

Overview of the Manganese Market



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New Delhi, India

1 – China's transforming steel industry

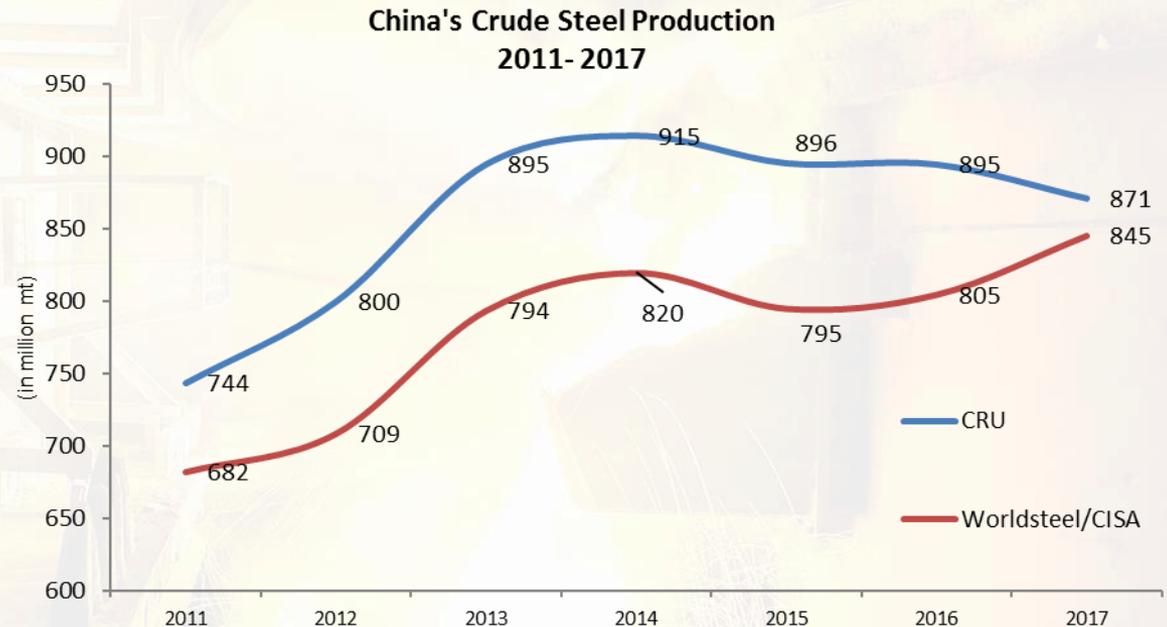
2 – Mn alloys production rising as Chinese and Malaysian smelters ramp up

3 – Mn ore supply reached a new record high, driven by rising demand from China

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- apparent rise in 2017 CISA figures masks a reporting issue: China closed in 2017 **more than 500 outdated induction furnaces**, mostly small producers, often producing without permit, and not captured in CISA statistics
- IF furnaces have been replaced by blast furnaces, reporting to CISA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
 - +5.4% to 848 Mln (CISA)
 - -2.6% to 871 Mln (CRU)



Source: Worldsteel/CISA, CRU, IMnI

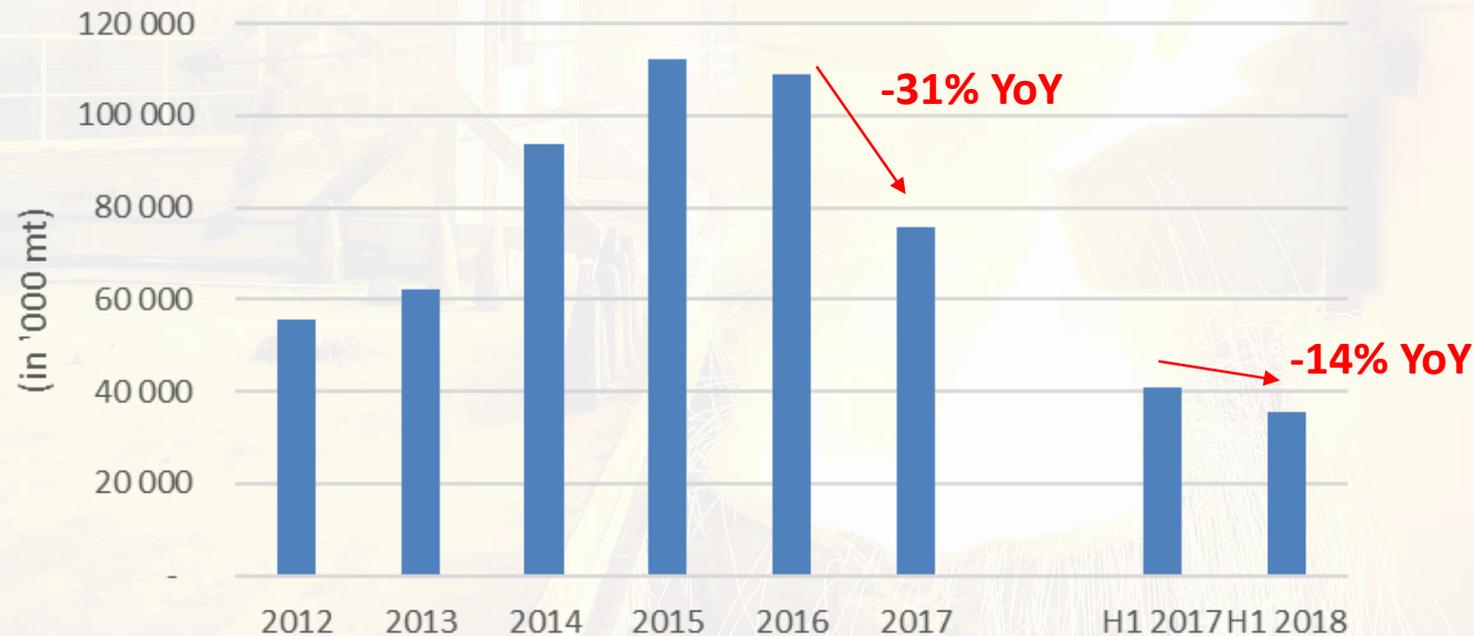
- reality of China's crude steel output probably in between CRU and CISA estimates
- with the elimination of IF in 2017, gap between CISA and CRU figures reduced

