Overview of the Global Manganese Industry

IMnI Annual Conference
June 18, 2015 – Shanghai

Aloys d'Harambure
International Manganese Institute (IMnI)

Outline

Introduction

I – Steel (production, manganese usage intensity)

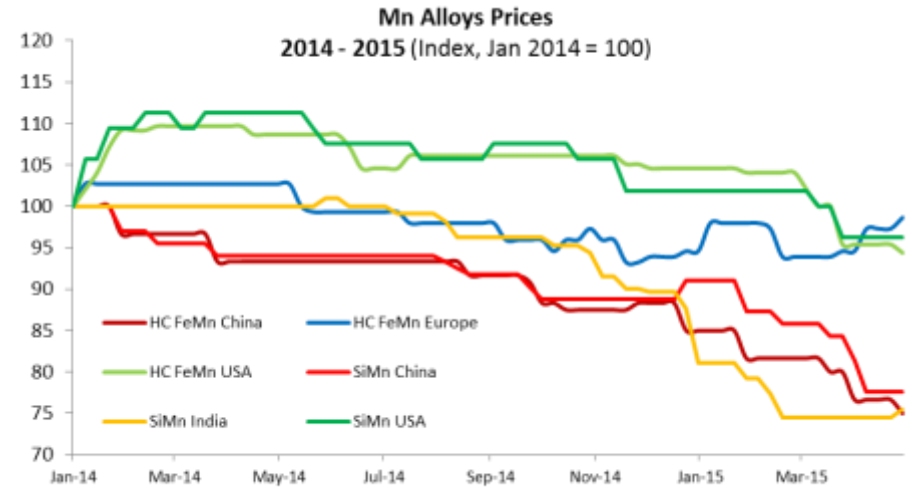
II – Manganese Alloys (SiMn, HC FeMn, Ref FeM)

III – Manganese Ore

Conclusion

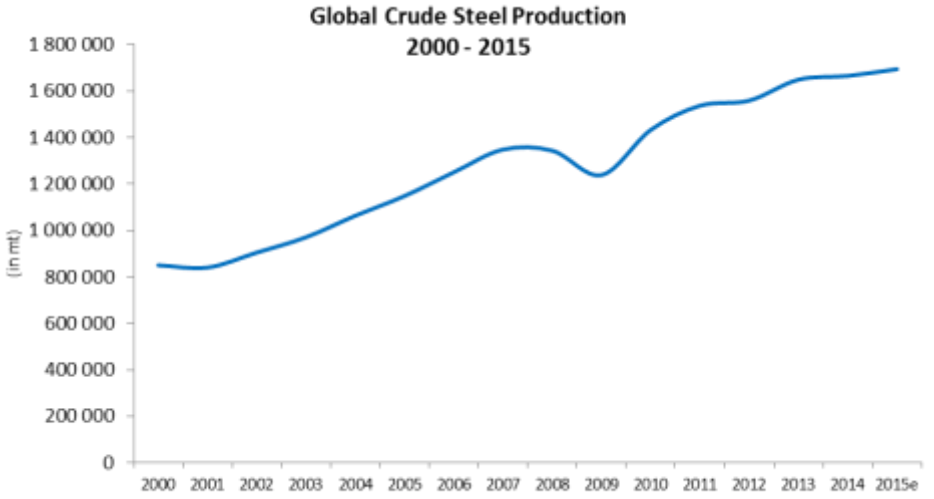
Introduction

Prices for most Mn alloys have been decreasing in 2014-2015 (Metal Bulletin)



Source: Metal Bulletin, IMnI

But at the same time, global crude steel production, which drives Mn alloys demand, reaches new record highs in 2014 and 2015 (World Steel Association)



Source: IMnI, World Steel Association

Why are prices for Mn alloys depressed, if steel production is increasing?

