

Overview of the Manganese Market

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Outline

1 – China continues driving steel production growth, but for how long?

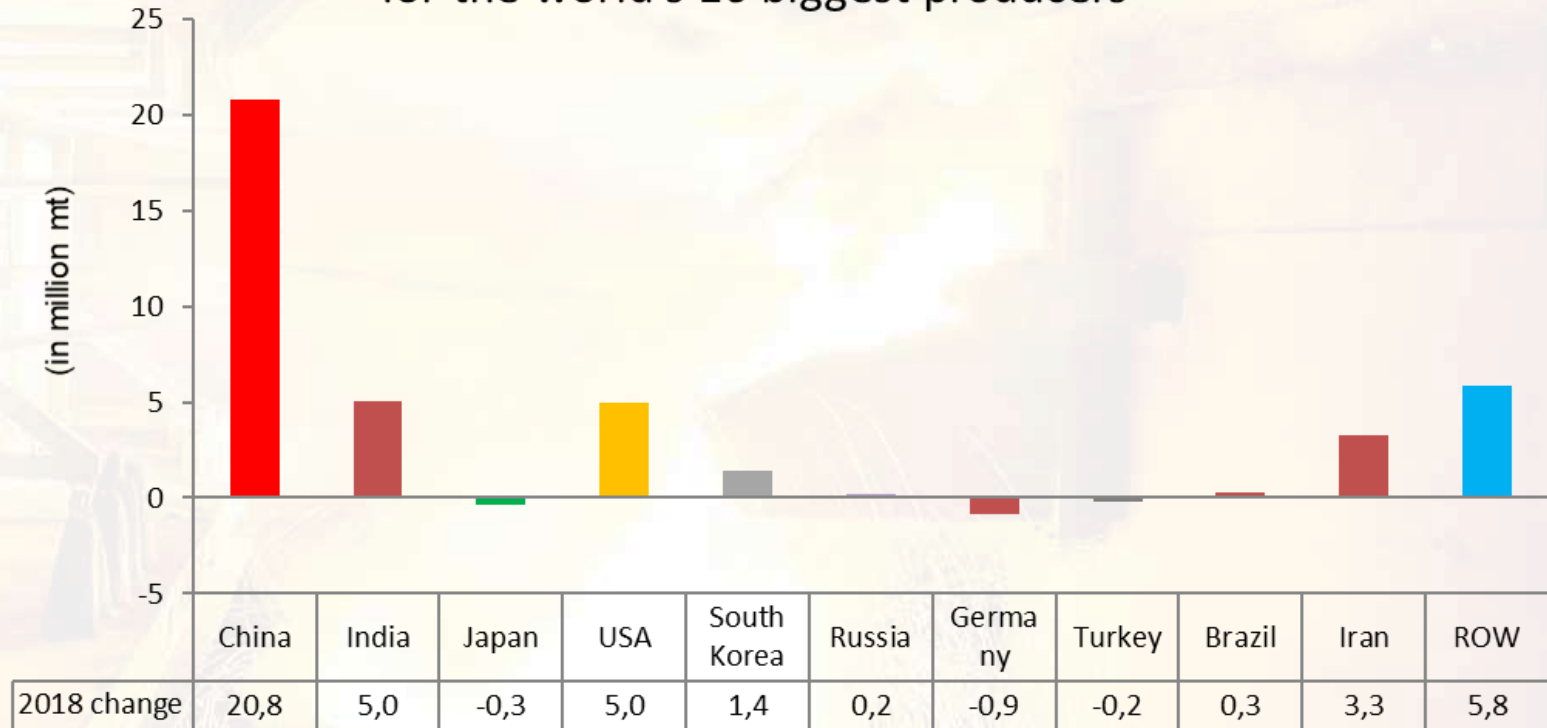
2 – Mn alloy market more balanced in 2019, but slowing growth expected

3 – Mn ore supply driven by China's needs for imported material

Global steel output: a new record high driven by China

- World steel output up for 3rd consecutive year in 2018: +2.3% (or 40 mln mt) to 1.77 biln. mt; A new record high, slightly above 2014 output (1.76 billion mt)
- China, India and the USA accounted for most of the extra production (India overtook Japan as 2nd biggest prod.)
- In the ROW, Egypt (+0.9 M mt) and Vietnam (+3.8 M mt) registered the biggest production increases in 2018
- In Q1 2019, steel prod. +3% YoY

Steel production change in 2018
for the world's 10 biggest producers



Steel production in China: a persistent rise

- Crude steel output increased in China in 2018 by 2.4% (or 21 million mt) to 893 million mt (50% of global)
- increase mostly materialized in Q4 2018, as heating season restrictions were less severe than in 2017
- Q1 2019 production +7% YoY
- China steel prod. will rise by 1 - 2% in 2019 (worldsteel 1%, Roskill 1.5%)
- China steel production will be stable for a couple of years, before slowly declining in 2025-2030 (Roskill)

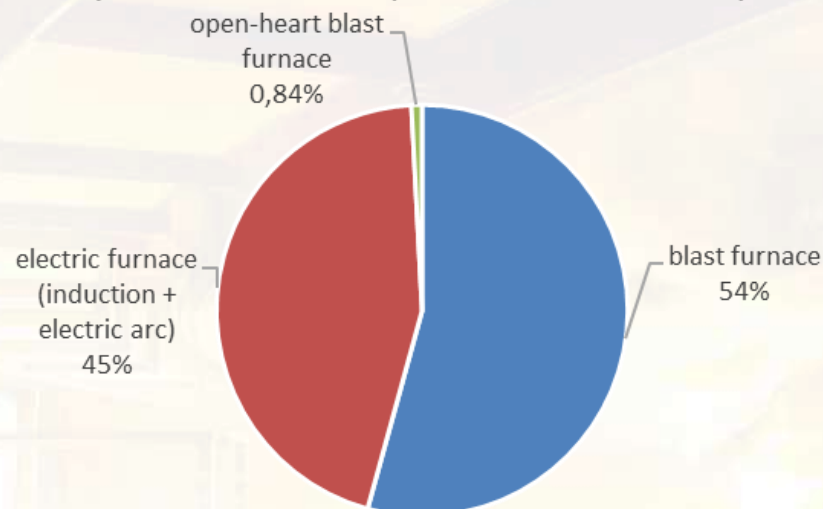


Source: CRU, IMnI

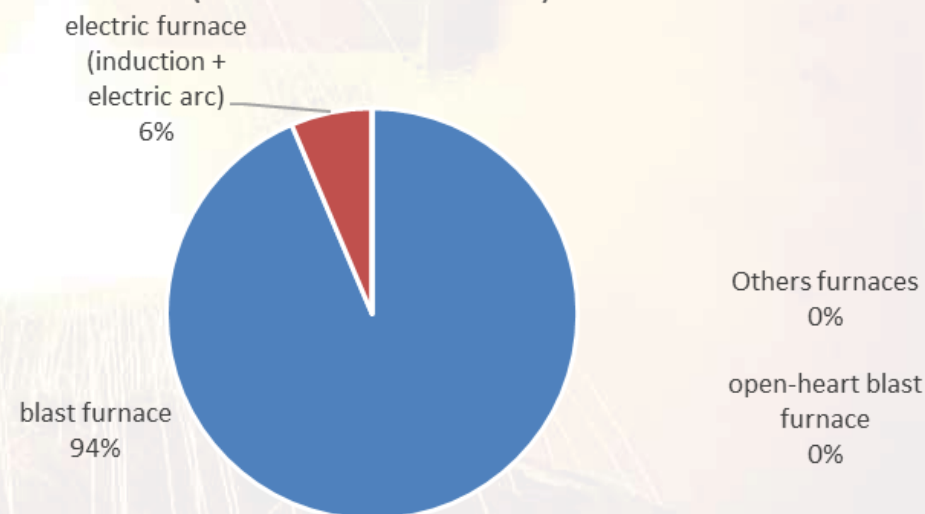
China steel industry turning to EAF

- More blast furnaces in China than in the ROW (94% vs 54%) because of lower steel scrap supply (can be used in EAFs) in China than in the Western world, and lower quality steel produced in China (mostly long prod.)
- But this will change as China is currently building many new electric arc furnaces (EAFs), and want to increase scrap use in blast furnaces
- EAFs consume less Mn units/mt of steel than blast furnaces (because EAFs use more steel scrap), so China Mn unit consumption will progressively align with ROW

World exc. China crude steel production by process in 2016 (source: Worldsteel)