Falling steel exports from China

Steel exports from China -31% in 2017 to 76 mln tons, and -14% in H1 2018, due to:

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

Steel exports from China 2012 - 2018

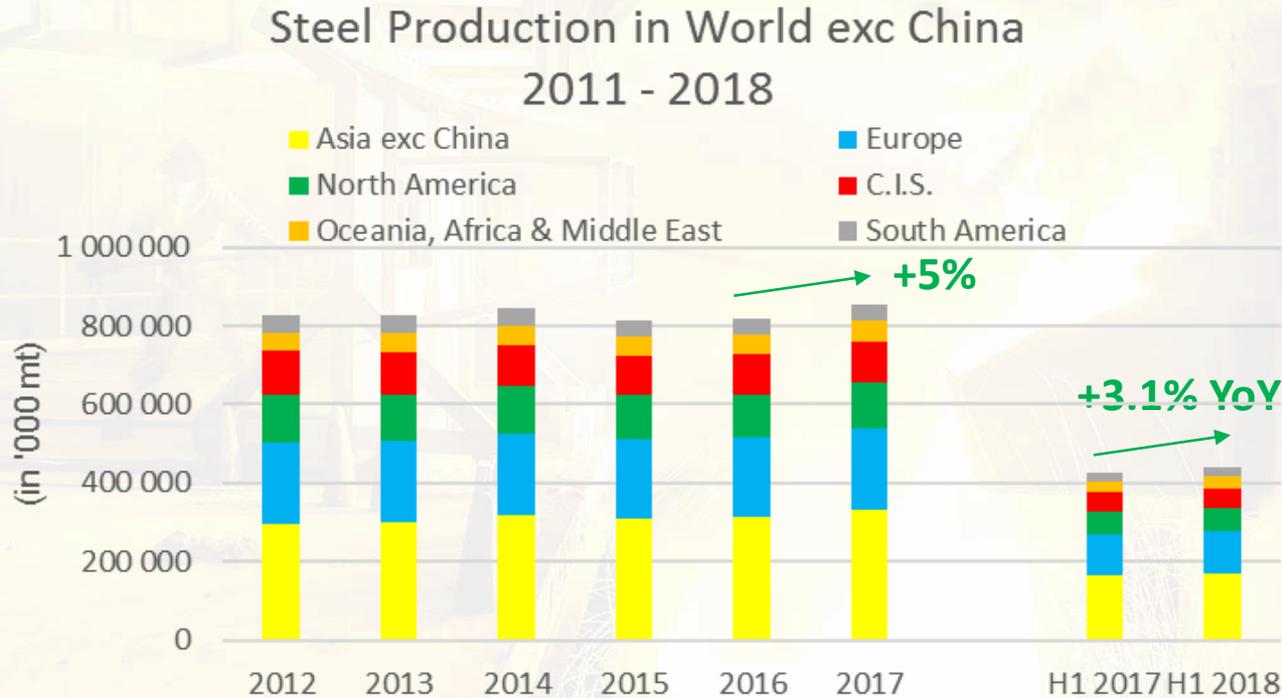


Source: China Customs

Trend expected to continue in the short term, as China keeps fighting overcapacity

Steel output growth driven by ROW

Steelmakers benefit from improving domestic demand & lower Chinese exports:
 China crude steel production in H1 2018 -3.2% YoY; ROW +3.1% YoY



Source: Worldsteel, IMnI

Asia ex. China +3% YoY in H1 2018; North America +2.4%; CIS +3%; Europe +2%;
 India +5.1% YoY (= +2.5 million mt produced in India in H1 2018)

