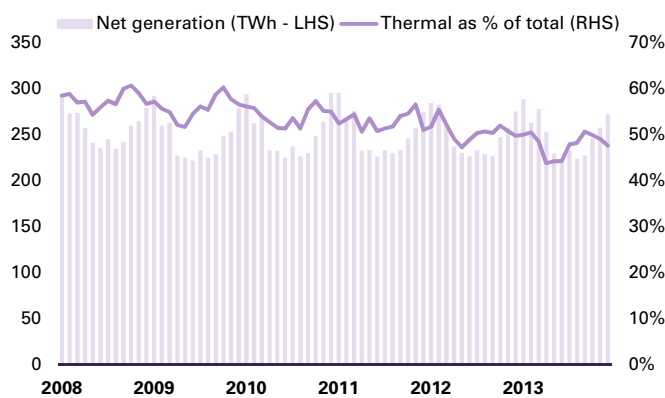
Long-term demand outlook clouded by structural headwinds

In our view, environmental regulation remains the biggest threat to thermal coal demand. Regulation impacts coal demand on two levels. In the short term, regulations impact the operating cost of coal-fired generation and the impact on coal demand is often limited: carbon prices are usually too low to undermine materially the cost advantage of coal-fired plants relative to gas. Likewise, plants that are unable to meet tighter emissions standards are often allowed to operate for a period of time before their eventual closure. However, the long-term impact of regulation is arguably greater, by increasing the risk profile of investment in new plants. How will current regulations be tightened over the 40-year lifetime of a new plant, and what new regulations may be introduced over that period that could result in its early closure? Faced with this uncertainty, many utilities choose to diversify their portfolios away from coal even when coal is the lowest cost energy source at the moment.

In addition to regulatory risks, we consider the trend towards higher energy efficiency and the spread of renewable energy as further headwinds for coal demand. In principle, lower electricity consumption per unit of GDP should impact all energy sources; in practice, the impact falls mostly on coal and gas because of their higher marginal costs relative to nuclear, hydro, solar and wind. In Europe, annual power generation has declined 3% between 2008 and 2013 while the share of conventional thermal fell from 58% to 48% (Exhibit 86). In Germany, renewable energy recently contributed up to 75% of midday power generation, driving spot power prices into negative territory for a short period of time.

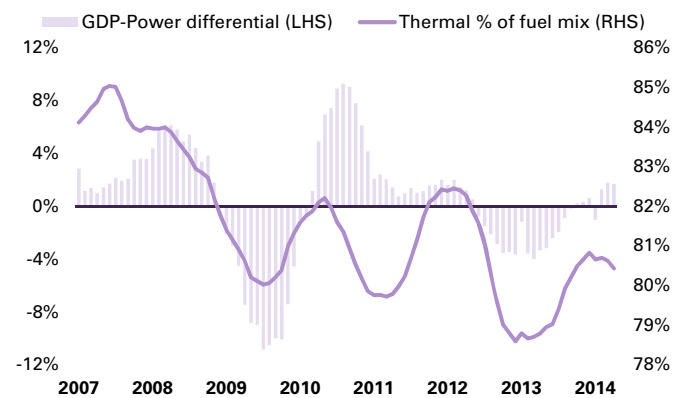
In China, power generation is growing at a slower rate. Whereas electricity demand growth enjoyed a decade of 12% average annual growth, it now has declined towards 6%. Relative to GDP growth, this trend reflects the efforts to improve energy efficiency in the Chinese economy. Regarding the fuel mix, investment in alternative energy sources is gradually reducing the share of conventional thermal power generation (Exhibit 87). For the first time in years, coal-fired plants accounted for less than 50% of new capacity additions in China, while wind and solar capacity increased by 41% to 90GW as of December 2013.

Exhibit 86: A structural decline in Europe...
EU27 power generation and share of conventional thermal



Source: Eurostat.

