

Overview of the Manganese Market



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1 – China’s transforming steel sector impacts the global industry

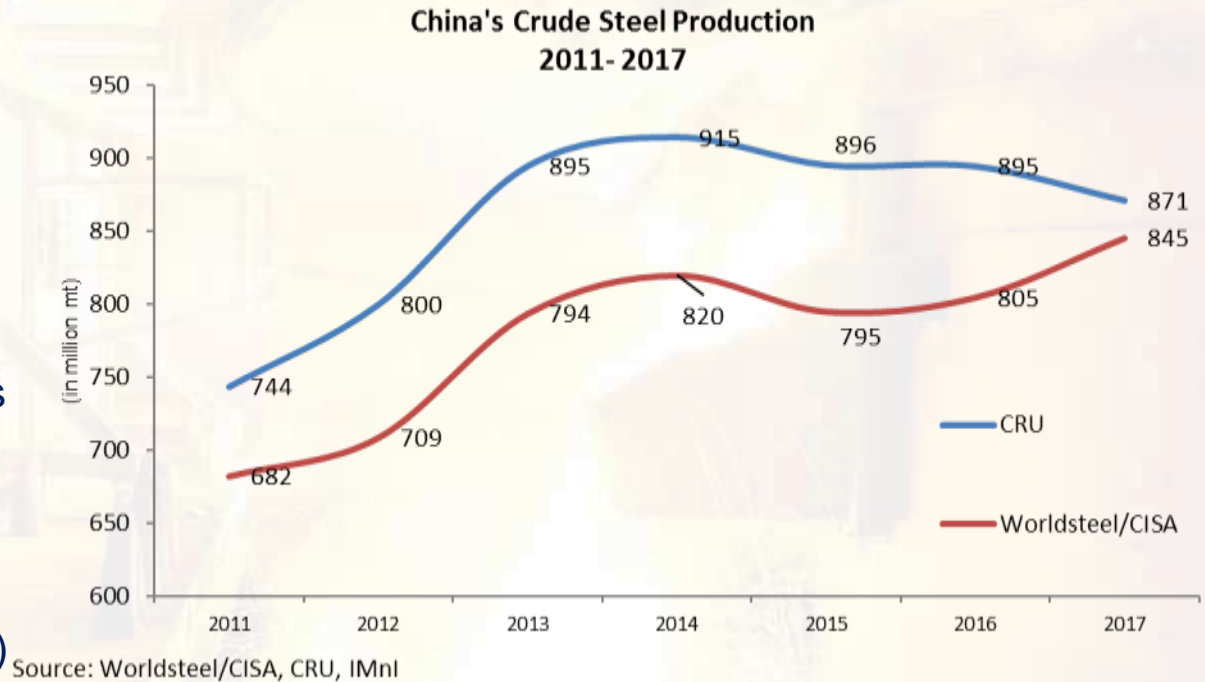
2 – Mn alloys production rising as Chinese and Malaysian smelters ramp up

3 – Growing Mn ore supply driven by mid-grade ore from South Africa

Steel production in China: a reporting issue

CISA figures (published by Worldsteel) underestimate China steel production, because only 80% of Chinese steelmakers are members of CISA

- apparent rise in 2017 CISA figures masks a reporting issue: China closed in 2017 **more than 500 outdated induction furnaces**, mostly small producers, often producing without permit, and not captured in CISA statistics
- IF furnaces have been replaced by blast furnaces, reporting to CISA
- 2017 China steel production
 - +5.1% to 845 Mln (CISA)
 - -2.6% to 871 Mln (CRU)

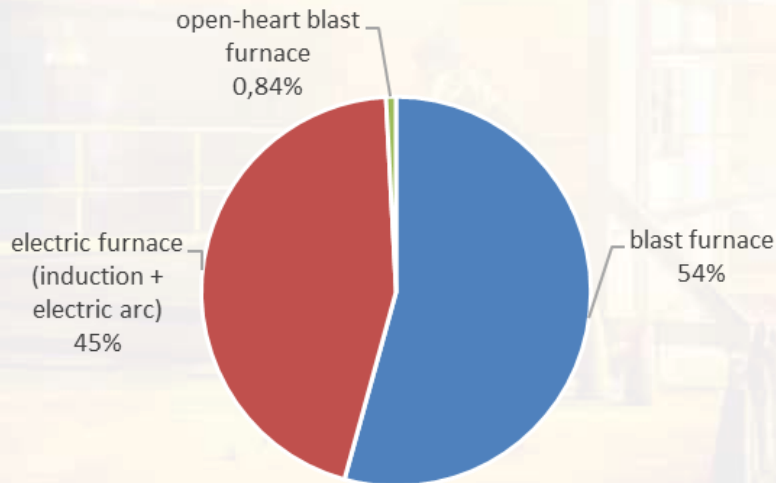


- reality of China's 2017 crude steel output probably in between CRU and CISA
- with the elimination of IF in 2017, gap between CISA and CRU figures reduced

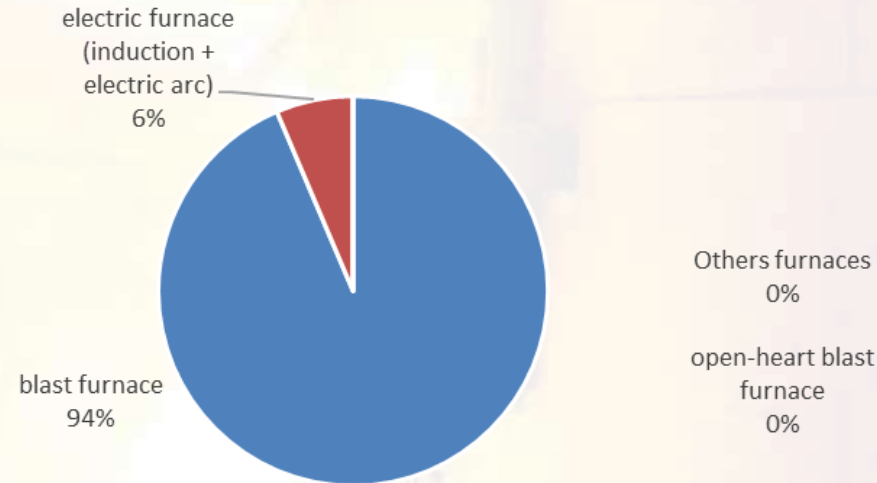
Steel production process evolving in China