Outline

1 – China's transforming steel industry

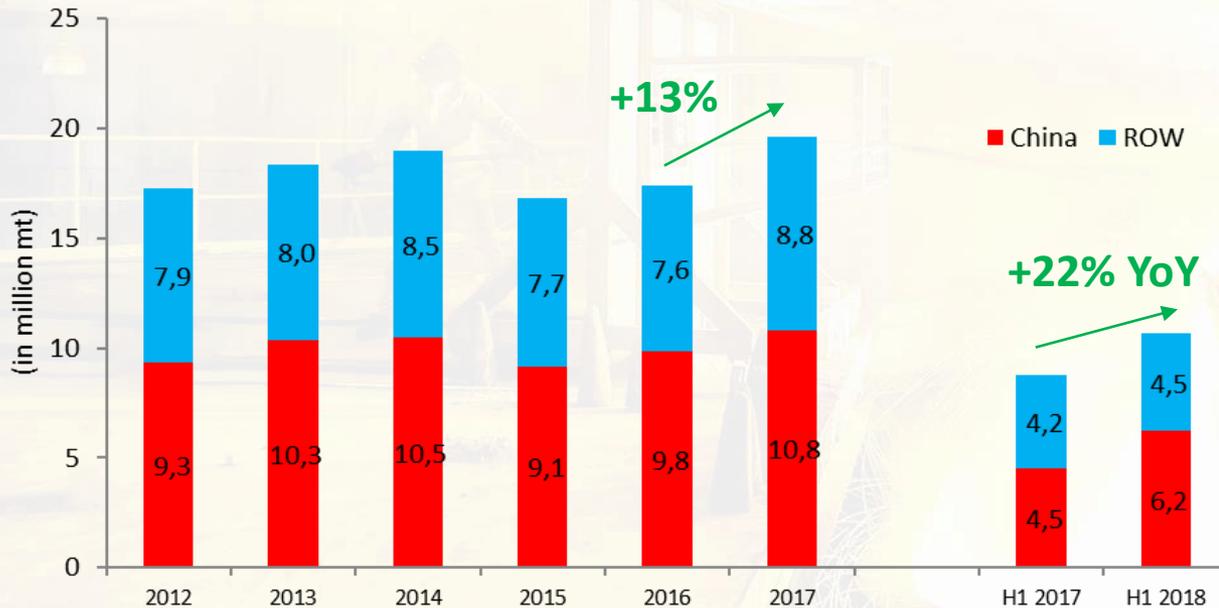
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Strong Mn alloy supply growth in Asia

Mn alloy output 10.7 million mt in H1 2018, +22% on last year (+38% in China; +27% in ROW), due to restocking by steel mills and higher SiMn consumption in steel in China, combined to ramp up of 3 Malaysian plants

Global Mn Alloys Production
2011 - 2018



Mn Alloys Supply H1 2018 % Change YoY	
Asia & Oceania	27%
C.I.S.	12%
Europe	2%
Americas	-0,5%
Africa & Middle East	-1%
World	22%

Source: CNFEOL, IMnI

Higher SiMn consumption in steel in China because of the replacement of induction furnaces by blast furnaces, consuming more Mn;
Mn supply continues ramping up in Malaysia: +47% YoY in H1 2018 to 297,000 mt.

Mn alloy demand rising more slowly than supply

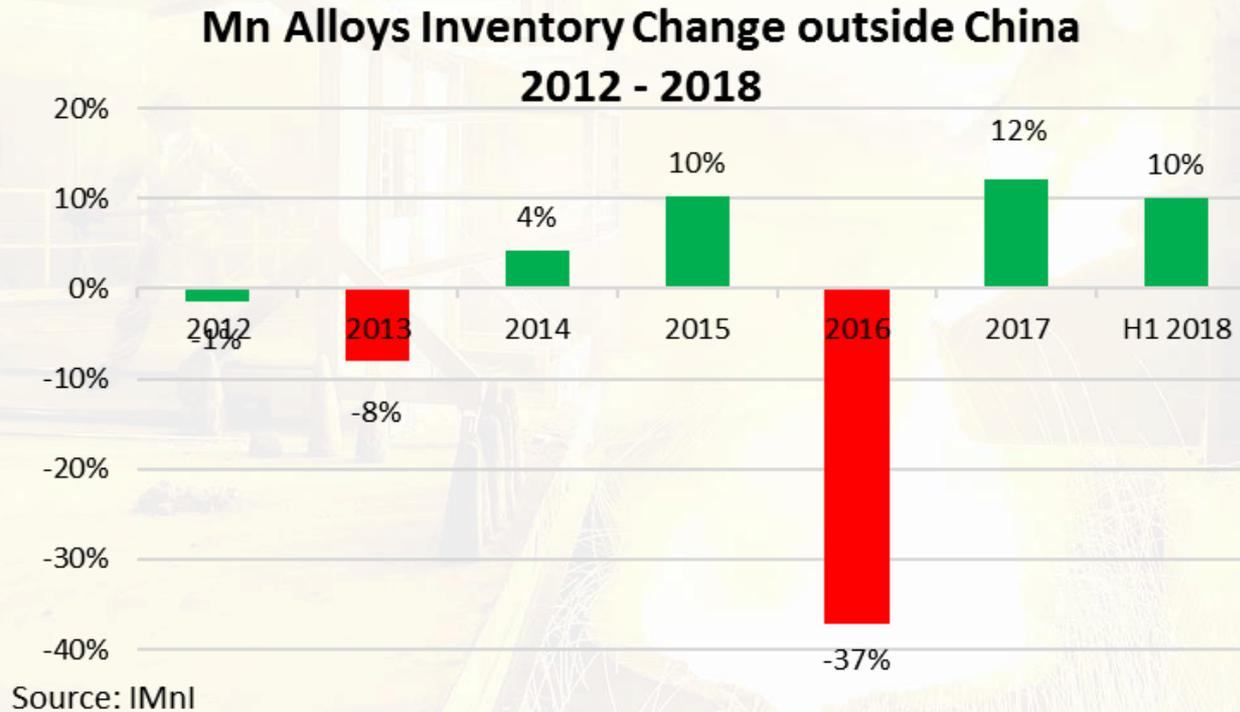
Rising Mn alloy demand (+15% in H1 2018) was not sufficient to absorb extra supply (+22%), so the S/D balance remained in surplus in 2018



Source: IMnI

Smelters restocking in 2018

Stocks of Mn alloy outside China increased by 10% in H1 2018 (based on inventory figures reported by IMnI Members in Africa, North & South America, Asia, Australia): after cutting inventory in 2016, smelters restocked in 2017 and H1 2018, because of higher supply than demand