Exhibit 87: ... and an inflection point in China
Differential between GDP and power generation growth



Source: CEIC.

As we have recently argued, a period of overinvestment in production capacity has ended, giving way to an exploitation phase where supply growth comes mainly from more efficient utilization of existing capacity. In this environment of rising productivity, cost deflation and falling commodity currencies, we reset our estimate of cost support to US\$80/t FOB Newcastle, and we argue that existing capacity should be sufficient to satisfy demand for the rest of the decade without the need for new investment in large greenfield projects.

During the exploitation phase that is now under way, a more competitive environment will drive coal producers to debottleneck their operations and focus on improving productivity; the pressure of lower profit margins in a well-supplied market creates a strong incentive to use labour and capital resources as efficiently as possible.

Coal will play a limited role in addressing energy poverty

Demand for electricity from Sub-Saharan Africa and Southeast Asia is bound to increase as electrification reaches a greater share of the population, and this will benefit coal-fired power generation. However, we see those regions as also amongst the most vulnerable to climate change (please see details in *Heat Sensor - The thermal coal paradox*, May 23, 2014) and this will likely shift future investment towards less polluting energy sources. India clearly has significant upside for thermal coal because of its size and its ability to build coal-fired plants, but the battle on energy poverty in other regions is unlikely to have a material impact on seaborne demand growth, in our view. Moreover, we consider the fact that only four countries account for 75% of the expected growth in demand over our forecast period as a negative.

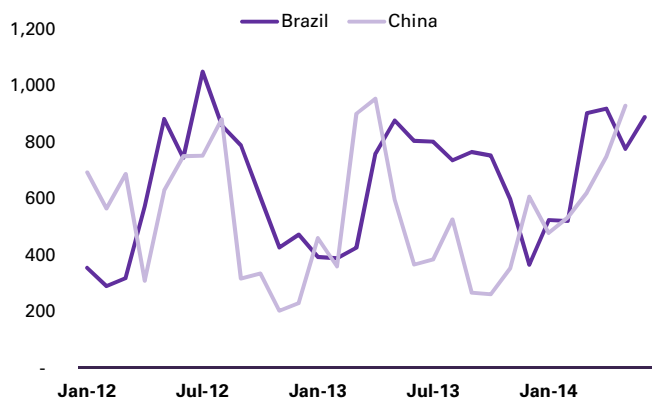
We expect the seaborne market to grow at an average annual rate of c.2% over our forecast period to 2018. On the supply side, the coal industry needs to undo a decade of productivity decline by using existing production capacity in a more efficient manner. In our view, volume growth from rising productivity will be sufficient to satisfy seaborne demand. Putting aside the debottlenecking and optimization of existing capacity, we believe that new investment in large-scale projects requiring new infrastructure is unlikely to earn a return as the window for profitable investment in new mining and infrastructure capacity has closed.

Potash: Pricing power versus excess capacity

1H14 recovery unlikely to be sustained in 2H

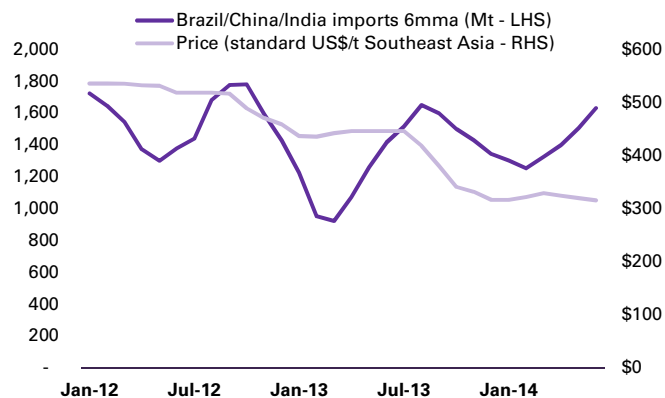
Potash demand has been strong so far this year. Low prices at the end of 2013 encouraged customers to buy at the trough of the market, and strong sales volumes in 1H14 has made it possible for producers to raise prices in some regions. Demand has been strongest in Brazil, where ytd imports are up 24% yoy, causing a shortage of granular product and a consequent premium over standard potash prices. This has raised expectations among producers of further price increases in the months ahead, but in our view market fundamentals point to a period of softness instead. First, strong demand in 1H14 was partly in response to low prices, and potash inventories in some markets are now relatively high. Second, a strong harvest and downward pressure on crop prices are likely to moderate the incentive for increased potash application in the next cycle, while a poor monsoon season is likely to depress Indian demand.