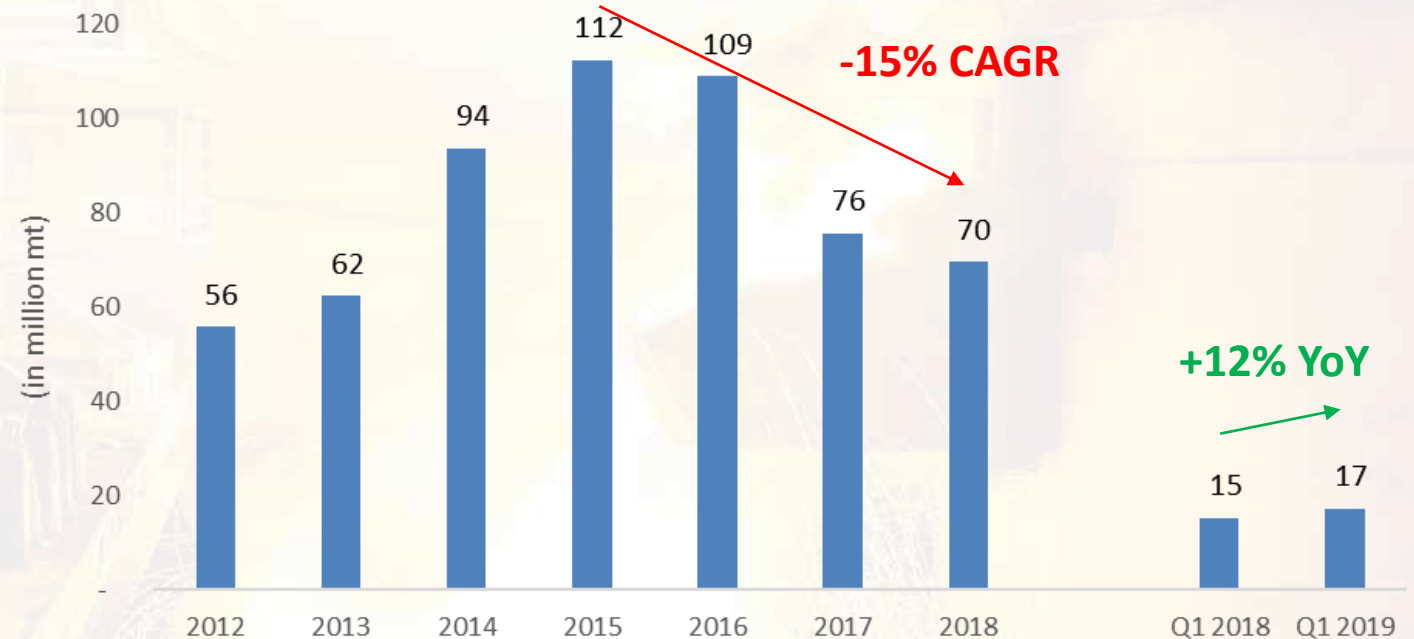
China's crude steel production by process in 2016 (source: Worldsteel)



China steel exports on the rise again

- China steel exports -15% per year between 2015 and 2018, to 70 million tons in 2018:
 - reform of overcapacity industries including steel improved domestic steel prices
 - anti-dumping cases in the ROW reduced competitiveness of China steel exports
- Q1 2019 China steel exports + 12% from Q1 2018, because of government stimulus for infrastructure: steel prices recovering, inventories falling and profitability increasing (despite higher iron prices)

Steel exports from China 2012 - 2019



Source: China Customs, IMnI

Steel production in the rest of the world rising

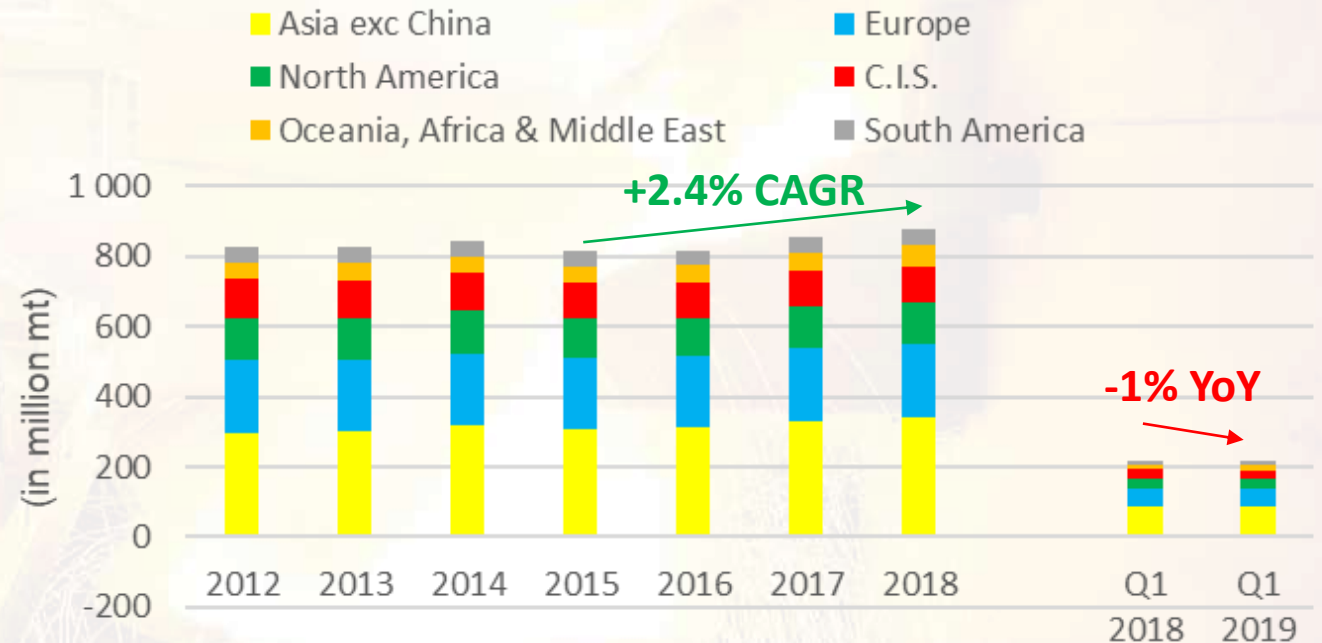
- Steel mills benefitted from higher domestic demand & lower imports from China in 2015-2018: **+2.4% CAGR** in world exc. China production

- In 2018, ROW steel prod **+2.3%** to 875 million mt (new record high);

- North America **+4%**; South America **+1%**; Asia ex. China **+3%**; Oceania & Africa & M. East **+9%**; Europe **-0.3%**

- Trend reverted in Q1 2019 (ROW production **-1% YoY**), on higher China exports and slowing demand

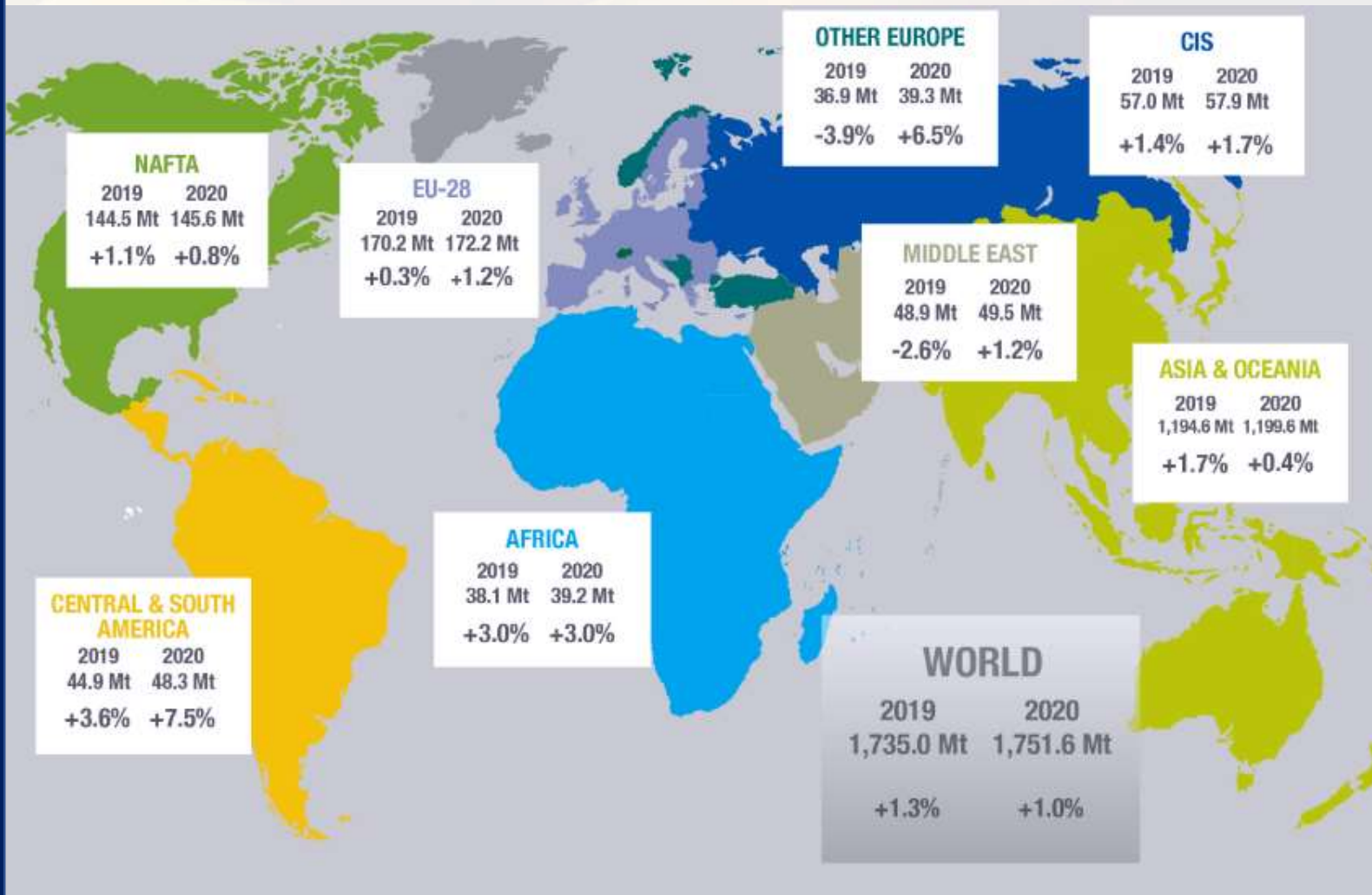
Steel Production in World exc China 2012 - 2019