Outline

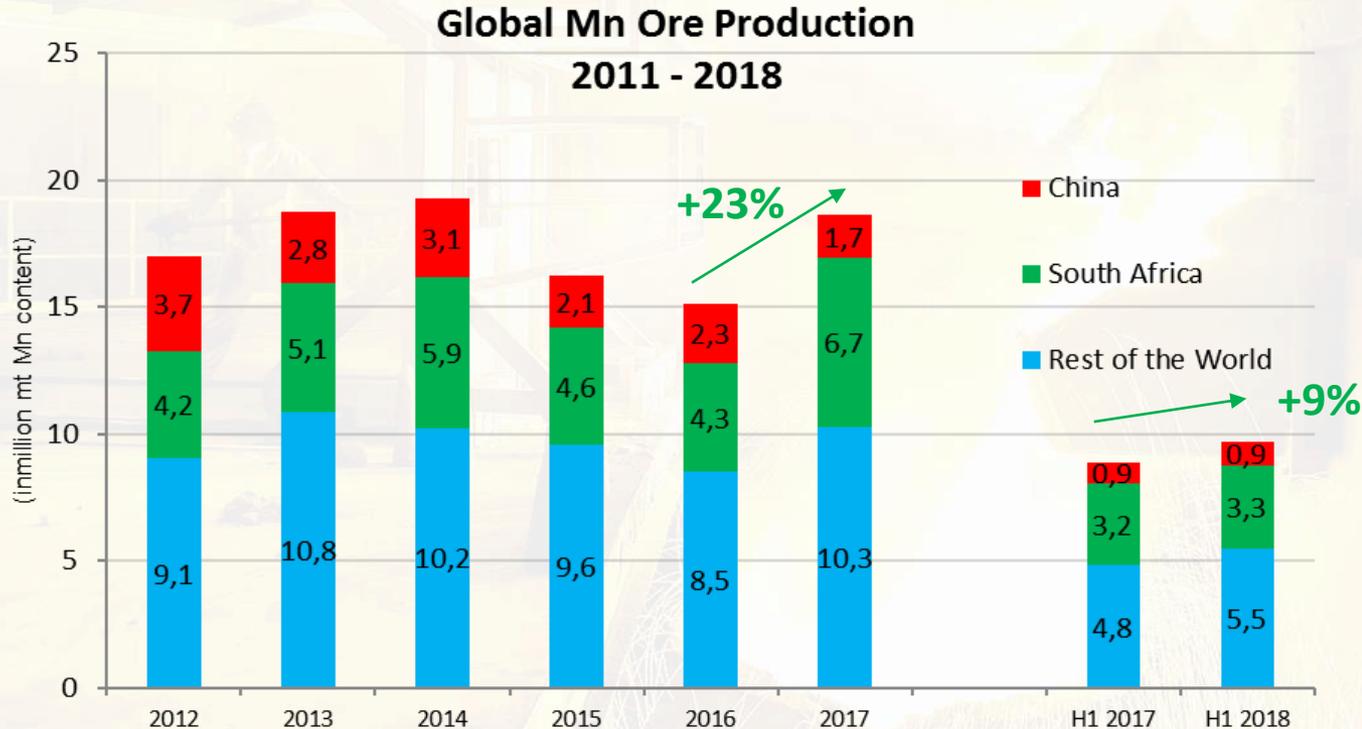
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Traditional suppliers leading Mn ore production growth in 2018

Mn ore output continues expanding in 2018, after booming in 2017 (+23%): in H1 2018 +9% YoY to almost 10 million mt (Mn content), a record high for the first half of the year, driven by Gabon, Ghana, South Africa, India, Australia (however Brazil -18% YoY)



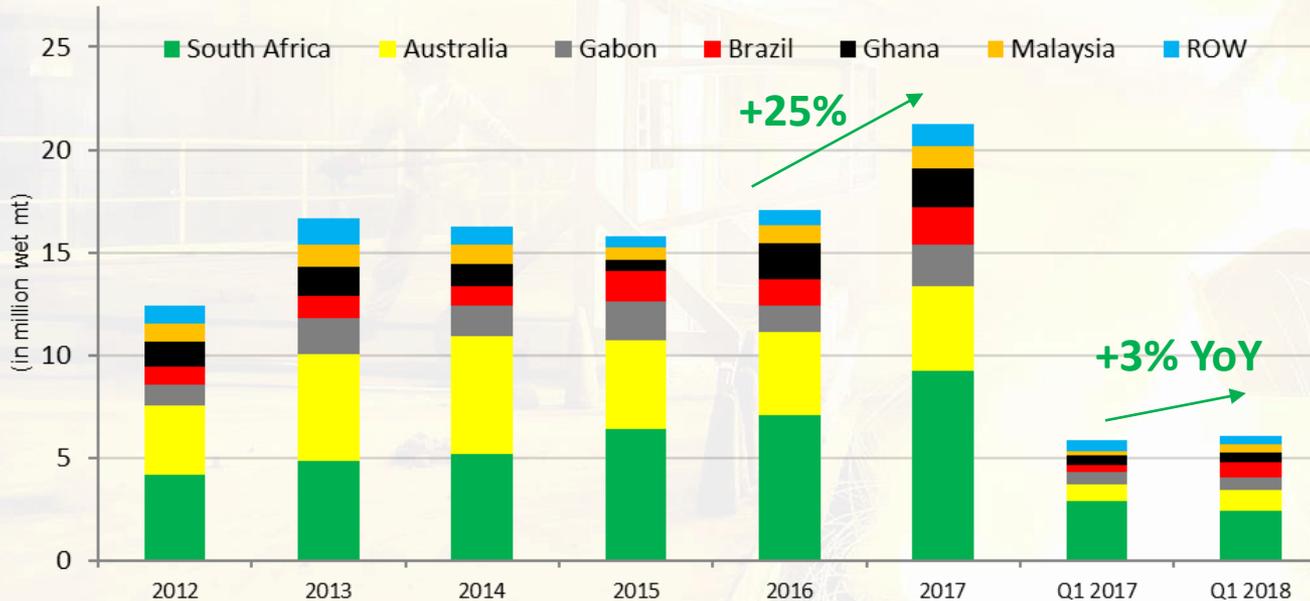
Source: IMnI

Supported demand in China: rising demand from smelters, restocking at ports, lower domestic output (due to reducing reserves, safety restrictions, lower EMM supply)