Outline

Introduction

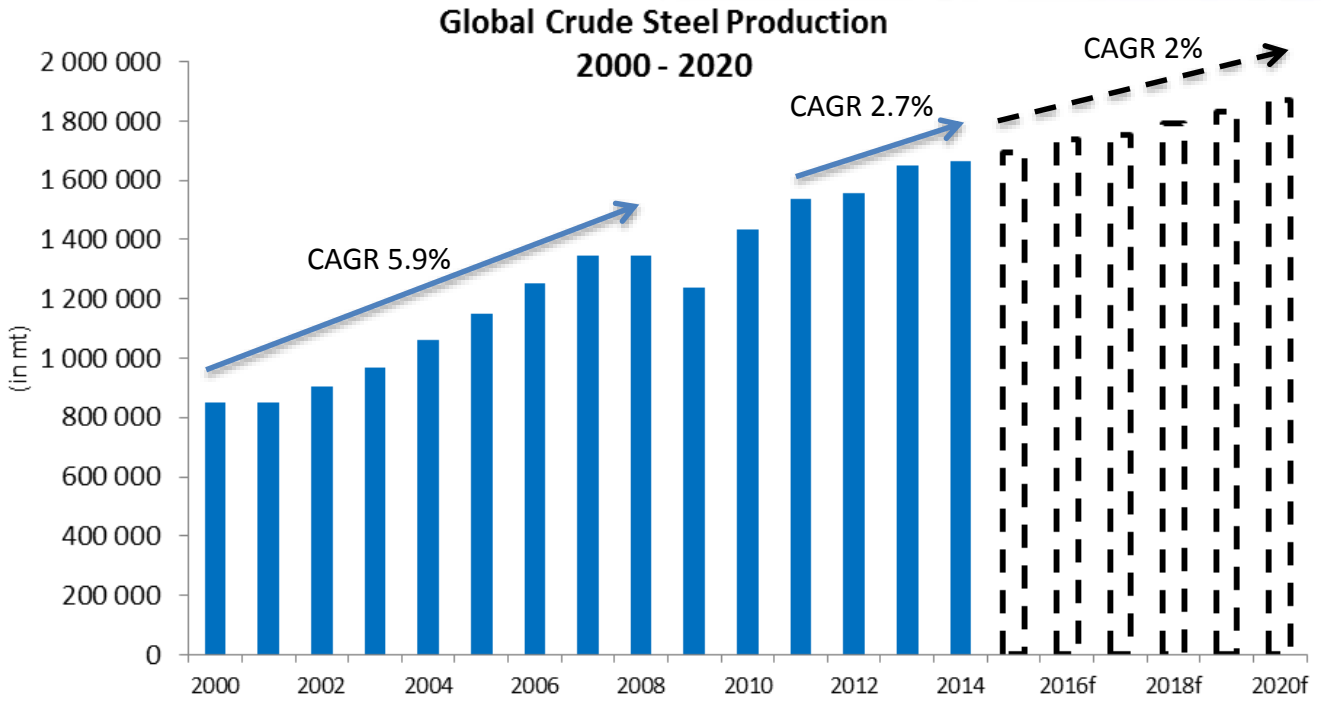
I – Steel (production, manganese usage intensity)

II – Manganese Alloys (SiMn, HC FeMn, Ref FeM)

III – Manganese Ore

Conclusion

I – Steel – Global Production



Source: Macquarie, World Steel Association, IMnI

In 2014, **global crude steel production reached 1,665 million mt** (new record high)
2013 to 2014 % change = +1% (or 16 million mt) → **lowest growth rate since the GFC in 2008/2009**
Average capacity utilisation ratio is in the 70-75% range

From 2015 to 2020, global crude steel production expected to grow by 2% CAGR (Macquarie)

→ firming recovery momentum in the Eurozone, increased optimism about India

→ growth in steel use in some countries in the Middle East, North Africa and ASEAN

Global crude steel production is still growing, but at a slowing pace, mostly due to China's deceleration

I – Steel – China's Production

China is a key driver of global crude steel production

China produced 823 million mt of crude steel in 2014, **up only 0.1% YoY**

Crude steel production slowing in China

→ weak construction demand
→ overcapacity in industrial sector
→ stricter environmental regulations

Source: IMnI, World Steel Association

China's steel industry is facing overcapacity, affecting steel prices

Worldsteel expects its crude steel output to drop by 0.5% in 2015, and again in 2016

I – Steel – Mn consumption

Long steel products (used in construction) contain more Mn than **flat steel products** (used in automotive, machinery and applicances)