Exhibit 88: Strong 1H14 demand from major markets...
Monthly potash imports – Kt (KCI)



Source: CRU.

Exhibit 89: ... unlikely to support 2H14 prices
Monthly potash imports and prices



Source: CRU.

Pricing power versus excess production capacity

In our view, the large suppliers (Canpotex, Uralkali and Belaruskali) have managed to reestablish a degree of pricing power which is reflected in the fact that prices have consistently remained above the level of marginal production costs, unlike other commodities with excess capacity such as metallurgical coal where prices have dipped up to 20% below marginal cost. Even in the absence of a joint marketing organization for Uralkali and Belaruskali, supply discipline is likely to resume; the body language of large producers suggest they would be comfortable with a return to 2012 market shares.

However, the potash price premium is unlikely to return to 2012 levels, when average operating margins were close to 50%. We expect instead that a widening gap between potash demand growth and installed production capacity will see global utilization rates decline gradually from 85% in 2014 to 78% in 2018. The time lag in the mining sector between the investment decision and the start of production is significant, and based on our analysis of global potash projects we estimate that 16Mt of new production capacity is likely to come online by 2018.

Moreover, we believe that producers outside the oligopoly will account for a growing share of capacity additions. Over the period 2014-18, we expect those producers to account for c.35% of new capacity, rising to c.45% by 2020. In the past, Canpotex and BPC have been willing to accept lower utilization rates than the rest of the industry in order to support

prices. Going forward, we believe that persistent overcapacity and a growing share of non-oligopoly players will make the old approach increasingly difficult to maintain.

We downgrade our LT price forecast to US\$350/t

In a perfect monopoly, the dominant producers are able to set prices at a level that maximizes their profits. Over a 5 year period to June 2013, seaborne potash prices averaged c. US\$450/t. Looking ahead, we believe the potash industry will be able to maintain prices above our US\$300/t estimate of marginal production costs. In the short term, we believe prices should soften on the back of healthy inventory levels and downward pressure on crop prices. In the long term, we believe that large producers will enjoy enough pricing power to support prices at the US\$350/t level.

Exhibit 90: We downgrade our LT price forecast by c.20% to US\$350/t

Bulk Commodities: Price Forecast Summary		nominal US\$/t except LT price									
		Q1 2014	Q2 2014	Q3 2014E	Q4 2014E	2013	2014E	2015E	2016E	2017E	Long Term 2014 \$
Potash											
MOP - granulated	CFR Brazil	\$ 326	\$ 346	\$ 335	\$ 320	\$ 405	\$ 332	\$ 310	\$ 320	\$ 340	\$ 350
	<i>change vs previous</i>			8%	3%		3%	0%	0%	0%	-19%
MOP - standard	CFR SE Asia	\$ 322	\$ 319	\$ 315	\$ 300	\$ 406	\$ 314	\$ 290	\$ 300	\$ 320	\$ 335
	<i>change vs previous</i>			9%	3%		3%	0%	0%	0%	-20%

Source: Goldman Sachs Global Investment Research.