Source: worldsteel, CRU, IMnI

Slowing growth expected for the steel industry in 2019 & 2020

- worldsteel forecasts global steel demand to rise by 1.3% in 2019 (reaching 1,735 Mt) and 1.0% in 2020 (to 1,752 Mt)
- Asia consumption growth expected to slow: +1.7% in 2019, +0.4% in 2020
- New capacity coming on line, as countries relying on imports seek self-sufficiency (like the USA with trade tariffs)
- Additional demand is too slow to absorb extra capacity, so overcapacity issue will remain, putting pressure on steel prices



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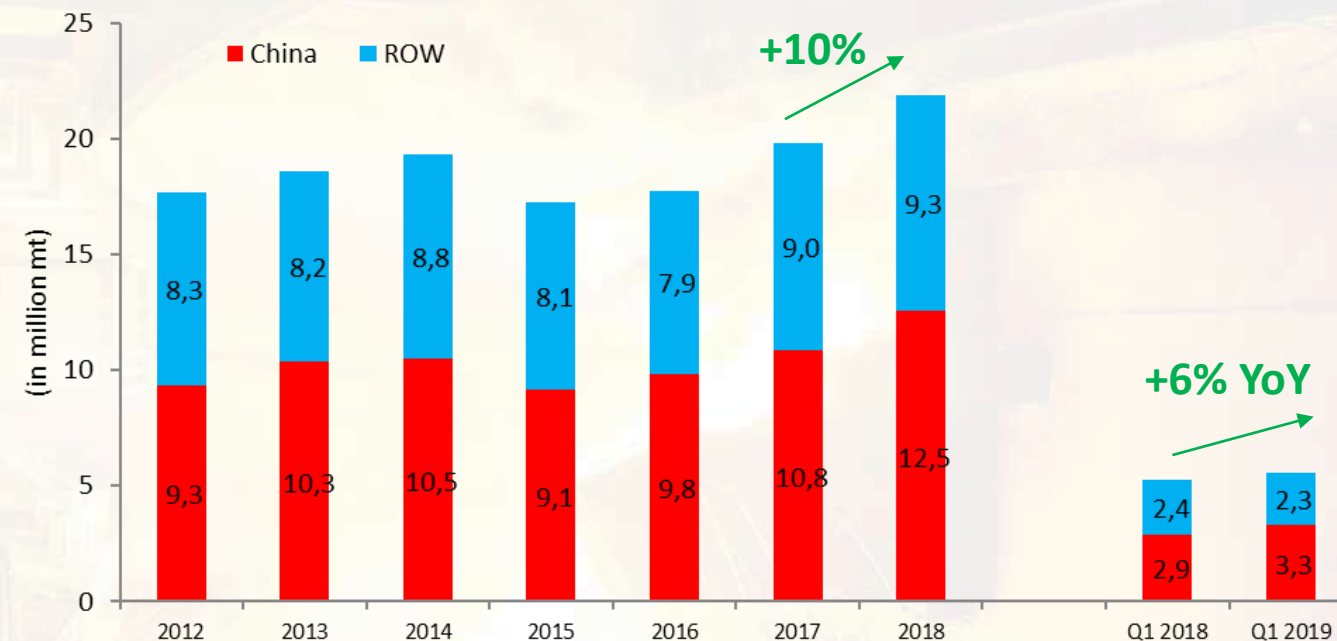
2 – Mn alloy market more balanced in 2019, but slowing growth expected

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Mn alloy supply growth driven by China

- Mn alloy output rose in 2018 for the 3rd consecutive year, to 21.9 million mt, +2.1 million mt = +10% from 2017, reaching a new record high
- Growth driven by China (+16% from 2017; ROW +4%), on steel mills restocking & higher SiMn consumption in steel
- Same rising trend in Q1 2019: +6% from Q1 2018, but only in China (+14% YoY), while prod. in the ROW -4% YoY, affected by lower steel demand, especially in Africa & Europe

Global Mn Alloys Production
2012 - 2019

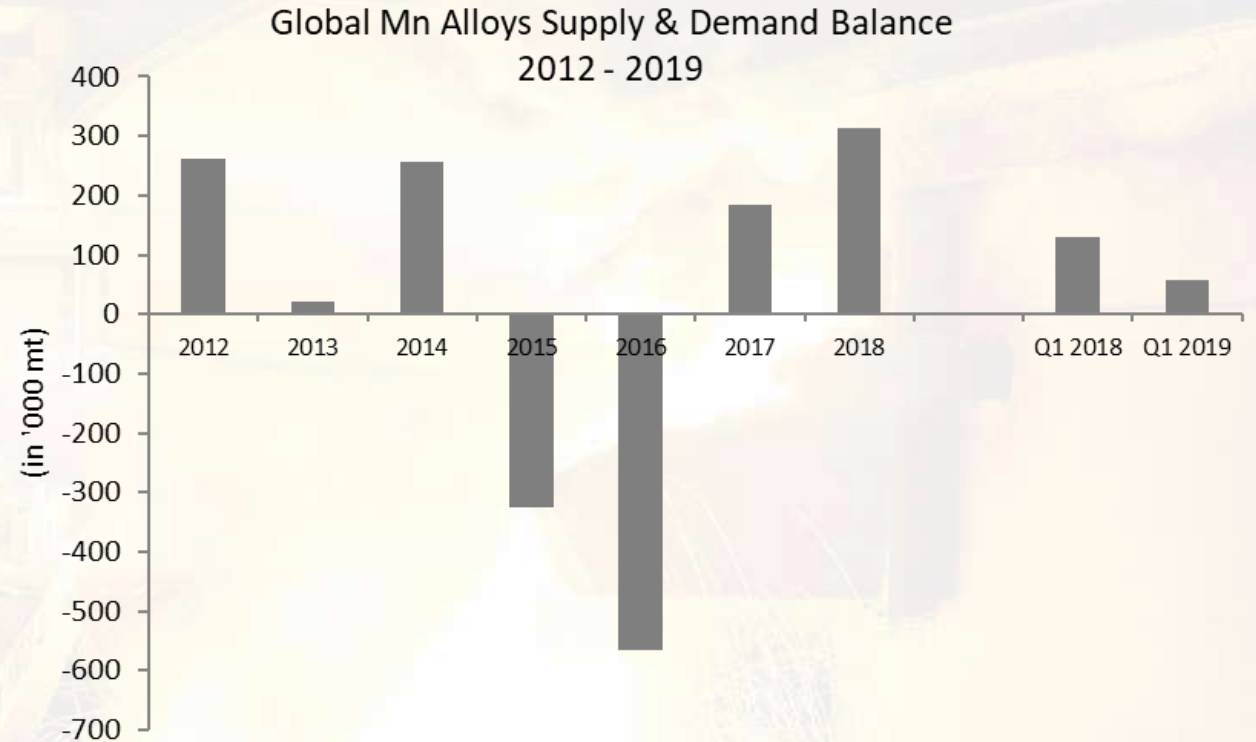


Source: CNFEOL, IMnI

Mn Alloys Prod. Q1 2019 % Change	
Asia & Oceania	8%
C.I.S.	-0,2%
Europe	-7%
Americas	0,5%
Africa & Middle East	-9%
World	6%