China increasingly dependent on imports

Mn ore imports into China reached a new record high in 2017, and continued rising in Q1 2018, due to increasing demand from smelters in China and lower domestic supply

China's Mn Ore Imports by Origin
2012 - 2018



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

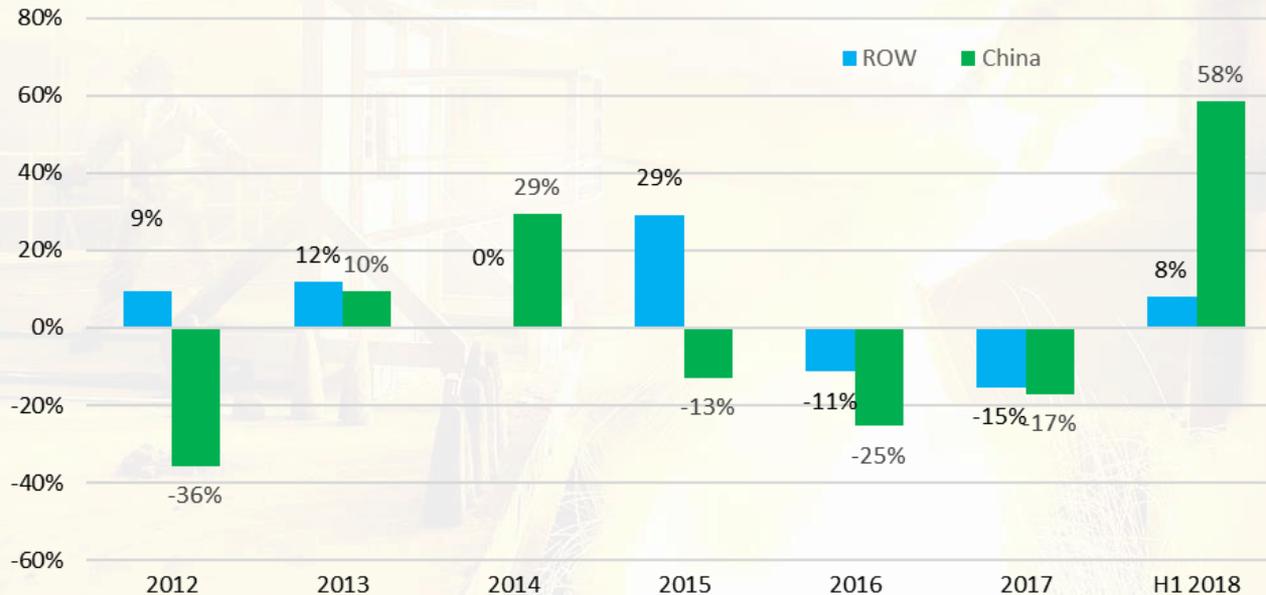
Source: TDM, IMnI

Since April 2018, China stopped publishing manganese trade statistics, officially “due to technical reasons”, but in fact because of trade tension with the USA