Exhibit 91: GS potash supply and demand forecast

Million tonnes

Million tonnes - KCI	2009	2010	2011	2012	2013E	2014E	2015E	2016E	2017E	2018E
Arable Land - million hectares										
OECD	417	408	412	416	415	414	413	412	411	410
non-OECD	964	972	976	978	980	982	985	987	989	991
Total	1,381	1,380	1,388	1,394	1,395	1,397	1,398	1,399	1,400	1,401
Fertilizer intensity - kg/ha										
OECD	75.8	83.2	84.0	84.8	85.7	86.5	87.4	88.3	89.2	90.0
non-OECD	123.3	128.4	132.7	133.4	135.8	138.2	140.7	143.2	145.7	148.3
Consumption - fertilizers										
US	6.4	6.9	7.0	7.0	7.0	7.2	7.2	7.2	7.2	7.2
EU27	3.8	4.5	4.6	4.7	4.7	4.9	5.0	5.1	5.1	5.2
Other OECD	2.2	2.4	2.5	2.5	2.6	2.7	2.7	2.8	2.8	2.8
OECD total	12.4	13.9	14.2	14.2	14.3	14.8	14.9	15.0	15.2	15.3
Brazil	5.0	6.2	7.0	7.1	7.3	8.1	7.9	8.1	8.3	8.5
China	6.8	8.2	9.4	10.1	10.6	11.4	11.8	12.3	12.7	13.2
India	5.8	5.6	4.4	4.0	3.9	4.1	4.5	4.9	5.3	5.7
Indonesia	1.3	2.0	2.4	2.4	2.5	2.6	2.7	2.8	2.9	2.9
CIS	1.8	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5
Other non-OECD	4.5	6.2	6.4	6.6	6.9	7.0	7.3	7.5	7.8	8.1
non-OECD total	25.1	30.0	31.5	32.3	33.2	35.3	36.4	37.9	39.4	41.0
Total	37.5	43.9	45.7	46.5	47.5	50.1	51.3	52.9	54.6	56.3
Consumption - industrial & losses										
OECD total	0.2	1.0	2.6	2.7	2.7	2.8	2.8	2.9	2.9	3.0
Total non-OECD	2.5	2.9	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.4
Total - other sectors	2.7	3.9	5.5	5.6	5.7	5.9	6.0	6.1	6.3	6.4
Total demand	40.1	47.7	51.2	52.1	53.2	56.0	57.3	59.1	60.9	62.7
% growth	-12.1%	19.0%	7.2%	1.8%	2.2%	5.1%	2.4%	3.0%	3.0%	3.0%
Incremental production capacity										
Canada	-	-	-	-	-	0	2	5	8	12
Others	-	-	-	-	-	1	1	2	3	5
Total incremental - unrisks	-	-	-	-	-	1	3	7	11	17
Total incremental - risks	-	-	-	-	-	1	4	8	13	16