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 developed world, and lower quality steel in China (mostly long steel products)

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



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



- But this will change as China is currently building at least 39 new electric arc furnaces (EAFs), with total capacity over 31 million mtpy;
- EAFs consume less Mn units/mt of steel than blast furnaces (because EAFs use more steel scrap), so China Mn unit consumpt. will progressively align with ROW

Reforms of China steel sector

Steel industry in China is transforming dramatically due to government's efforts to:

- fight overcapacity (50 million mtpy of capacity phased out in 2017) as other major steelmaking countries turn to protectionism
- and reduce environmental pollution: China curbed heavy industrial activity in 28 northern cities during the winter 2017/2018 to reduce smog

2017 top 10			2007 top 10			2001 top 10		
Rank	Company	Production	Rank	Company	Production	Rank	Company	Production
1	Baowu steel	6 539	1	Baosteel	2 858	1	Baosteel	1 913
2	Hebei steel	4 406	2	Shasteel	2 289	2	Anshan steel	879
3	Shasteel	3 835	3	Tangshan steel	2 275	3	Captial steel	824
4	Anshan steel	3 422	4	Wuhan steel	2 019	4	Wuhan steel	708
5	Captial steel	2 763	5	Anshan steel	1 617	5	Benxi steel	490
6	Shandong steel	2 168	6	Masteel	1 416	6	Masteel	477
7	Jianlong steel	2 026	7	Captial steel	1 285	7	Baosteel	421
8	Hualing steel	2 015	8	Jinan steel	1 212	8	Hualing steel	406
9	Masteel	1 971	9	Laiwu steel	1 169	9	Tangshan steel	392
10	Benxi steel	1 576	10	Hualing steel	1 112	10	Pansteel	357
	Subtotal	30 721		Subtotal	17 252		Subtotal	6 867
	China total	83 173		China total	48 966		China total	15 163
	Top 10 share	37%		Top 10 share	35%		Top 10 share	45%

Source: Mysteel

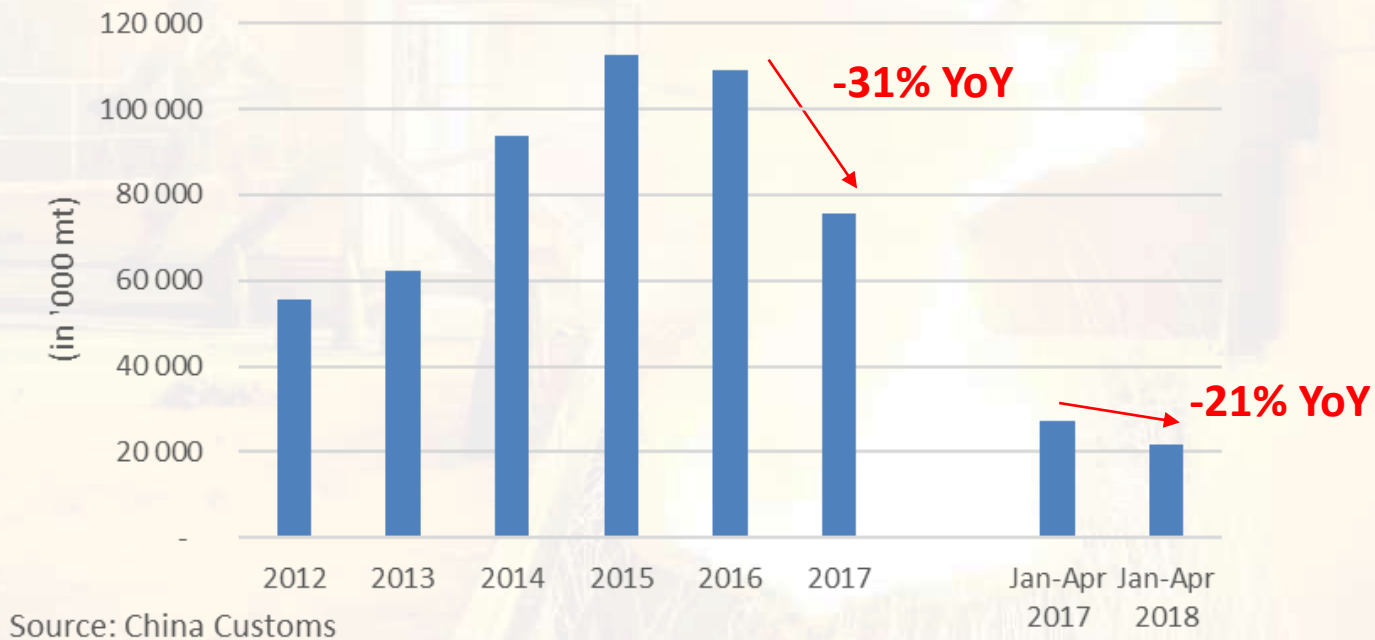
China transitioning into a less steel-intensive phase of its economic development and the Chinese government wants to shut down older, inefficient and more polluting steel mills, encouraging the consolidation of steel companies, and reducing steel exports

Falling steel exports from China

Steel exports from China dropped by 31% in 2017 to 76 million tons

- the reform of overcapacity industries including steel improved domestic steel prices, so Chinese steel mills had less incentive to export
- firmer demand for steel in China
- anti-dumping cases in the ROW reduced competitiveness of China steel exports