Mn ore restocking in 2018

Miners stocks increased by 8% in H1 2018 because of higher production

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

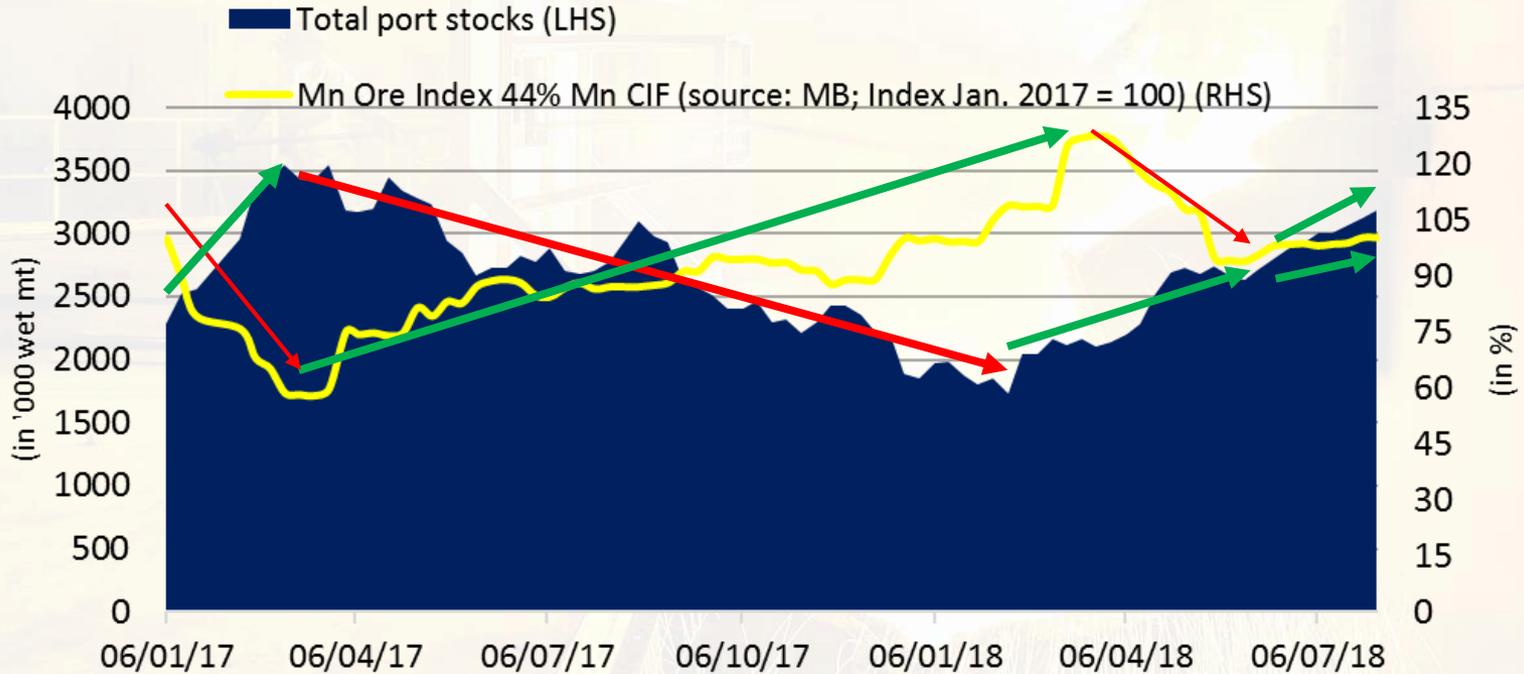


Source: Mysteel, IMnI

Rising inventory in China in Q3 2018 not sufficient to reduce Mn ore prices

Mn ore stocks at China's ports continued increasing in August: reaching 3.13 million wet mt on August 10, on growing imports

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



Source: Mysteel, Metal Bulletin, IMnI

Port inventory and price followed the same trend in Q3, because of supported demand from China

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 RSA, rail capacity getting close to maximum (in 2017, RSA exported 15.5 million wet mt of Mn ore), and rising oil prices increase trucking cost

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 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



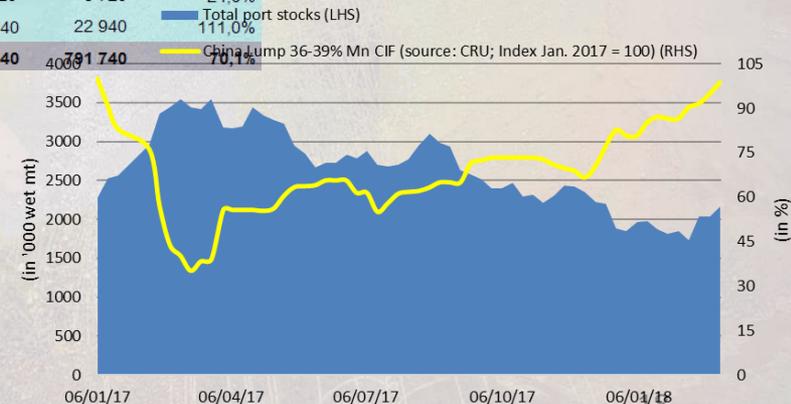
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Exclusive statistics on China

IMnI China Representative based in Shanghai collects the best data available on China for IMnI Members, including production figures by province for SiMn, FeMn and EMM (monthly), Mn ore inventory at China's ports (weekly) etc.

产区 Regions	月份 Month	调研厂家数 Number of Smelters Surveyed	开工厂家数 Number of Smelters in Operation	年产能 Annual Capacity	30天计月产能 Monthly Capacity (30 day basis)	推算日产能 Deducted Daily Capacity	日产量 Daily Output	推算月产量 Monthly Output	产能利用率 Cap Utilization Ratio
宁夏Ningxia	Jan	23	17	3 180 000	265 000	8 833	4 530	140 430	51,3%
内蒙Inner Mongolia	Jan	32	31	3 362 400	280 200	9 340	9 310	288 610	99,7%
湖南Hunan	Jan	20	4	132 000	11 000	367	400	12 400	109,1%
云南Yunnan	Jan	15	7	382 800	31 900	1 063	580	17 980	54,5%
广西Guangxi	Jan	54	45	2 220 000	185 000	6 167	4 750	147 250	77,0%
贵州Guizhou	Jan	19	15	1 362 000	113 500	3 783	2 260	70 060	59,7%
山西Shanxi	Jan	12	7	554 400	46 200	1 540	830	25 730	53,9%
甘肃Gansu	Jan	9	4	544 800	45 400	1 513	640	19 840	42,3%
四川Sichuan	Jan	9	2	391 200	32 600	1 087	400	12 400	36,8%
东北Northeast	Jan	12	6	319 200	26 600	887	560	17 360	63,2%
新疆Xinjiang	Jan	9	4	252 000	21 000	700	420	13 020	60,0%
河南Henan	Jan	9	2	180 000	15 000	500	120	3 720	24,0%
重庆Chongqing	Jan	12	3	240 000	20 000	667	740	22 940	111,0%
调研企业产量 Total Output Survey	Jan	235	147	13 120 800	1 093 400	36 447	25 540	791 740	70,1%

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



Source: Mysteel, CRU, IMnI

Manganese producers & future projects

Database of 700 Mn producers and 200 future Mn mines and plants, with production status, capacity, contact details, location etc.