Production										
Canada	7.2	15.6	17.7	15.3	17.3	17.5	18.9	20.2	21.5	22.1
Russia	6.1	10.2	10.8	9.4	9.9	10.7	10.7	10.8	11.3	12.5
Belarus	4.1	8.7	8.9	8.0	7.2	8.3	8.5	9.0	9.1	9.1
Israel	3.0	3.3	2.8	3.2	3.0	3.0	3.1	3.3	3.4	3.4
China	3.6	3.7	4.0	4.3	4.3	4.3	4.4	4.4	4.5	4.5
Germany	2.2	3.5	3.6	3.5	4.0	4.0	4.0	4.0	3.9	3.9
Other	4.6	6.2	7.1	7.1	7.4	8.1	7.7	7.4	7.1	7.1
Total Production	31.0	51.0	54.9	50.8	53.2	56.0	57.3	59.1	60.9	62.7
% growth	-40.7%	64.4%	7.7%	-7.5%	4.9%	5.1%	2.4%	3.0%	3.0%	3.0%
Production capacity	57.0	57.0	58.4	61.1	65.5	65.6	68.4	72.6	77.1	80.5
utilisation rate	54%	89%	94%	83%	81%	85%	84%	81%	79%	78%
Balancing item										
Stock changes	(9.1)	3.2	3.8	(1.3)	-	-	-	-	-	-
Exports										
Canada	6.4	15.8	16.7	14.9	16.0	16.9	18.2	19.6	20.9	21.5
Russia	4.5	8.3	8.8	7.0	8.0	8.9	8.9	9.0	9.4	10.6
Belarus	3.0	7.0	7.8	6.4	6.0	6.7	6.8	7.3	7.3	7.3
Germany	2.2	3.4	3.3	3.3	3.0	3.2	3.2	3.2	3.1	3.1
Israel	1.8	3.7	3.5	2.9	2.8	2.8	2.9	3.0	3.1	3.1
Other	2.2	4.2	4.2	4.6	4.2	3.2	2.8	2.8	2.8	2.8
Total seaborne exports	20.1	42.4	44.2	38.9	40.0	41.7	42.9	44.8	46.7	48.4
Imports										
US	3.3	8.0	7.4	6.8	7.0	7.3	7.3	7.3	7.4	7.4
EU27	1.7	4.8	4.8	4.6	4.6	4.7	5.0	5.0	5.1	5.2
Other OECD	1.1	2.4	2.4	2.3	2.4	1.9	1.9	2.0	2.0	2.0
OECD total	6.2	15.3	14.6	13.8	14.0	13.8	14.2	14.3	14.5	14.6
Brazil	3.7	6.8	7.2	7.3	7.4	8.1	8.0	8.2	8.4	8.7
China	1.3	5.1	6.8	6.3	6.6	7.2	7.6	8.0	8.4	8.9
India	5.4	6.2	4.7	3.2	3.0	4.2	4.6	5.0	5.4	5.8
Indonesia	0.8	2.4	3.1	2.5	2.5	2.7	2.8	2.9	3.0	3.1
Other non-OECD	2.7	6.5	7.7	5.9	6.5	7.1	7.4	7.6	7.9	8.2
non-OECD total	13.9	27.1	29.5	25.2	26.0	29.3	30.4	31.7	33.2	34.6
Total imports	20.1	42.4	44.2	38.9	40.0	43.2	44.5	46.1	47.6	49.3
% growth	-51.1%	111.1%	4.1%	-11.9%	2.6%	8.1%	3.1%	3.5%	3.4%	3.4%