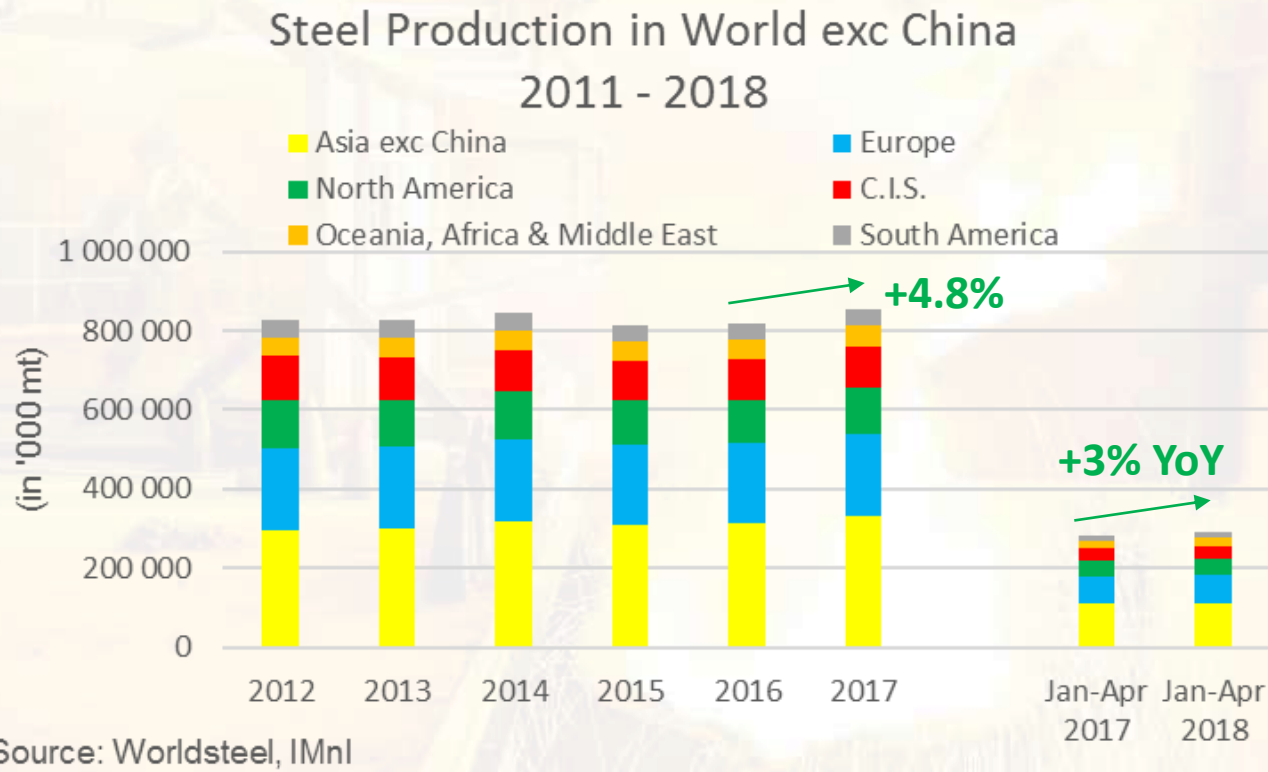
Steel exports from China 2012 - 2018



China steel exports continue falling in 2018, because China government continues phasing out outdated steel capacity, and because of trade tariffs by the USA

Steel output growth driven by ROW in 2017

Steelmakers benefitted from improving domestic demand & lower imports from China
 2017 showed fastest steel production growth in ROW since 2011: **+4.8%**
 Europe +5.1%; Asia exc China +4.9%; North America +4.6%



Trend continues so far in 2018, with ROW production +3% from Jan-Apr 2017:
 Asia exc. China +2%, North America & Europe +3%, CIS +1%

Outline

1 – China's transforming steel sector impacts the global industry

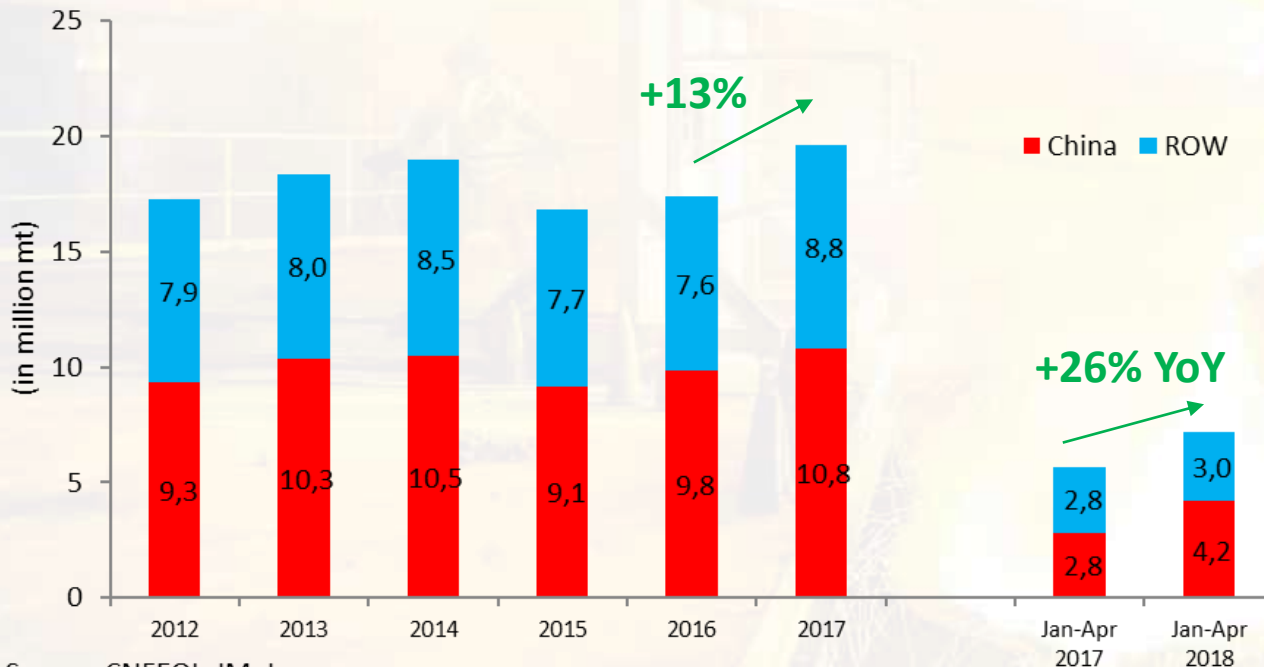
2 – Mn alloys production rising as Chinese and Malaysian smelters ramp up