Mn alloy excess supply reducing

- Rising Mn alloy demand in 2018 (+11%) absorbed extra supply (+10%), but the S/D balance remained in surplus, mostly outside China
- In Q1 2019, demand increased faster than supply, causing excess supply to reduce



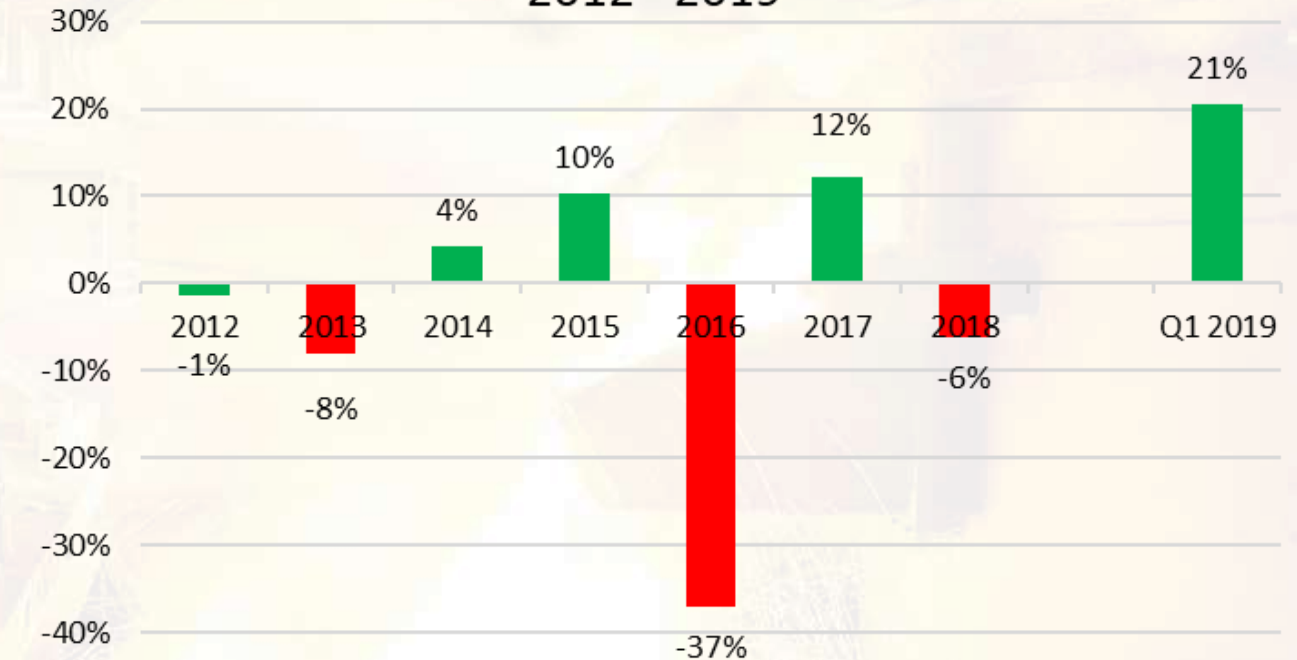
Source: CNFEOL, IMnI

Smelters destocked in 2018

- Stocks of Mn alloy outside China dropped by 6% in 2018 on destocking after smelters increased inventory in 2017, based on inventory figures reported by IMnI Members in Africa, North & South America, Asia, Australia

- In Q1 2019, smelters increased inventory by 21% on average, because of higher supply than demand

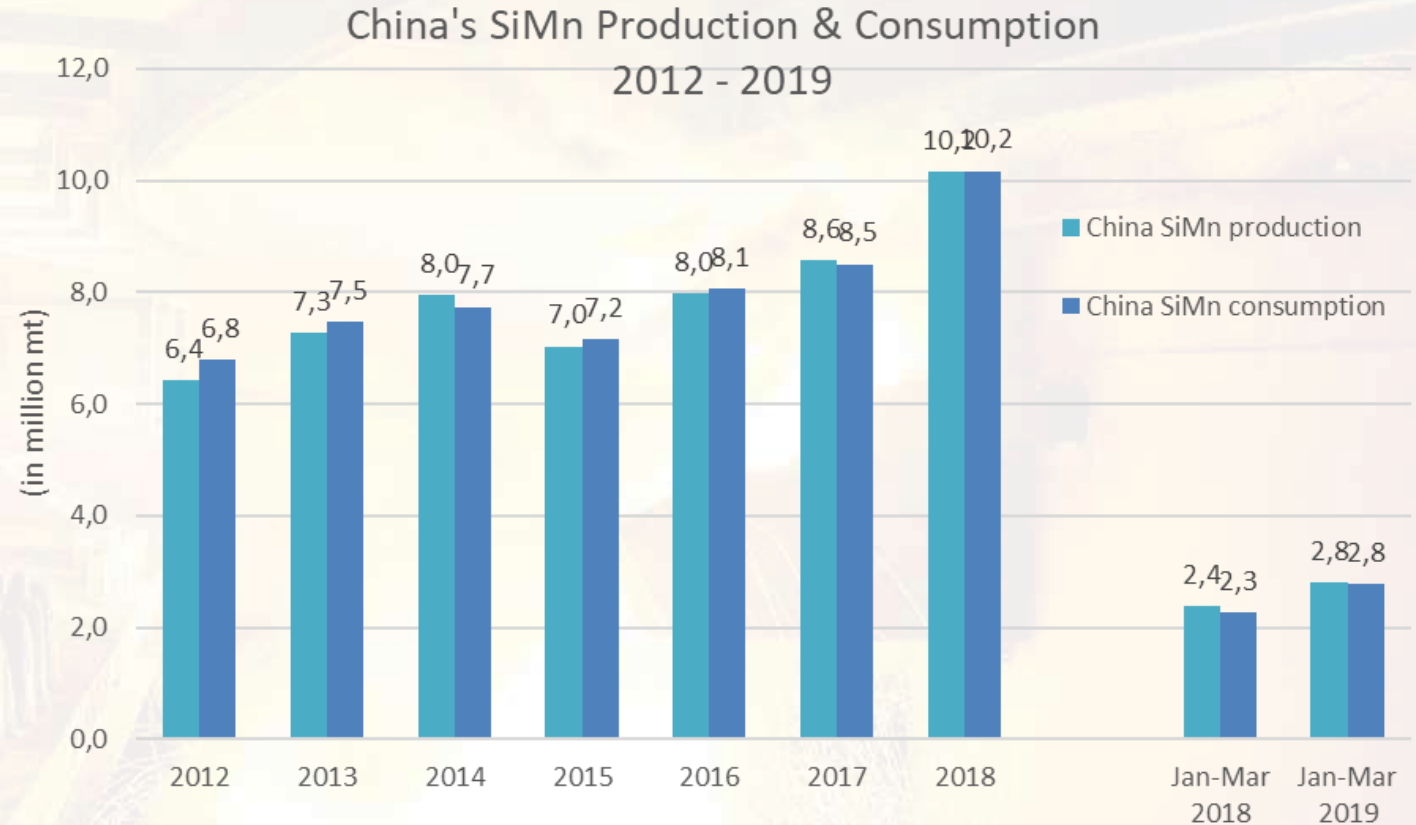
Mn Alloys Inventory Change outside China
2012 - 2019



Source: IMnI

China SiMn production in 2018 +18% YoY to 10.2 million mt

- rising steel output in China (+2.4%)
- restocking by Chinese steel mills
- higher quality steel produced → higher SiMn consumption / ton of steel
 - replacement of induction furnaces by blast furnaces, consuming more Mn;
 - some producers switched from producing flats to rebar in H2 2018 due to higher profitability
 - new “reinforcement bar” (= rebar) standard in 2018 in China: rebar steel must contain at least 1.5%Mn (vs 1.2% before)