Manganese Companies Around the World

(for any question or comment please contact IMnI market research manager Aloys d'Harambure adharambure@manganese.org)

Product Type	Product Details	Country	Region	Company	Current capacity (in '000 mtpy)	Production Status	Details	If stopped, date of closure	Cap Cut
EMM	electrolytic manganese	China	Asia	Changyang Hongxin Manganese	24	active	one of the biggest manganese producers in China, halted production in 2017		
EMM	electrolytic manganese	China	Asia	Changyang Mengte Hongxin Manganese	40	active	one of the biggest manganese producers in China, halted production in 2017		
EMM	electrolytic manganese	China	Asia	CITIC Dameng	55	active			
EMM	99.9% Mn electrolytic manganese	China	Asia	CITIC Dameng	15	active	uses 36%Mn fines from South Africa; this EMM is produced in 2017		
EMM	electrolytic manganese	China	Asia	CITIC Dameng Daxin New plant	20	active			
EMM	electrolytic manganese	China	Asia	Guangxi Xin-manganese	70	active			
EMM	electrolytic manganese	China	Asia	Kingray New Materials	60	active	06-2017: has reopened its 5,000 t/month line.		
EMM	electrolytic manganese	China	Asia	Guizhou Wuling Manganese	80	active	06-2017: has restarted its production line, with output at 2017		

New Manganese Projects Around the World

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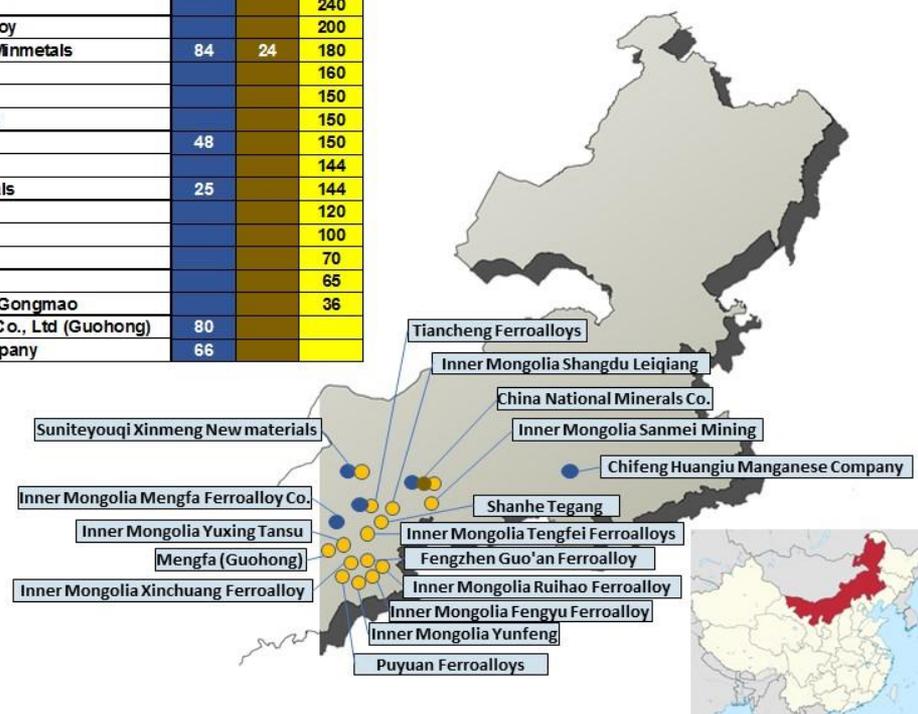
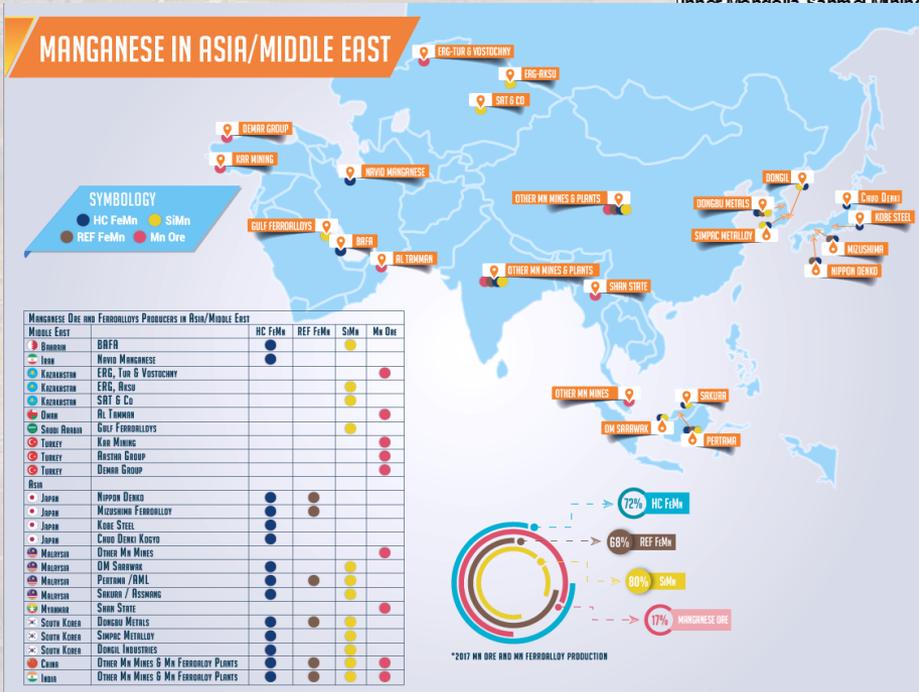
Product Type	Product Details	Country	Region	Company	Extra Capacity (in '000 mtpy)	Expected Production Start	Probability	Details
EMM		China	Asia	Xinjiang Aketao Kebang Manganese (c	100	2017	1 high	Expansion project: Kebang Manganese is X
EMM		China	Asia	Songtao Sanhe Manganese	10	2017	1 high	private-sector EMM producer in Songtao city
EMM		Indonesia	Asia	Tsingshan Steel	100	2019	1 high	Large Chinese stainless steelmaker Tsingshan
SiMn		China	Asia	SPIC Guizhou Zunyi Suiyang plant	500	2017	1 high	Under construction, will be commissioning in 2017
SiMn		China	Asia	Ningxia Tianyuan Manganese Group	1 000	2018	1 high	1st phase of 4x30MVA EAFs is under construction
SiMn		Georgia	CIS	Georgian Alloys Group	12	2017	1 high	Expansion plans: double capacity in 2016; 2017
HC FeMn		India	Asia	Tata Steel - Joda plant	10	2017	1 high	Nov 2015: received approval from the Ministry of Steel
HC FeMn		India	Asia	Brahm Energy - Bankura project	118	indefinite	1 high	In West Bengal. The proposed project is awaiting approval
Mn Ore		India	Asia	MOIL Kandri project	37	2020	1 high	in Maharashtra. In February 2015, MOIL's Board approved the project
Mn Ore		India	Asia	MOIL Parsoda project	40	2017	1 high	received mining lease in May 2015; mine located in West Bengal