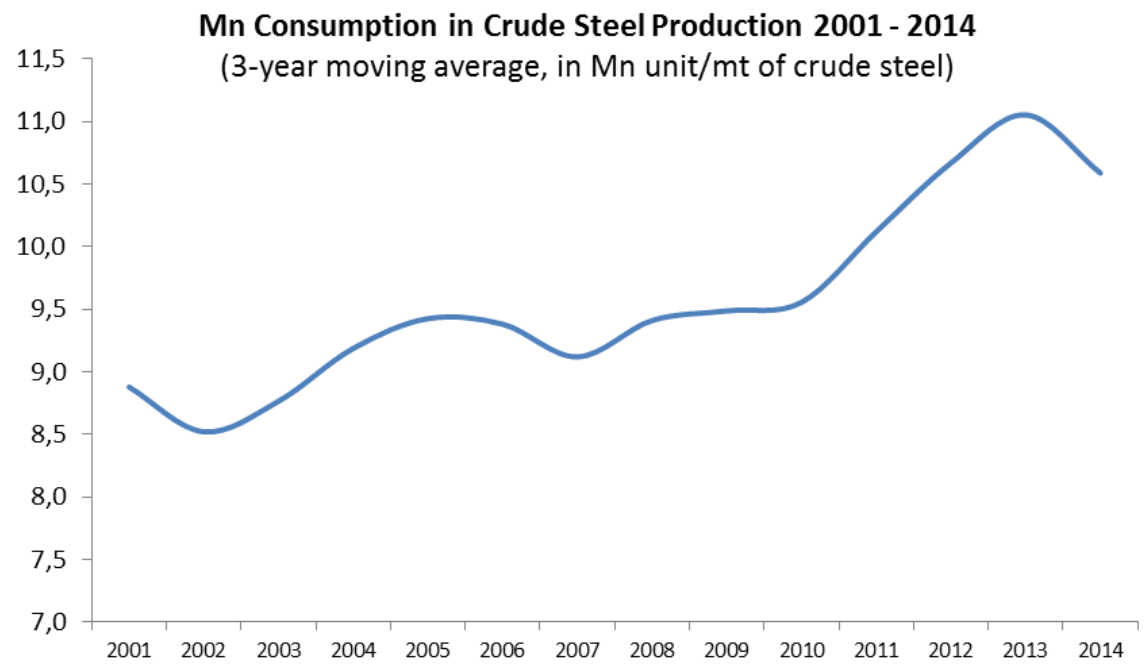
→ since 2008 and the global financial crisis, **growth in Chinese steel production has been driven more by demand for long products than flat,**

→ due to continued urbanisation and infrastructure development

→ but **China's economy is now becoming more consumption-driven,**

→ increased demand for machinery and applicances (flat steel), reduced demand for construction (long steel)

→ putting pressure on the intensity of Mn usage



Source: WSA, IMnI

China's demand is progressively shifting back from long steel products to flat steel products, reducing Mn usage intensity

Outline

Introduction

I – Steel (production, manganese usage intensity)

II – Manganese Alloys (SiMn, HC FeMn, Ref FeM)