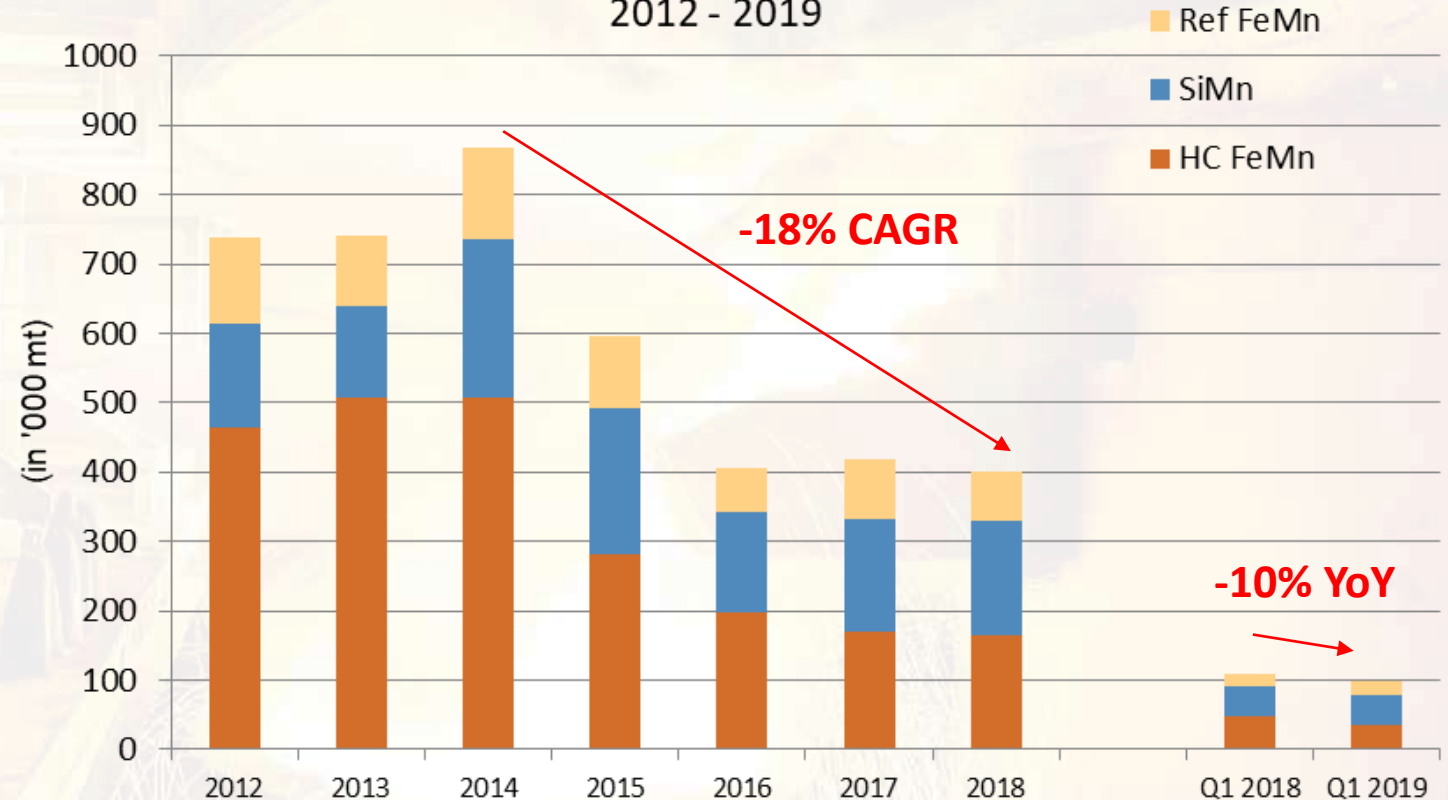


Source: CNFEOL, IMnI

South Africa's Mn alloy production contracting fast

- 3 Mn alloy producers in RSA, with combined production capacity of 870,000 mt per year
- Some consider stopping their furnaces, because of:
 - electricity prices high and rising (+523% since 2006 for industrial users, and potentially +30% over the next 3 years, according to South Africa Minerals Council)
 - rising Mn alloy production in China & India to supply domestic steel mills
 - competition with new Mn alloy smelters in Malaysia
- A major Mn alloy producer in RSA to announce final decision by Oct. 2019

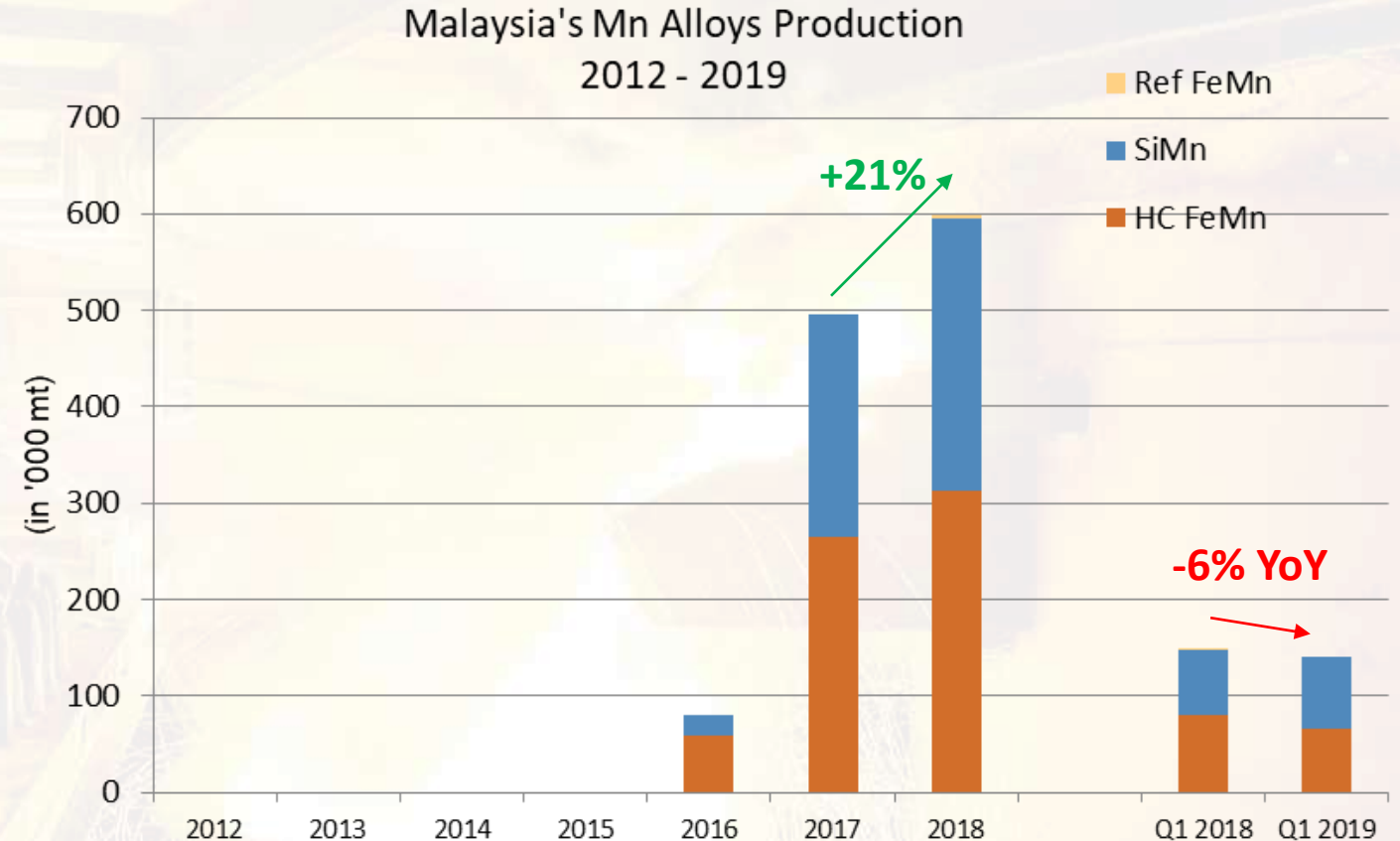
South Africa's Mn Alloys Production
2012 - 2019