3 – Growing Mn ore supply driven by mid-grade ore from South Africa

Mn alloy supply growth higher in ROW in 2017

Mn alloy output 19.6 million mt +13% last year (+10% in China; +16% in ROW)
 on restocking by steel mills and higher SiMn unit consumption in steel in China
 (due to the replacement of induction furnaces by blast furnaces, consuming more Mn)

Global Mn Alloys Production
 2011 - 2018



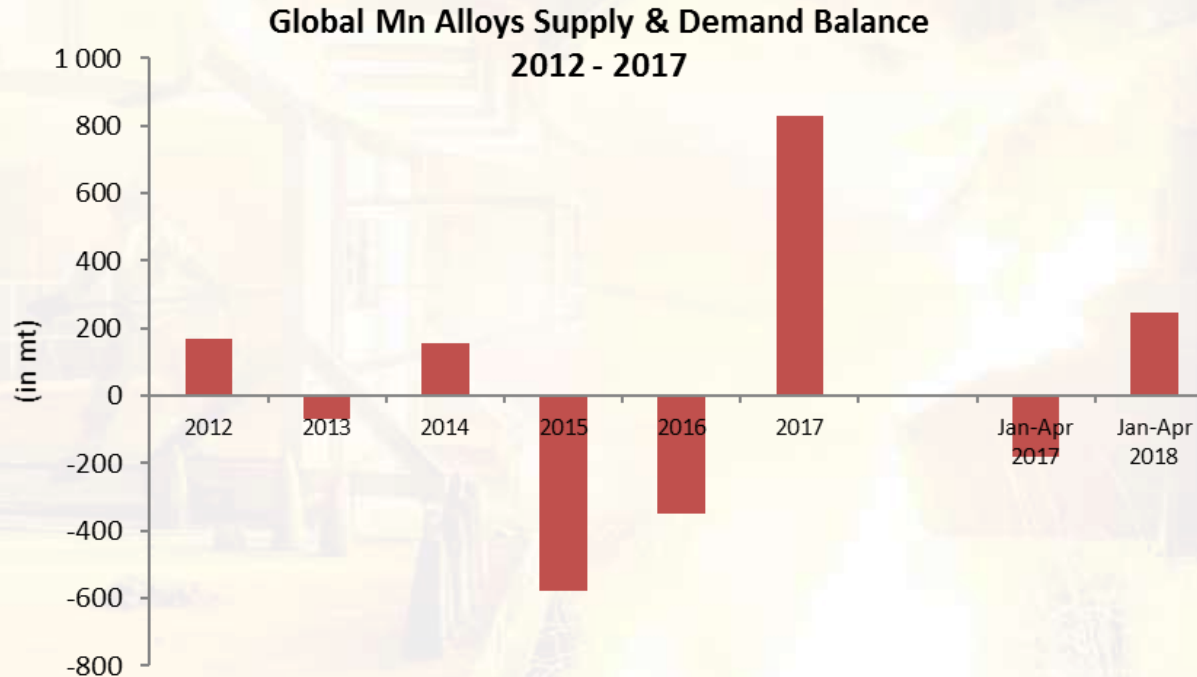
Mn Alloys Supply 2017 % Change YoY	
Asia & Oceania	14%
C.I.S.	8%
Europe	6%
Americas	9%
Africa & Middle East	5%
World	13%

Source: CNFEOL, IMnI

In Jan-Apr 2018, Chinese smelters increased production by 47% YoY, while output for foreign producers rose by 6% YoY (Malaysia +59% YoY)

Mn alloy demand rising more slowly than supply

Rising Mn alloy demand (+6% in 2017) was not sufficient to absorb extra supply (+13%), so the S/D balance moved into surplus after 2 years of production cuts