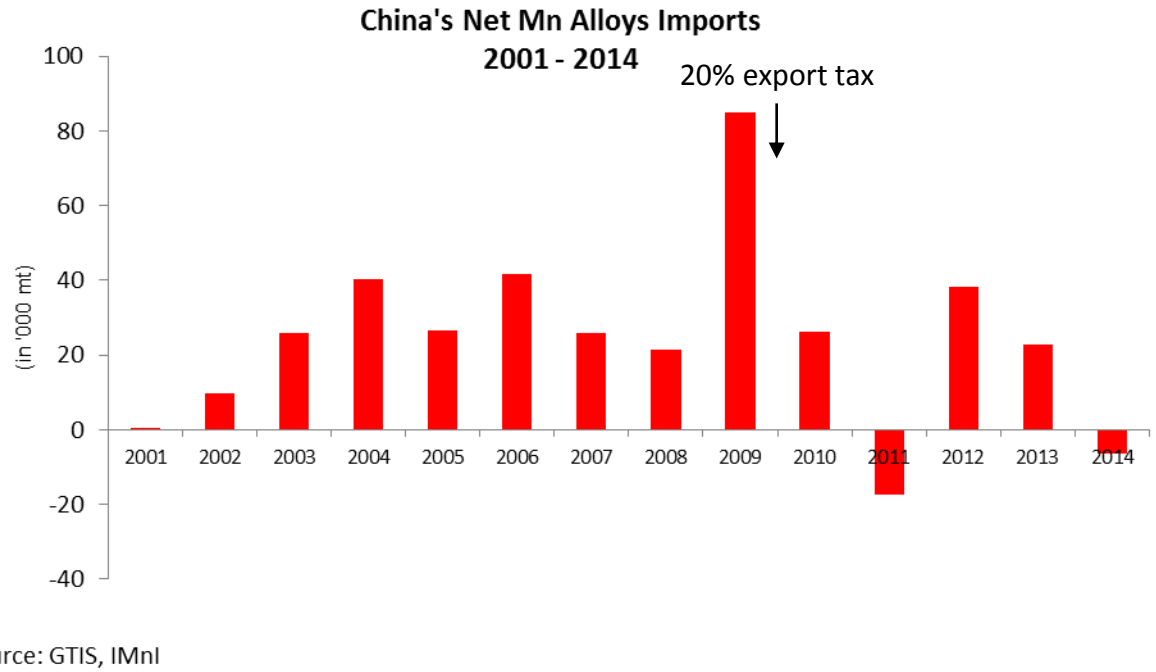
III – Manganese Ore

Conclusion

II – Mn Alloys

What about Mn alloys supply?

China remains balanced in Mn alloys trade, due to the imposition of a 20% export tax in 2009



Source: GTIS, IMnI

But several other major steel producing countries import a large share of their Mn alloy requirements (USA, Europe, Japan etc.)
Fierce competition between Mn alloys producers to supply these key markets

Mn alloys production has been growing significantly over the last few years (especially SiMn in India, the CIS)

With cheap Mn alloy supplies becoming abundant, prices have fallen significantly

II – Mn Alloys – SiMn Supply & Demand

SiMn mostly used in long steel products, like reinforcing bars and wire mesh (used in construction)

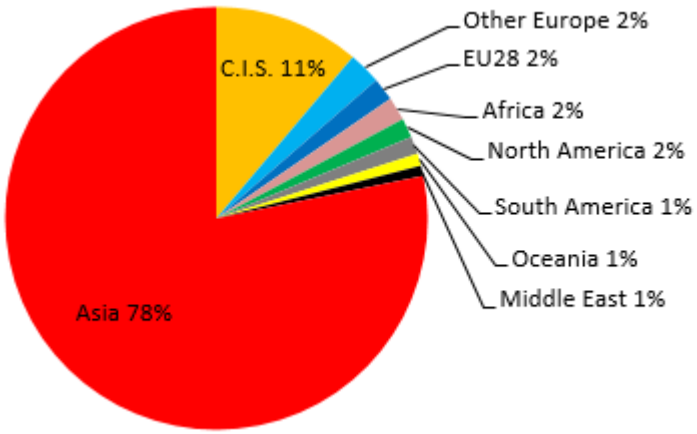
SiMn in 2014:
supply: 12.8 million mt, down 4.3% YoY
demand: 13.2 million mt down 2.5% YoY

Change 2013-2014 (in '000 mt)	Supply	Demand
C.I.S.	304	195
Africa	95	32
Other Europe	13	20
Oceania	9	2
Middle East	0	22
European Union (28)	-6	49
North America	-6	101
South America	-63	-23
Asia	-924	-729
World	-578	-333

- Kazchrome in Kazakhstan and Chelyabinsk in Russia produced more SiMn in 2014
- China sharply reduced its SiMn production in 2014

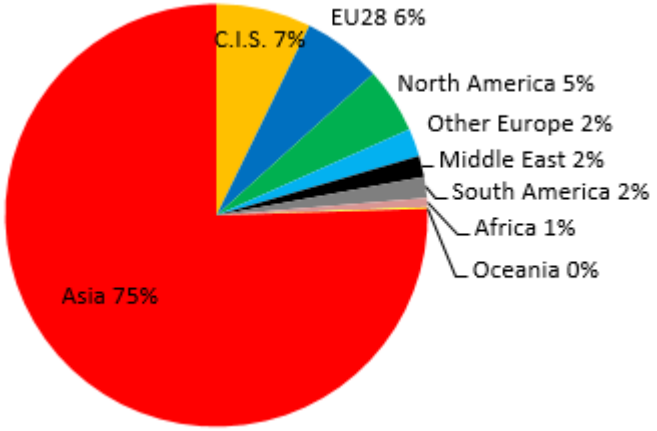
II - Mn Alloys – SiMn Supply & Demand Balance