Source: IMnI

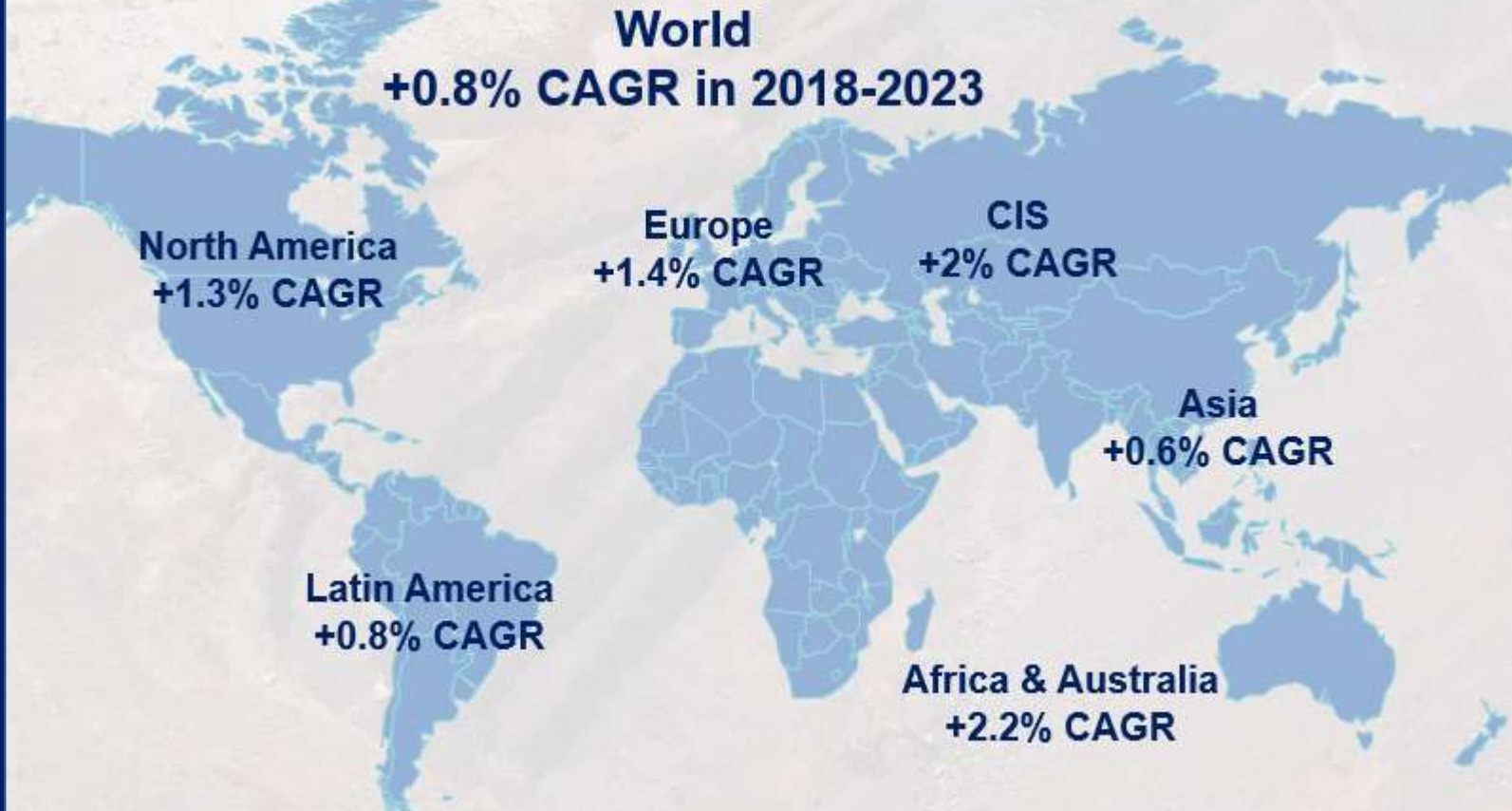
Production by Malaysian smelters stopped rising in 2019

- 3 Mn alloy producers in Malaysia, with combined production capacity of 605,000 mt per year
- Production increased from 80,000 mt in 2016 to 598,000 in 2018
- Capacity utilisation ratio 99% in 2018
- Malaysian smelters benefit from:
 - competitive power prices
 - proximity with major steelmakers in Asia
- Malaysia's HC FeMn production declined in Q1 2019, not entirely offset by rising SiMn production



Mn alloy demand to increase by 0.8% / year in 2018 - 2023

- Most of this rise in consumption would come from the Africa & Australia region (+2.2% CAGR), followed by the CIS (+2% CAGR)
- Asia shows the smallest increase in Mn alloy demand in the coming 5 years (+0.6% CAGR)



Source: Fastmarkets MB Research

Outline

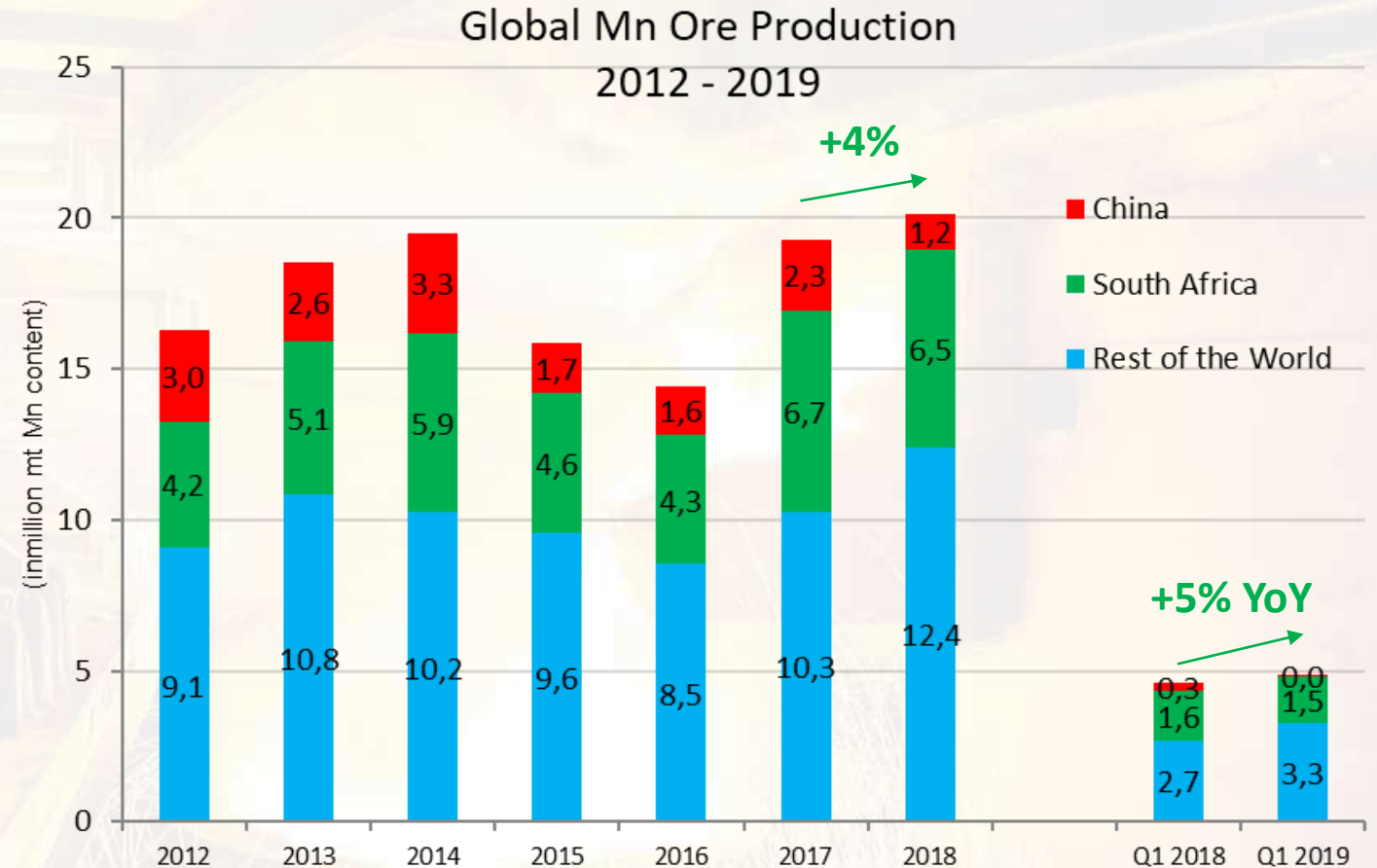
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Rising global Mn ore production masks falling China's output

- Mn ore output +4% in 2018 to 20.1 million dry mt, new record high
- Lower output in China mostly because of reducing reserves, falling quality, and safety restrictions
- compensated by rising production in the rest of the world (but South Africa -2% in 2018), driven by China's demand
- Q1 2019 production +5% from Q1 2018, driven by ROW (RSA & China lower)