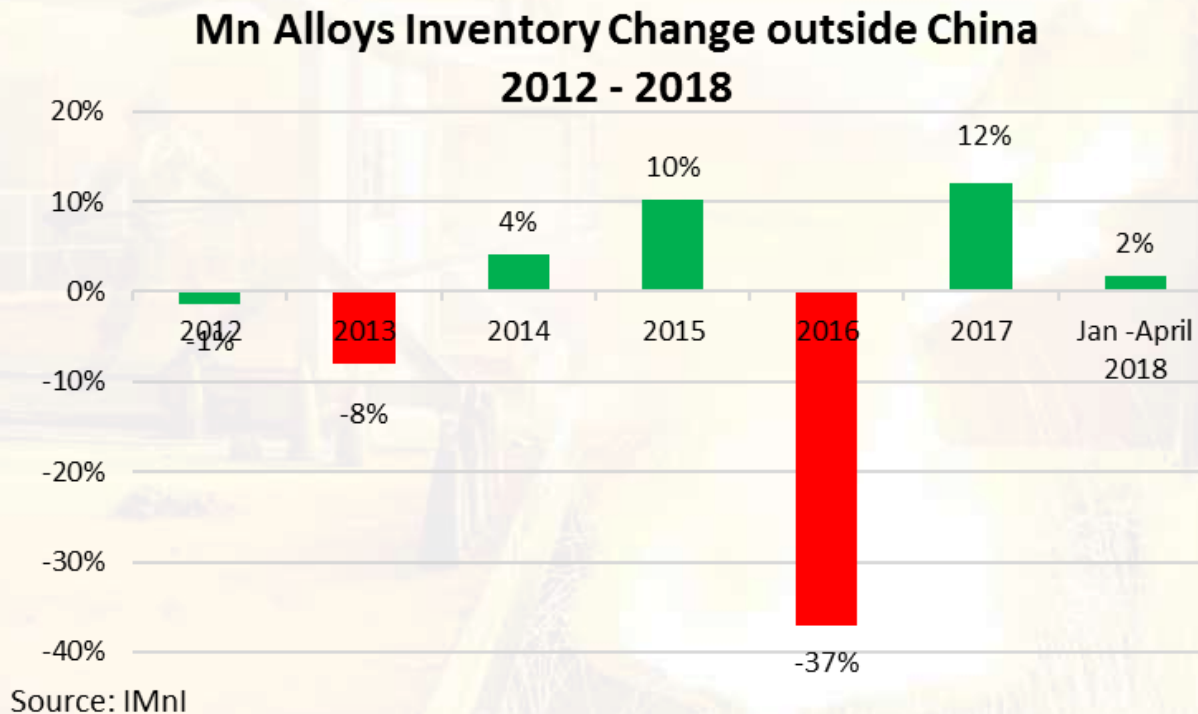


Source: IMnI

In Jan-Apr 2018 as well, demand increased less than supply, causing excess supply to accumulate

Smelters restocked in 2017

Stocks of Mn alloy outside China increased by 12% in 2017 on restocking after smelters cut inventory in 2016, based on inventory figures reported by IMnI Members in Africa, North & South America, Asia, Australia

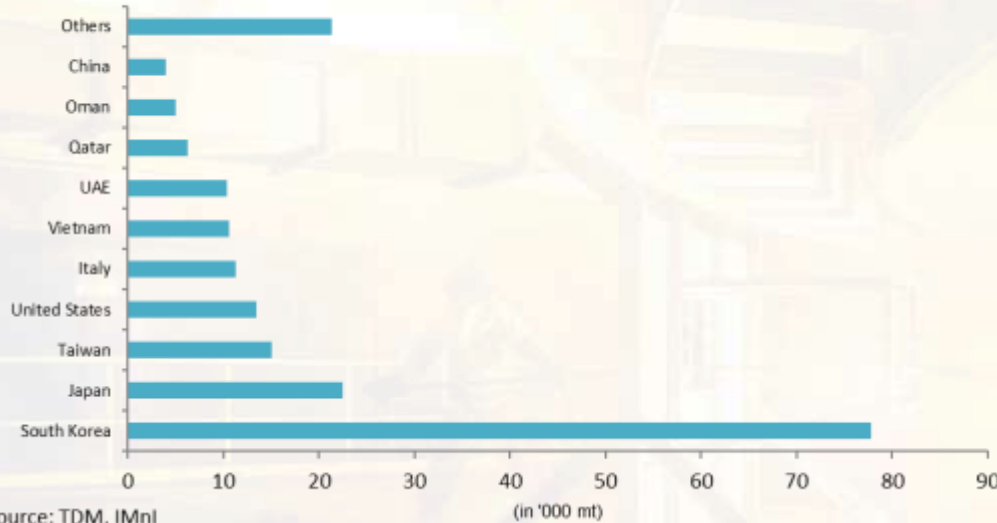


In Jan-April 2018, smelters increased inventory by 2% on average, because of higher supply than demand