Supply



SiMn 2014

Demand



Supply/Demand Balance 2014 (in '000 mt)

European Union (28)	-571
North America	-441
Middle East	-112
South America	-42
Other Europe	33
Asia	85
Oceania	103
Africa	138
C.I.S.	465
World	-342

SiMn supply

EU28, Americas, Middle East in deficit

CIS, Africa and Oceania in surplus

II – Mn Alloys – HC FeMn Supply & Demand

HC FeMn mostly used in surface critical flat steel products (sheet and plate) and some long steel products (used to produce consumer appliances, tubes and pipes for the oil and gas industry, and rails)

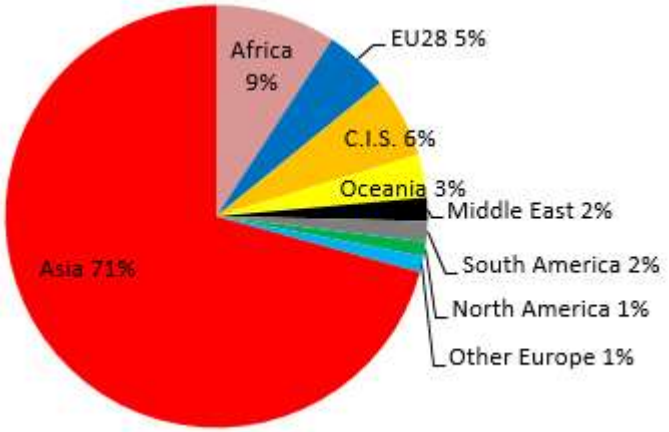
HC FeMn in 2014:
supply: 4.9 million mt, up 9% from 2013
demand: 4.97 million mt up 5% from 2013

Change 2013-2014 (in '000 mt)	Supply	Demand
Asia	255	164
C.I.S.	111	27
European Union (28)	49	32
South America	23	3
Oceania	18	-4
North America	0,5	16
Middle East	-	11
Other Europe	-19	7
Africa	-35	1
World	402	259

- India, and to a lesser extent China & Japan, increased HC FeMn production in 2014
- Kramatorsk restarted production in the Donbass region of Ukraine at the beginning of 2014, after being taken over by Evgeny Ivanov, owner of the Satka Metallurgical Mill in Russia

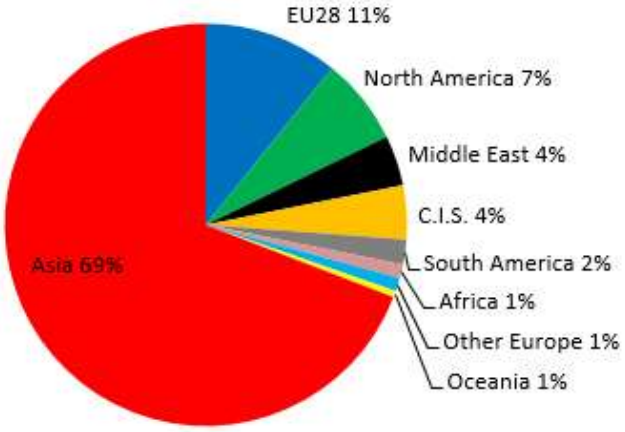
II – Mn Alloys – HC FeMn Supply & Demand Balance

Supply



HC FeMn 2014

Demand



Supply/Demand Balance 2014 (in '000 mt)

European Union (28)	-296
North America	-293
Middle East	-114
South America	-22
Other Europe	7
Asia	31
C.I.S.	86
Oceania	137
Africa	397
World	-68