Source: CRU, IFA, World Bank, FAO, Goldman Sachs Global Investment Research.

Mineral sands: Outlook relies on further supply discipline

The outlook for zircon and titanium feedstocks is dependent on five drivers: a) the volume of supply growth from new entrants; b) the behavior of top producers and the degree of pricing power they may still enjoy; c) inventory cycles which can result from a mismatch between expected and actual demand for end products; d) intensity of use, which is dependent on innovation as well as product mix; and e) finished product demand growth from end users. In other words, there are many moving parts to consider, but on balance we believe that mineral sand prices have bottomed and some modest upside exists from 2015 onwards as long as the largest producers continue to exercise restraint.

Prices stabilize above marginal production costs

Mineral sands prices have weakened further relative to 2013 while operating margins are now a fraction of their 2012 level. However, the downward momentum appears to have stalled, leaving prices above marginal production costs (Exhibit 92). In our view, this is largely due to the supply discipline of the largest producers, which have been willing to prioritize price over volume.

Exhibit 92: Supply discipline has prevented prices from reaching marginal production costs

Indicative revenue, costs and EBIT margin for a generic mineral sands producer – US\$/t

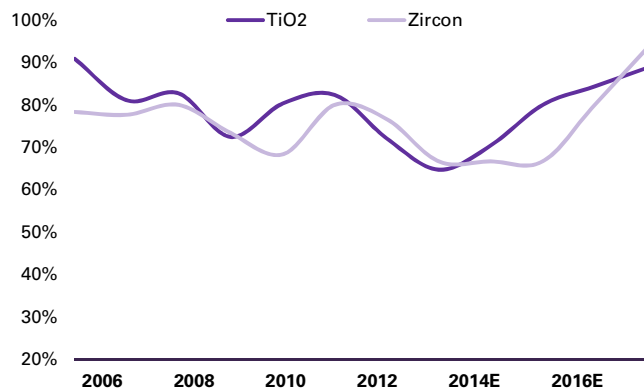
	Product ratio	2010		2011		2012		2013		2014E	
		Price	Revenue	Price	Revenue	Price	Revenue	Price	Revenue	Price	Revenue
Rutile	10%	\$ 560	\$ 56	\$ 1,055	\$ 106	\$ 2,383	\$ 238	\$ 1,129	\$ 113	\$ 875	\$ 88
Synthetic rutile / UGS	10%	\$ 598	\$ 60	\$ 858	\$ 86	\$ 2,183	\$ 218	\$ 983	\$ 98	\$ 750	\$ 75
Slag - chloride grade	35%	\$ 450	\$ 158	\$ 724	\$ 253	\$ 1,907	\$ 667	\$ 825	\$ 289	\$ 825	\$ 289
Ilmenite - sulphate grade	45%	\$ 110	\$ 50	\$ 181	\$ 81	\$ 293	\$ 132	\$ 220	\$ 99	\$ 148	\$ 67
Total revenue per tonne of sales			\$ 323		\$ 526		\$ 1,256		\$ 599		\$ 518
Production cost per tonne of sales			\$ 322		\$ 370		\$ 425		\$ 457		\$ 457
EBIT margin			0%		30%		66%		24%		12%

Notes: the product ratio is designed to model approximately the global product mix rather than the typical mine profile; margin analysis is based on current estimate of production costs: US\$1.75/t ROM mining cost, 4.5% HMC grade, US\$5.50/t ROM processing costs at the concentrator, US\$230/t processing costs at the mineral separation plant (MSP), US\$50/t in inland logistics, overheads and royalties; we apply annual cost inflation of 15%, falling to 0% at the end of the period.

Source: Goldman Sachs Global Investment Research.

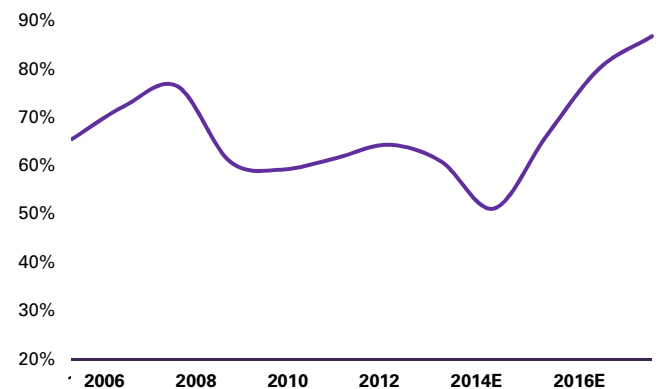
Rio Tinto plays a prominent role on the back of its c.50% share of the high grade TiO₂ market, low production costs and 1.1Mtpa in excess capacity that is equivalent to c.15% of global supply (Exhibits 93 and 94). We believe the price recovery is likely to be gradual, as global inventories remain high and demand is not strong enough to absorb the excess capacity in the near term. In the case of other producers, finished product inventory may be gradually declining but stockpiles of heavy metal concentrate (HMC) have yet to peak. We assume that the largest producers will continue to show restraint in order to prevent further price declines.

Exhibit 93: RBM operating at c.70% utilisation
Richards Bay Minerals capacity utilization



Source: Company data, Goldman Sachs Global Investment Research.