Malaysia SiMn exports

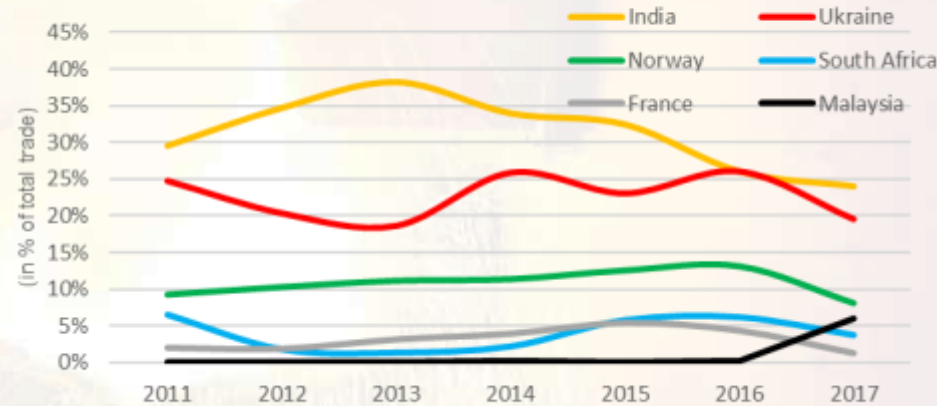
Malaysia mostly ships SiMn to Asia

Top 10 Malaysia SiMn Importers in 2017



Source: TDM, IMnI

Evolution of SiMn Exports for Some Major Exporters in 2011 - 2017



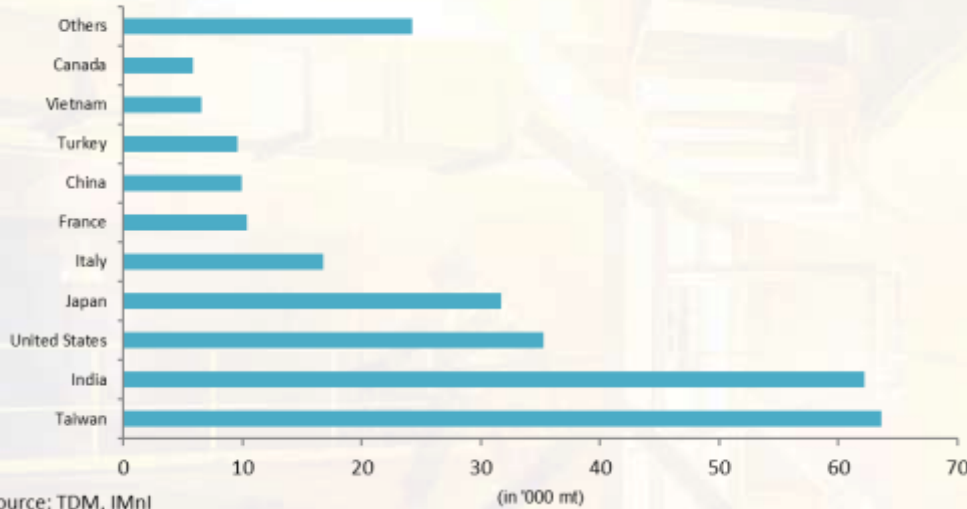
Source: TDM, IMnI

Malaysian SiMn exports mostly displaced shipments from India & RSA in 2017

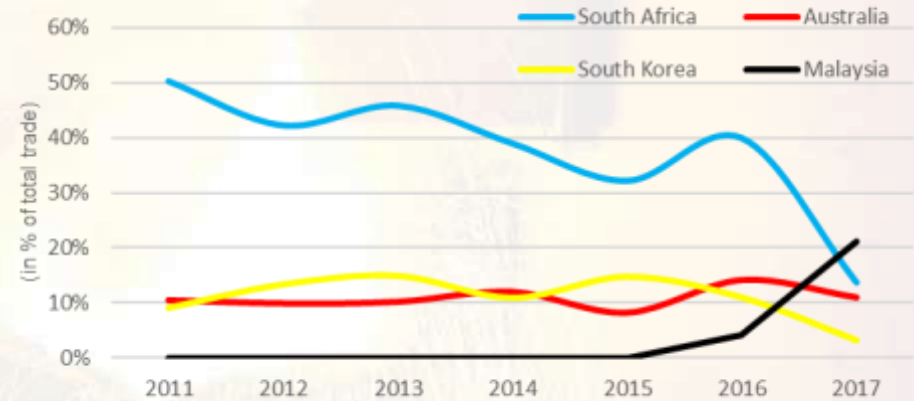
Malaysia HC FeMn exports

Malaysia mostly ships HC FeMn to Asia and the USA

Top 10 Malaysia HC FeMn Importers in 2017



Evolution of HC FeMn Exports for Some Major Exporters in 2011 - 2017



Source: TDM, IMnI

Malaysian smelters compete with HC FeMn producers in South Africa and South Korea

EMM competition with Ref FeMn increased

EMM is expensive to use in electric arc furnaces, but EMM prices resisted cost-push pressure from rising Mn ore prices in 2017, partly because of oversupply in China



Source: TDM, IMnI

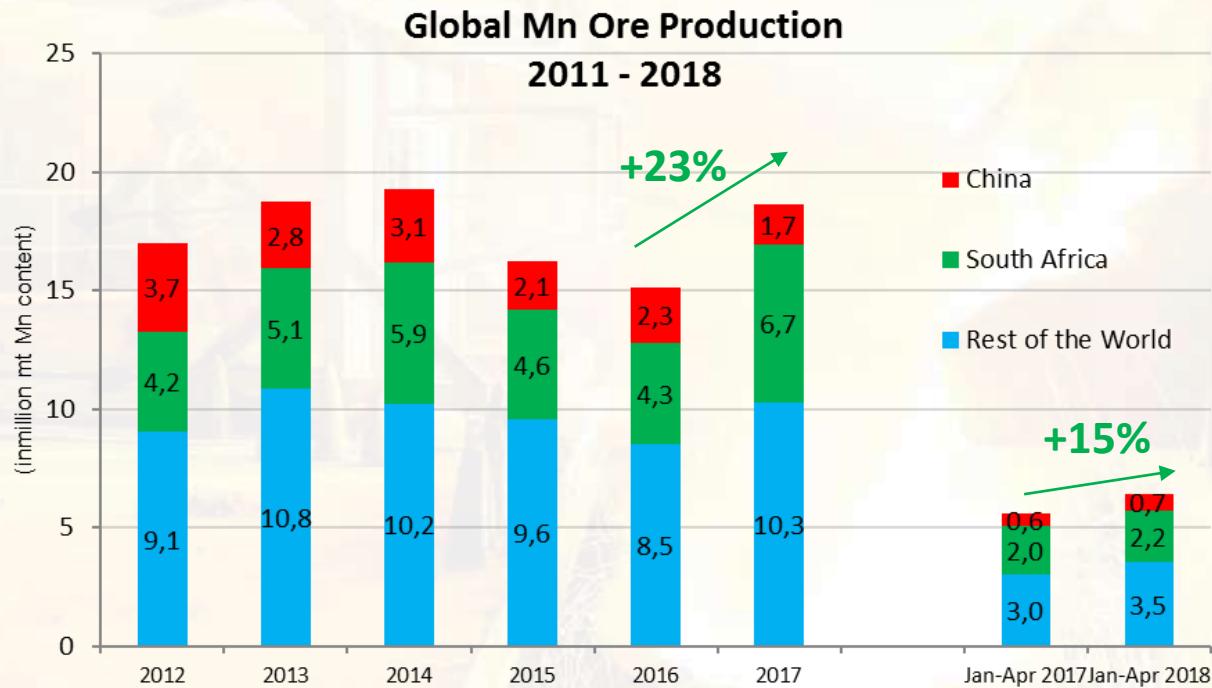
Some stainless and special steelmakers replaced Ref FeMn by EMM, mostly outside China (EMM consumption in China only increased slightly in 2017, but EMM exports from China increased by 107,000 or 29%, mostly to Europe, the USA, Russia & India)

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Mn ore production growth in 2017 led by mid-grade ore from South Africa

Mn ore output boomed in 2017 to 18.6 million mt, +23% from 2016 (= +3.4 million mt), driven by lower output in China combined to rising demand; RSA supply +56% (= +2.4 million mt); China -27%; ROW +20%