Maps of Manganese Industry

Maps showing the location of major Mn ore and alloy producers (detailed maps by province in China)

Inner Mongolia Autonomous Region (East)

Inner Mongolia Producers Current Capacity (in '000 mtpy)	HC Fe/Mn	REF Fe/Mn	Si/Mn
Inner Mongolia Ruihao Ferroalloy			300
Puyuan Ferroalloys			240
Inner Mongolia Xinchuang Ferroalloy			200
China National Minerals Co. Ltd - Minmetals	84	24	180
Mengfa (Guohong)			160
Inner Mongolia Fengyu Ferroalloy			150
Inner Mongolia Tengfei Ferroalloys			150
Tiancheng Ferroalloys	48		150
Inner Mongolia Sanmei Mining			144
Inner Mongolia Shangu Leiqiang			120
Inner Mongolia Yuxing Tansu			100
Inner Mongolia Mengfa Ferroalloy Co., Ltd (Guohong)	80		65
Inner Mongolia Yunfeng			36
Inner Mongolia Puyuan Ferroalloys	66		



Complete import and export statistics

Monthly trade statistics for SiMn, HC FeMn, refined FeMn, Mn ore, EMM and EMD, with volume traded, value in USD\$, and unit price per ton traded with more than 100 countries reporting imports & exports.

Unit Price / Ton											
Type	Imports										
Commodity	Mn Ore										
Year	2 017										
		Month									
Reporter	Partner	1	2	3	4	5	6	7	8	9	
[-] China	[-] Australia										
	Avg. Price (USD\$/mt)	349	411	293	189	196	218	237	230	241	
	mt	307 934	245 262	264 533	341 657	430 354	364 538	371 884	357 847	404 314	237
	usd\$	107 538 659	100 861 853	77 451 396	64 518 086	84 323 695	79 646 277	88 253 201	82 263 864	97 501 244	59 784
	Total Australia	107 846 942	101 107 526	77 716 222	64 859 932	84 754 245	80 011 033	88 625 322	82 621 941	97 905 799	60 021
	[+] Bolivia	91 217									
	[-] Brazil										
	Avg. Price (USD\$/mt)	334	295	185	176	181	186	222	227	223	
	mt	137 036	113 385	232 776	64 123	46 829	113 277	110 374	165 950	208 324	53
	usd\$	45 726 486	33 423 035	43 084 030	11 317 389	8 454 025	21 066 513	24 489 828	37 677 602	46 413 305	8 986
	Total Brazil	45 863 856	33 536 715	43 316 991	11 381 688	8 501 035	21 179 976	24 600 424	37 843 779	46 621 852	9 039
	[+] Bulgaria	3 059 015									
	[+] Czech Republic	5 915									
	[+] Egypt	64 232									
		71									

Mn alloy & ore price forecasts

Metal Bulletin provides IMnI Members with their **quarterly price forecasts** for free, for high-carbon ferro-manganese, silico-manganese and Mn ore.

	HC FeMn	SiMn	Mn Ore
	78% Mn	65-75% Mn	44% Mn
	EU (€/t)	EU (€/t)	(\$/mtu)
janv-18	1 093	1 046	6,88
Q1 18	For IMnI Members only		
Q2 18			
Q3 18			
Q4 18			
2017			
2018			
Source: Metal Bulletin Research			

By joining IMnI you can benefit from

- **the best market research** available on manganese
- **exclusive events:** IMnI Technical Workshop in Inner Mongolia in August (3 Mn smelter technical visits + presentations on smelting technology and reduction of dust emissions)
- **credibility:** stand out from the crowd of Mn alloy producers in Asia
- **HSE support to comply with new regulations** and make your staff and processes more efficient
- **networking opportunities** with international manganese ore and alloy suppliers

IMnI fees have been reduced for Indian companies to €7,000/year!

Any questions adharambure@manganese.org

International Mn Institute (IMnI)



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in the business of **Manganese**



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