Exhibit 94: RTIT operating at c.60% utilisation
Rio Tinto Iron & Titanium capacity utilization (TiO₂)



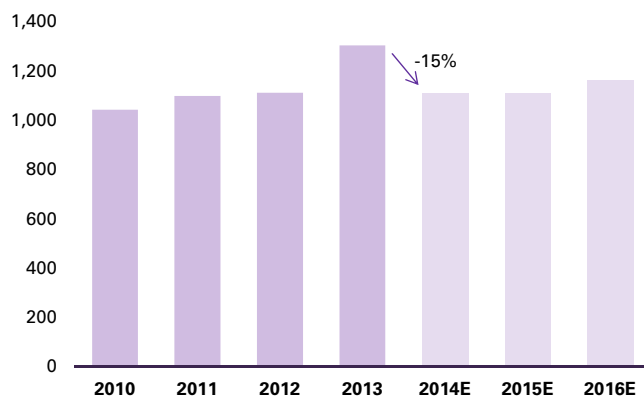
Source: Company data, Goldman Sachs Global Investment Research.

We also believe the focus by tile producers to reduce zircon use via thrifting and substitution has lessened considerably, and new tile designs could well contain more zircon than the tiles they replace *within the same category*. However, the success of tile types with below average zircon content could still result in a modest decline in zircon intensity across all tile types. Based on this information, we leave zircon intensity over the period 2014-18 relatively flat in our zircon demand model, and we will continue to engage with industry sources in order to monitor the constantly changing Chinese tile market.

In China, a softening property market has led to a decline in housing sales; this could impact future demand for both zircon and titanium feedstocks via lower-than-expected consumption of tiles, paint and other end products (Exhibit 95). Across the Pacific, expectations of a strong rebound in the US housing market have not translated yet into a visible increase in demand for mineral sands. However, government statistics show a 5% yoy increase in employment in the construction of residential and commercial buildings; we believe this should be a leading indicator for stronger demand in 2H14 and 2015 (Exhibit 96).

Exhibit 95: Demand in China could weaken going into 2015

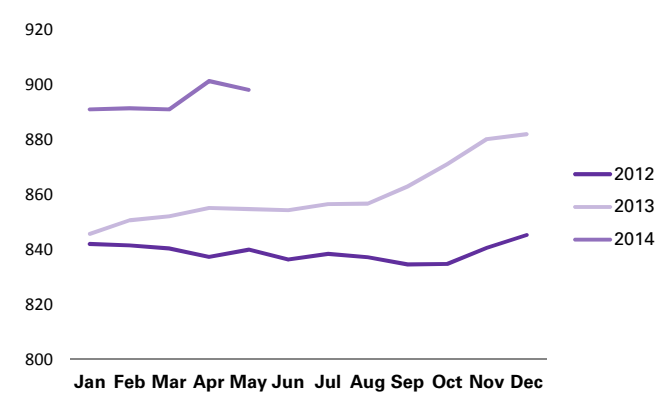
Commodity housing floor area sold – Million m²



Source: CEIC, Gao Hua Securities Research.

Exhibit 96: The US construction sector provides upside

Employment in the construction of buildings – '000



Source: Bureau of Labor Statistics.

The commissioning of greenfield projects in Africa (Kwale in Kenya, Grande Côte in Senegal) will boost supply growth from 2014 onwards, in our view. With combined production capacity of 105Kt in zircon and 1Mt in mainly low grade titanium feedstocks, the gradual ramp-up of these two operations will test the supply discipline of the large established producers at a time when demand growth for mineral sands is moderate.