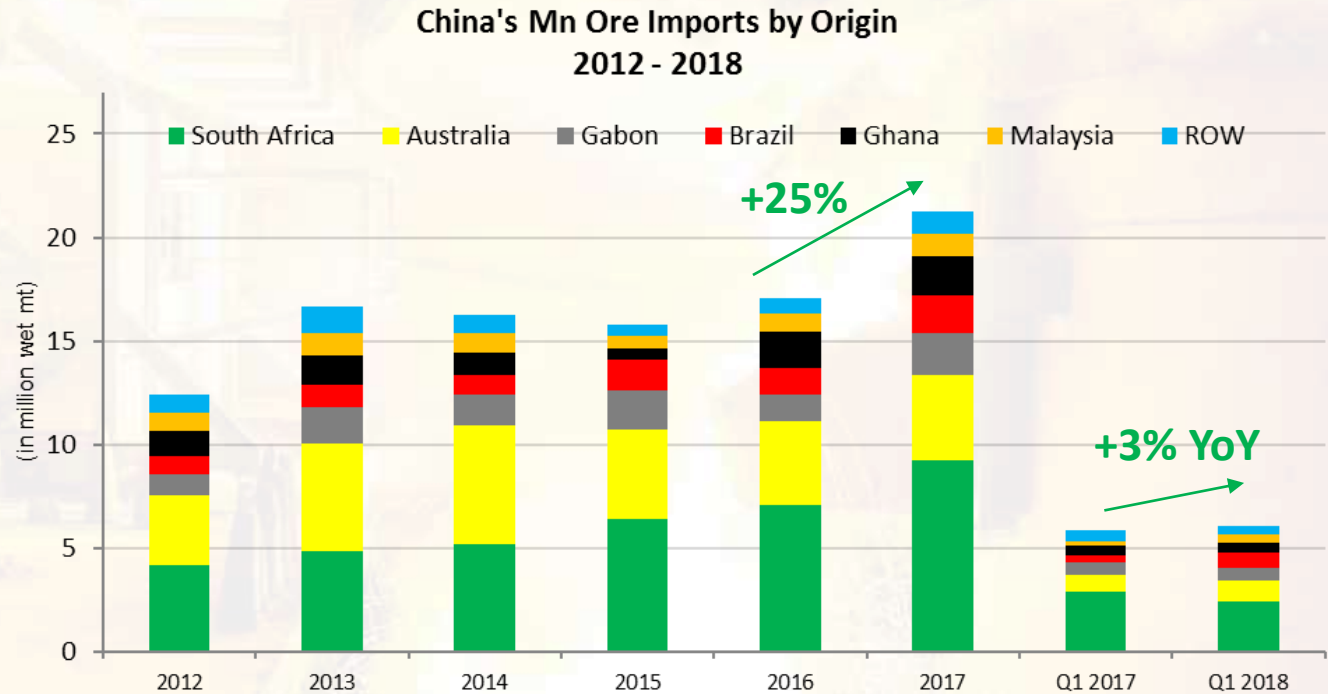
Source: IMnI

2017 prod by grade +41% mid; +21% high, -12% low, mostly because of reducing reserves, falling quality, and safety restrictions in China; YTD 2018 RSA +7% YoY

China even more dependent on imports

Mn ore imports into China reached a new record high in 2017 due to rising demand from Chinese smelters (+7%), and lower domestic ore production (-27%)

China's Mn ore imports = 21.3 million wet mt in 2017, including 9.3 million mt from South Africa (+31% YoY) = 44% of China's imports



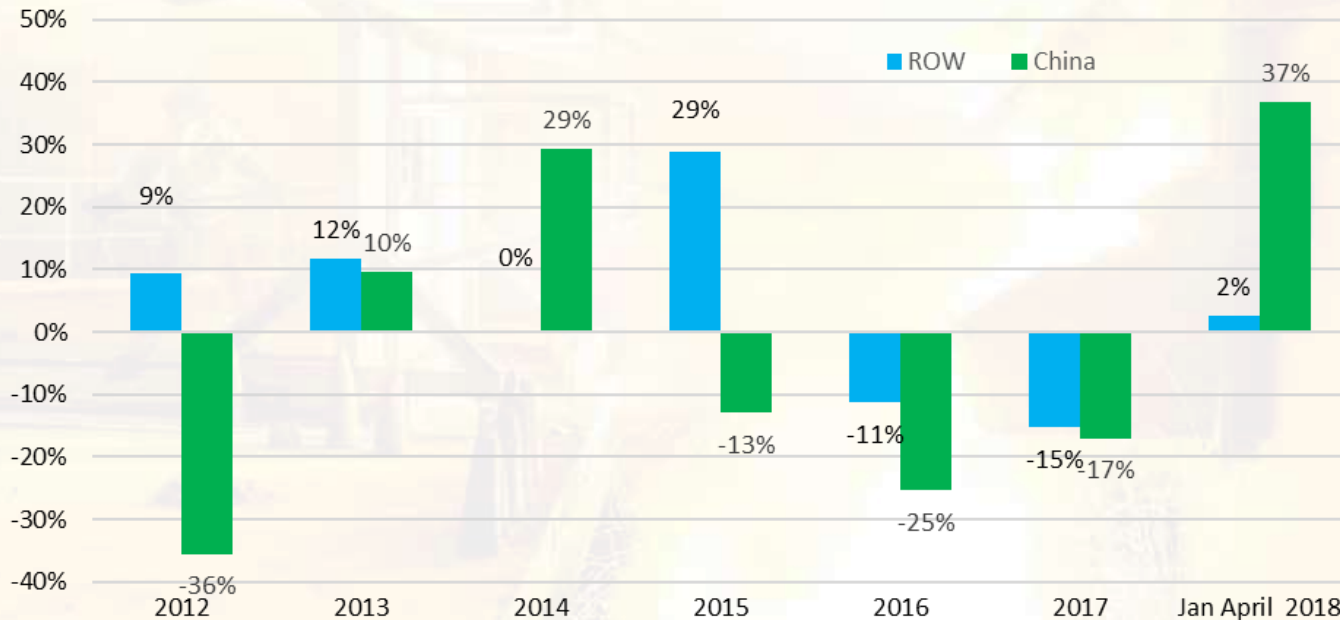
Source: TDM, IMnI

In Q1 2018, China imported 6.06 mln wet mt of ore (new record for a single quarter): +3% from Q1 2017 and **+15% from Q4 2017**

Mn ore destocking in 2017

Stocks of Mn ore decreased in 2017 for miners (-15%), and consumers in China (-17%)