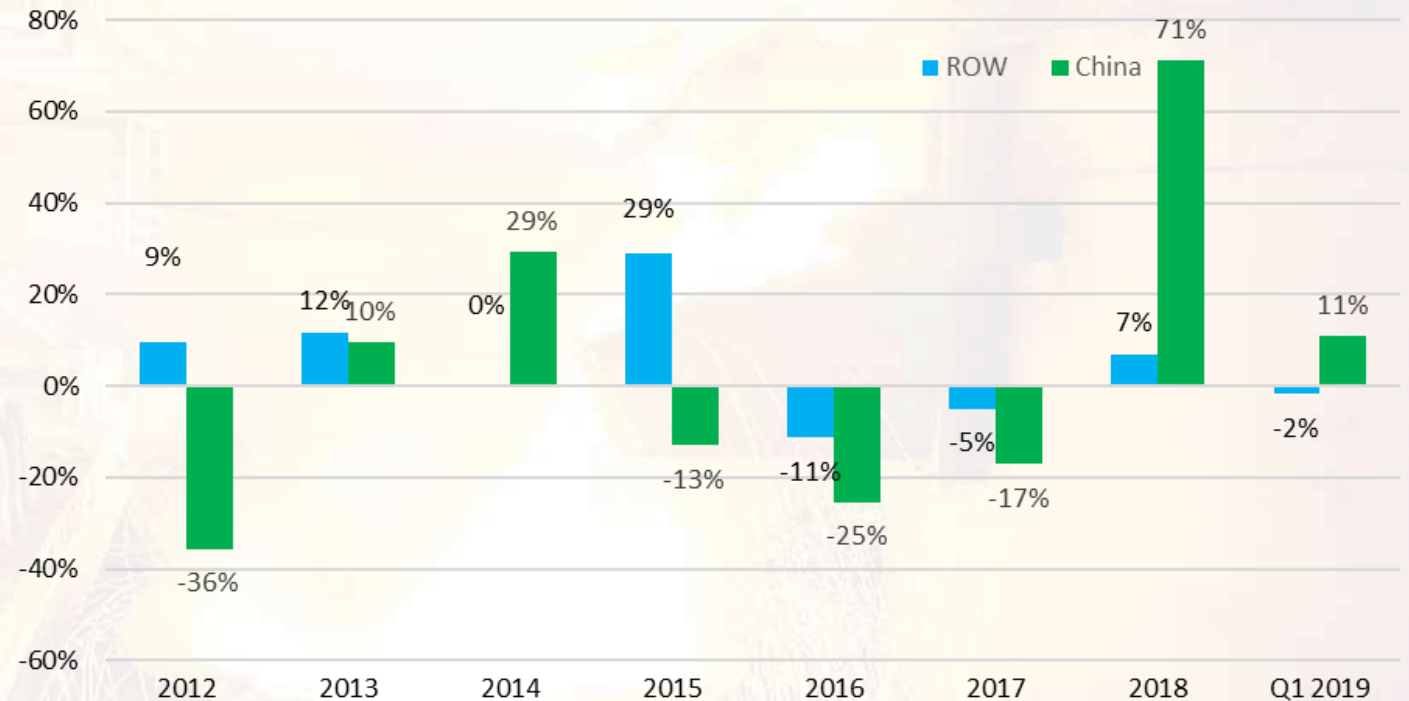


Source: IMnI

Miners outside China restocked in 2018

- Miners outside China increased stocks in 2018 by 7% on average
- While China's port stocks skyrocketed (+71% in 2018), driven by smelters restocking and higher dependence on imported material
- Stock for the world's biggest Mn ore miners contracted by 2% in Q1 2019
- And China's port inventory continued rising in Jan-May 2019

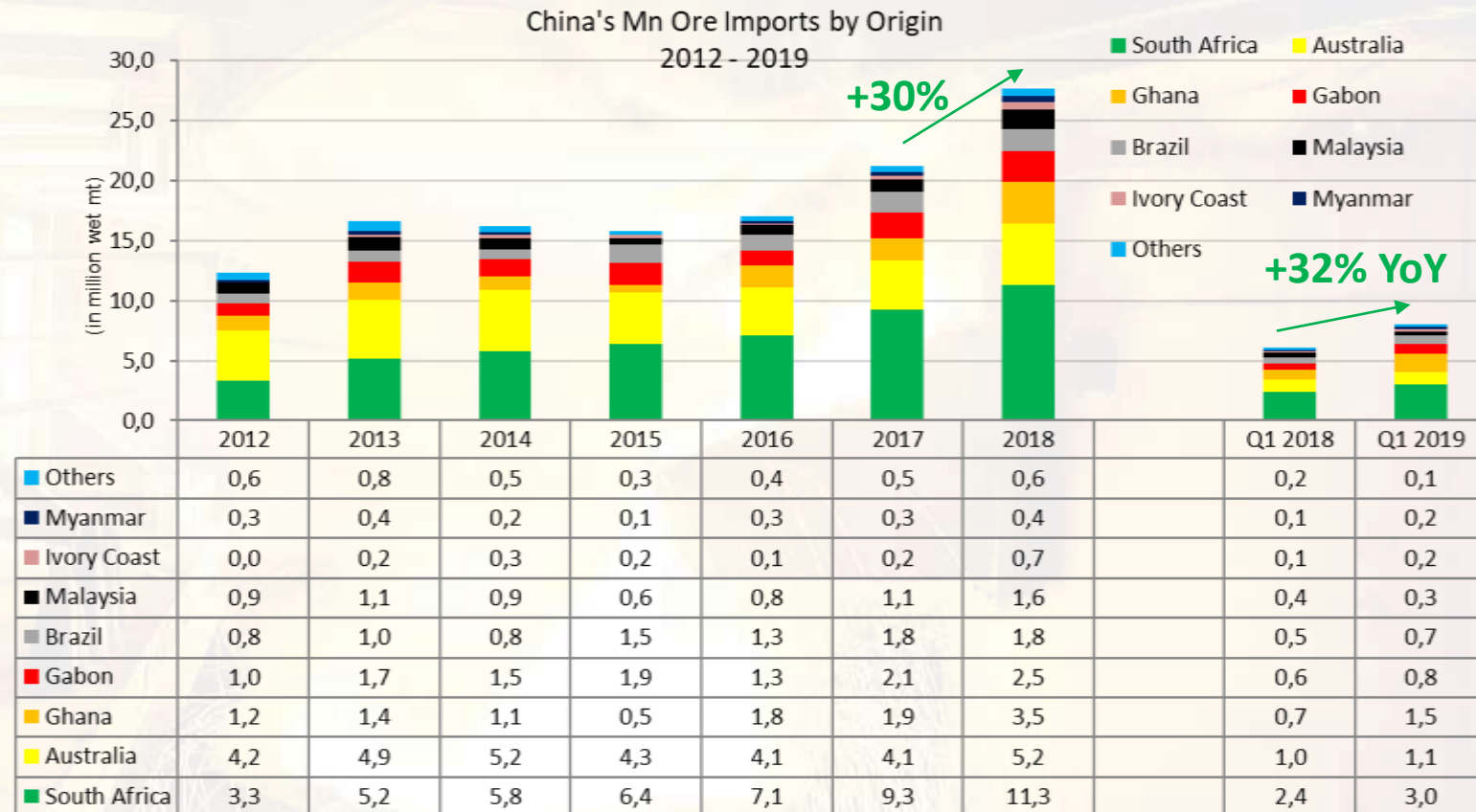
Global Mn Ore Inventory Change
at China's ports vs ROW Mn mines; 2012 - 2019



Source: Mysteel, IMnI

China even more dependent on imports

- Mn ore imports into China reached a new record high in 2018, 27.6 million wet mt, +30% from 2017, on rising demand from Chinese smelters and lower domestic ore production
- South Africa exported 11.3 million wet mt to China (+22% YoY) = 41% of China's imports
- In Q1 2019, China imported 8.02 mln wet mt of ore, +32% from Q1 2018 (but -5% from the record high of Q4 2018)