Exhibit 97: GS zircon supply and demand forecast

Thousand tonnes

	2009	2010	2011	2012	2013E	2014E	2015E	2016E	2017E	2018E
Global consumption										
North America	86	113	116	111	112	114	115	117	118	120
Europe	229	328	313	185	178	178	175	173	171	169
China	438	578	574	480	491	531	562	599	639	683
RoW	274	353	375	292	284	293	304	312	317	323
Total	1,027	1,372	1,378	1,069	1,066	1,116	1,156	1,201	1,246	1,295
% growth	-11.5%	33.6%	0.5%	-22.4%	-0.3%	4.7%	3.7%	3.8%	3.7%	3.9%
Global production										
Australia	420	540	734	464	389	439	454	454	454	454
South Africa	355	340	398	380	335	335	347	368	380	395
China (incl. from imported concs.)	64	120	194	150	130	65	55	55	55	55
RoW	253	301	319	291	256	250	307	321	351	360
Total	1,091	1,301	1,646	1,285	1,110	1,088	1,163	1,197	1,239	1,263
% growth	-12.6%	19.2%	26.5%	-21.9%	-13.7%	-1.9%	6.9%	2.9%	3.5%	1.9%
Balance										
Surplus/(deficit)	64	(71)	268	216	44	(28)	7	(4)	(7)	(32)
Inventory	113	42	309	525	569	541	548	544	538	506
Price										
Zircon, bulk FOB Australia	\$ 900	\$ 906	\$ 1,898	\$ 2,275	\$ 1,233	\$ 1,125	\$ 1,200	\$ 1,250	\$ 1,300	\$ 1,464*

*2018E price forecast represents our LT forecast in US\$2014; forecast in other years are nominal.

Source: TZMI, Goldman Sachs Global Investment Research.

Exhibit 98: GS TiO₂ feedstocks supply and demand forecast

Thousand TiO₂ units, unless otherwise stated

	2009	2010	2011	2012	2013E	2014E	2015E	2016E	2017E	2018E
TiO₂ pigment consumption (Kt)										
North America	819	875	806	900	920	943	963	983	1,004	1,025
Europe	1,121	1,245	1,338	1,352	1,346	1,355	1,368	1,385	1,397	1,410
China	1,089	1,202	1,314	1,416	1,540	1,648	1,767	1,896	2,032	2,180
RoW	1,487	1,594	1,674	1,582	1,606	1,656	1,719	1,783	1,832	1,882
Total	4,516	4,915	5,130	5,250	5,413	5,602	5,818	6,046	6,265	6,497
% growth	-7.0%	8.8%	4.4%	2.3%	3.1%	3.5%	3.8%	3.9%	3.6%	3.7%
TiO₂ feedstock consumption										
TiO ₂ pigment production	4,710	5,791	6,331	5,586	5,518	6,095	6,372	6,624	6,857	7,113
Titanium metal	227	259	379	431	409	422	434	447	461	475
Other	342	372	471	467	350	361	372	383	394	406
Total	5,279	6,422	7,181	6,484	6,278	6,878	7,178	7,454	7,712	7,994
% growth	-12.1%	21.7%	11.8%	-9.7%	-3.2%	9.6%	4.4%	3.9%	3.5%	3.7%
TiO₂ feedstock production										
Chloride grade	3,211	3,578	3,784	3,502	2,788	2,981	3,375	3,441	3,535	3,543
Sulfate grade	2,148	2,812	3,427	3,610	3,752	3,784	3,857	4,022	4,066	4,064
Greenfield						117	302	359	532	705
less disruption allowance						(206)	(301)	(391)	(407)	(416)
Total	5,359	6,390	7,211	7,112	6,540	6,675	7,233	7,431	7,727	7,896
% growth	-12.1%	19.2%	12.8%	-1.4%	-8.0%	2.1%	8.4%	2.7%	4.0%	2.2%
Balance										
Surplus/(deficit)	80	(32)	30	628	262	(203)	55	(23)	14	(98)
Inventory	644	612	642	1,270	1,532	1,329	1,385	1,361	1,376	1,278
Price										
Rutile, bulk FOB Australia	\$ 540	\$ 560	\$ 1,055	\$ 2,400	\$ 1,129	\$ 875	\$ 900	\$ 925	\$ 950	\$ 980*

*2018E price forecast represents our LT forecast in US\$2014; forecast in other years are nominal.

Source: TZMI, Goldman Sachs Global Investment Research.

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