Global Mn Ore Inventory Change at China's ports vs ROW Mn mines; 2012 - 2018



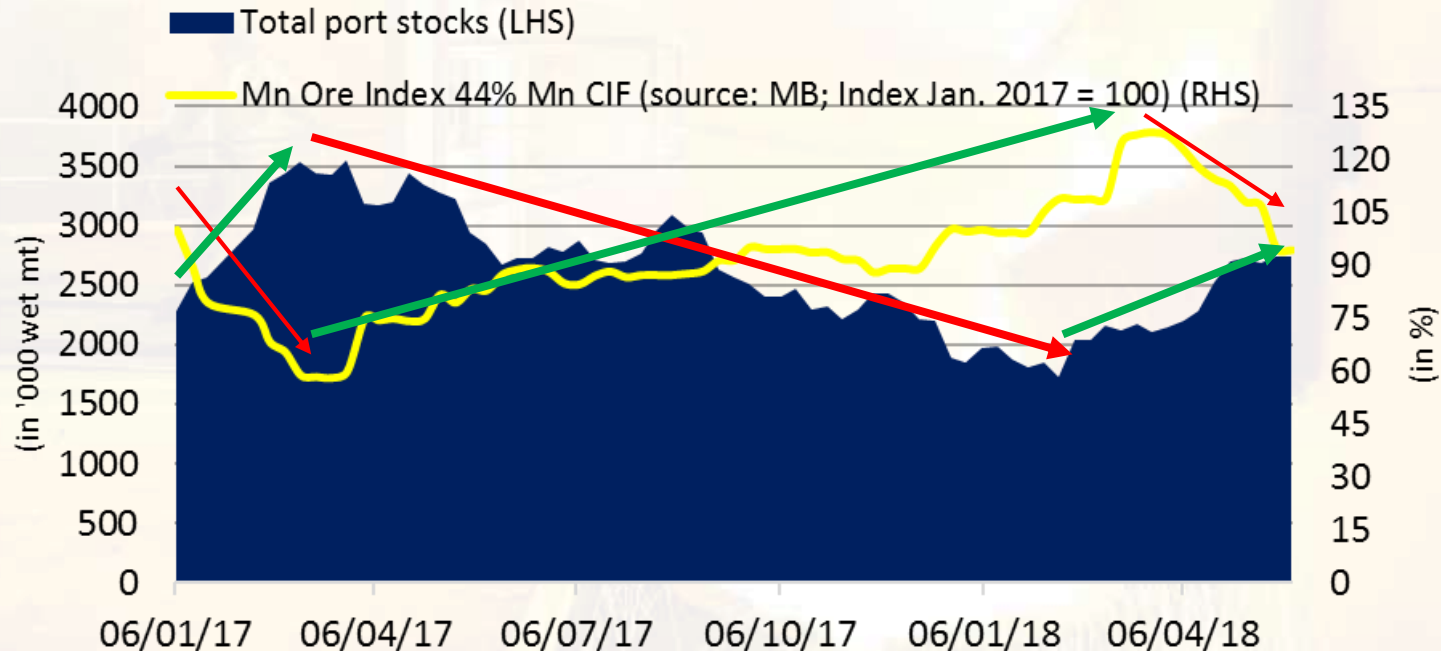
Source: Mysteel, IMnI

Miners stocks increased by 2% so far in 2018 because of higher production
 In Apr 2018, Mn ore miners stock = 1.8 months of prod, vs 1.6 in previous 6 months

Rising imports into China weigh on prices

Mn ore stocks at China's ports continued increasing in Q2 2018: reaching 2.7 million wet mt on May 25, on growing imports: stocks are now sufficient for 1.4 month of consumption, compared to only 0.9 month of reserves in February

China's Mn Ore Port Stocks vs Price 2017 - 2018



Source: Mysteel, Metal Bulletin, IMnI

Stocks in China still low, but quickly rising due to stable demand and rising imports

6.7 million wet mtpy of new Mn ore capacity

including 2 million mtpy in Ghana for EMM production

Country	Company	Extra Capacity (in '000 wet mtpy)	Expected Production Start
Ghana	Ghana Manganese - Nsuta mine	2 000	2018
South Africa	Assmang - Black Rock	1 400	2019
	Kudumane	400	2018
Australia	Bryah Resources Ltd	?	2019
	Montezuma - Butcherbird project	1 000	2021
India	Brahm Energy - Bankura project	330	2018
	Rungta Mines	161	2018
	MOIL Chikla mine	80	2020
	RBSSN - Sadanandapuram mine	78	2018
	Tata Steel - Joda plant	50	2018
	MOIL Ukwa mine	105	2019
	MOIL Kandri mine	37	2020
	MOIL Parsoda mine	40	2018
Guyana	Guyana Manganese Incorporated (GMI), subsidiary of Bosai Minerals Group. - Matthews Ridge project	750	2019
Ivory Coast	Shiloh Manganese (a subsidiary of India's Shiloh Industries)	120	2018
Zambia	GoodEarth	60	2018
Brazil	Meridian (formerly BMC) - Espigão project	30	2019
	Maxtech Ventures	20	indefinite
Total		6 661	
Malaysia	OM Sarawak - sinter plant	225	2019
	Pertama Ferroalloys - sinter plant	200	2018
Australia	OM Holdings Bootu Creek - tailings plant	250	2019

Source: IMnI

Kalagadi ramping up in South Africa

In 2017, RSA exported 15.5 million wet mt: rail capacity getting close to maximum

Conclusion: short term outlook for Mn ore

+ Factor supporting Mn ore prices +	+ Factor putting pressure on Mn ore prices +
China's declining domestic ore supply and increasing dependence on imports	Protectionism in the steel industry
Logistics in South Africa: limited rail capacity + rising oil prices, increasing trucking cost	Mn alloy sector moving towards oversupply
Weak US\$ increasing Mn production costs for in Australia, Brazil etc.	Rising Mn ore supply expected from some existing mines & new projects
	Increasing stocks for Mn ore producers and at China's ports

data used in this report available to IMnI Members



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