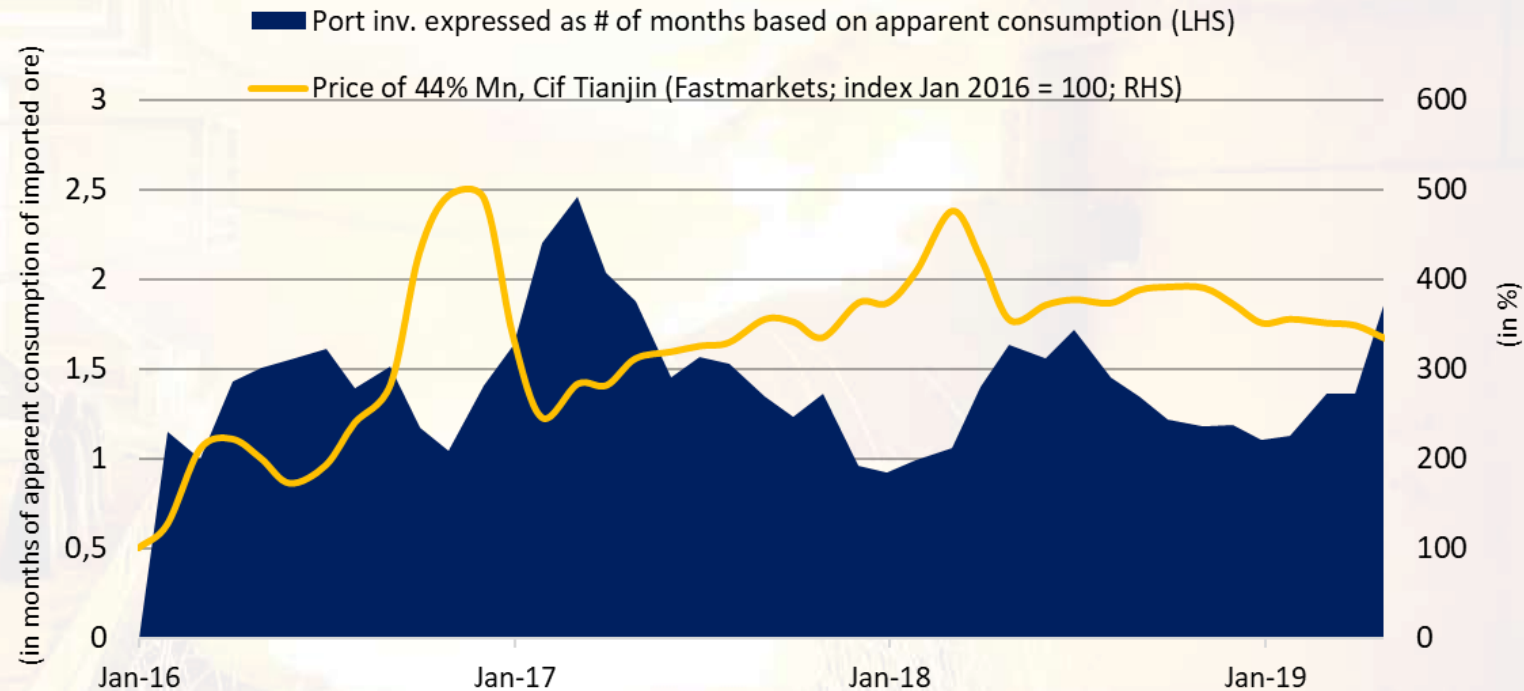


Source: TDM, IMnI

Rising imports into China weigh on prices

- Mn ore stocks at China's ports continued increasing in Q1 & Q2 2019, peaking at 4.2 million wet mt at the end of May
- stocks are now sufficient for 1.9 month of consumption (record high since May 2017), compared to only 1.1 month of reserves in January, and 1.3 month on average in 2018
- Rising reserves weighed on prices, which contracted over the last few months

China's Mn ore port stock (in months of demand) & price
2016 - 2019

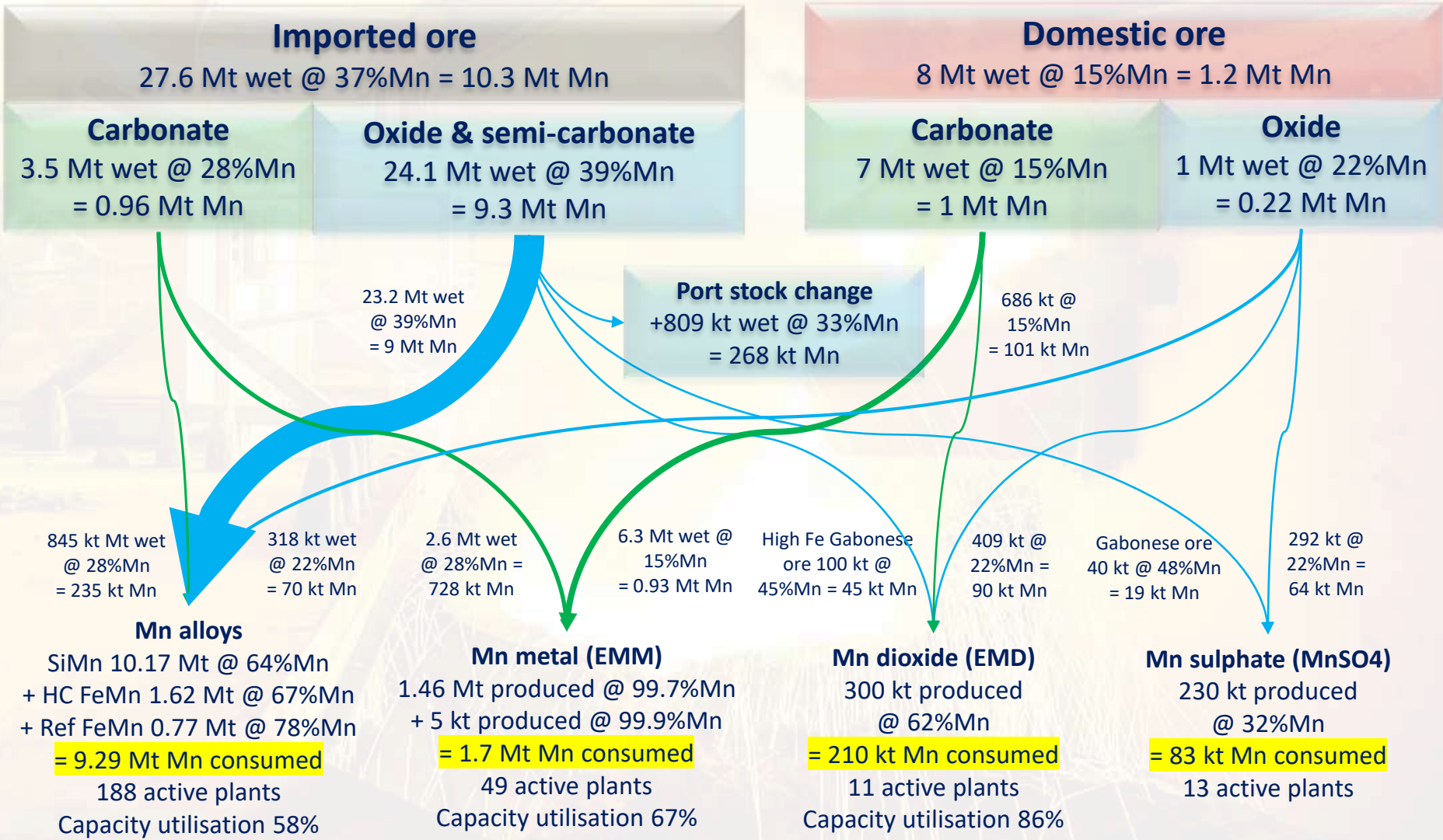


Source: Mysteel, Fastmarkets, Trade Data Monitor, IMnI

China Mn industry: a summary

China Mn ore in 2018 (in million mt)	wet	dry Mn	Average %Mn
Production	8,0	1,2	15%
Imports	27,6	10,3	37%
Port stock change	0,8	0,3	33%
Consumption	34,8	11,2	32%

- Imported material represented 79% of China's consumption in 2018 (vs 59% in 2017)
- Ghana exported 3.46 million wet mt to China in 2018, more than the 2.6 million mt required by TMI for EMM production
- China's Mn ore consumption in 2018 was 34.8 million wet mt, including 24.3 million wet mt for Mn alloys (70%)



Source: CITIC Dameng, IMnI
Mt = Million metric tons
kt = '000 metric tons

8.3 million wet mtpy of additional Mn ore capacity announced

- Around 8.3 million wet mt per year of additional Mn ore capacity announced to be commissioned in the near future (excluding sinter plants)
- most of it in Gabon, South Africa, India, Australia and Brazil

Parent company/group	Company/mine/plant	Capacity (in '000 mtpy)	Production Status/Expected start date	Country
Eramet	Moanda	2 320	2023	Gabon
Nouvelle Gabon Mining	Nouvelle Gabon Mining	1 500	2020	Gabon
Ore & Metal Company Limited	Black Rock	1 400	2019	South Africa
Element 25	Butcherbird	1 000	2020	Australia
Mineracao Britirama S.A.	Mineracao Britirama S.A.	1 000	2019	Brazil
Bosai Minerals Group	Guyana Manganese Incorporated (GMI) -	500	2019	Guyana
Mangilall Rungta	Rungta Mines	161	2019	India - Odisha
MOIL Limited	Ukwa	105	2019	India - Madhya Pradesh
MOIL Limited	Chikla	80	2020	India
RBSSN	Sadanandapuram	78	2019	India - Andhra Pradesh
GoodEarth	GoodEarth	60	2019	Zambia
Gulf Minerals Corporation (GMC)	PT Gulf Mangan Grup - Kupang	50	2019	Indonesia
MOIL Limited	Kandri	37	2020	India - Maharashtra
Brahm Group	Dimension Steel & Alloys	35	2019	India - West Bengal
Maxtech Ventures	Maxtech Ventures	20	indefinite	Brazil
Bryah Resources Limited	Bryah Resources		2019	Australia
Menar	Sitatunga Resources - East Manganese		2019	South Africa

Mn ore demand to increase by 2.1% / year in 2018 - 2023

- Most of this rise in consumption would come from Asia (+2.6% CAGR), followed by the Africa & Australia region (+1.8% CAGR)
- The CIS shows the smallest increase in Mn ore demand in the coming 5 years (+0.6% CAGR)



Conclusion: short term outlook for Mn ore

+ Factor supporting Mn ore prices +	+ Factor putting pressure on Mn ore prices +
Steel production rising sharply in China so far in 2019	China steel production expected to slow in 2019 & 2020
Global Mn alloy excess supply reducing in Q1 2019	Steel production slowing outside China so far in Q1 2019
China's declining domestic ore supply and increasing dependence on imports	Mn alloy production contracting in Q1 2019 in all regions except Asia
Mn ore demand to increase by 2.1% / year in 2018 - 2023	Rising Mn ore inventory in China
	8.3 million wet mt per year of extra capacity announced in the short term

All data in this report available to IMnI Members Join IMnI at manganese.org

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