HC FeMn supply

EU28, North America, Middle East in deficit

Africa, Oceania in surplus

II – Mn Alloys – Ref FeMn Supply & Demand

Ref FeMn mostly used to produce low carbon critical surface flat steel products, used to manufacture automotive body sheet and some flat stainless steels

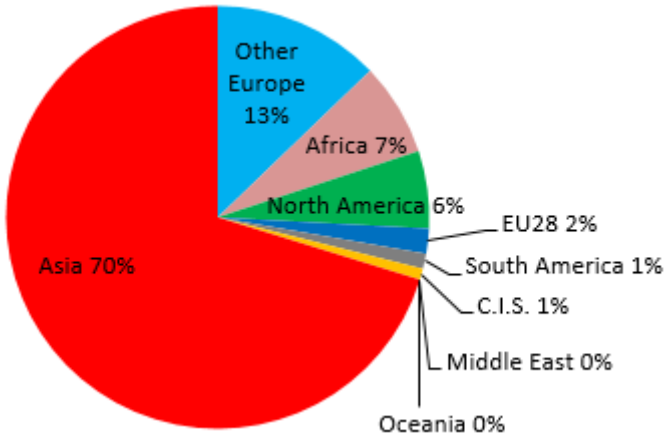
Ref FeMn in 2014:
supply: 1.84 million mt, up 7.3% from 2013
demand: 1.86 million mt up 7.7% from 2013

Change 2013-2014 (in '000 mt)	Supply	Demand
Asia	67	89
Africa	29	-3
North America	13	56
Other Europe	8	-3
European Union (28)	8	-15
C.I.S.	3	-7
Middle East	0	14
Oceania	0	1
South America	-3	0
World	126	133

- China increased its Ref FeMn production in 2014
- In South Africa, BHP Billiton & Assmang produced more Ref FeMn in 2014 than in 2013

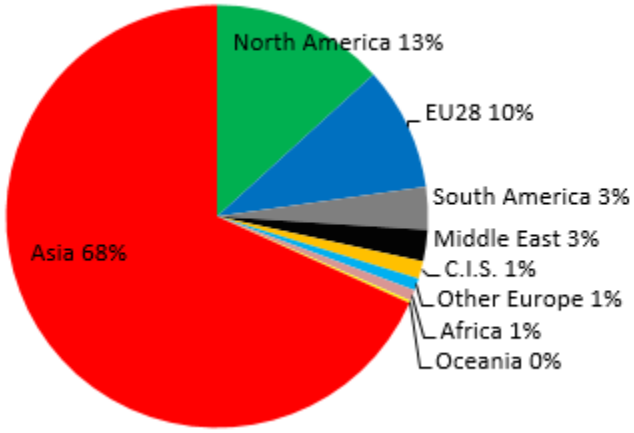
II – Mn Alloys – Ref FeMn Supply & Demand Balance

Supply



Ref FeMn 2014

Demand



Supply/Demand Balance 2014 (in '000 mt)

European Union (28)	-152
North America	-139
Middle East	-46
South America	-39
C.I.S.	-9
Oceania	-3
Asia	28
Africa	116
Other Europe	218
World	-26

Ref FeMn supply
EU28, Americas, Middle East in deficit
Other Europe and Africa in surplus

II – Mn Alloys – New Projects

Country	Product	Company/Project	Mn Alloys Capacity (in '000 mtpy)	Launch
Malaysia	FeSi, Ref FeMn & SiMn	Pertama Ferroalloys (JV of Asia Minerals, Nippon Denko, Shinsho Corp.)	175 (120 of SiMn and 55 of Ref FeMn)	H2 2015
China	SiMn	Minmetals Ferroalloys & Huade Jinxin Ferroalloys	60	Q3 2015
Malaysia	HC FeMn & SiMn	Sakura Ferroalloys (JV of Assmang, Sumitomo and China Steel Corp.)	170 (110 of HC FeMn and 60 of SiMn)	Q4 2015
Malaysia	FeSi (and possibly SiMn)	Sarawak Project (JV of OM Holdings & Cahya Mata Sarawak)	290	2016
Indonesia	HC FeMn	Gulf Minerals/Asia Minerals	100	Q3 2016

5 new manganese alloys projects to come on stream soon in Asia

Including 3 major projects in Malaysia

→ cheap ore, labour & electricity

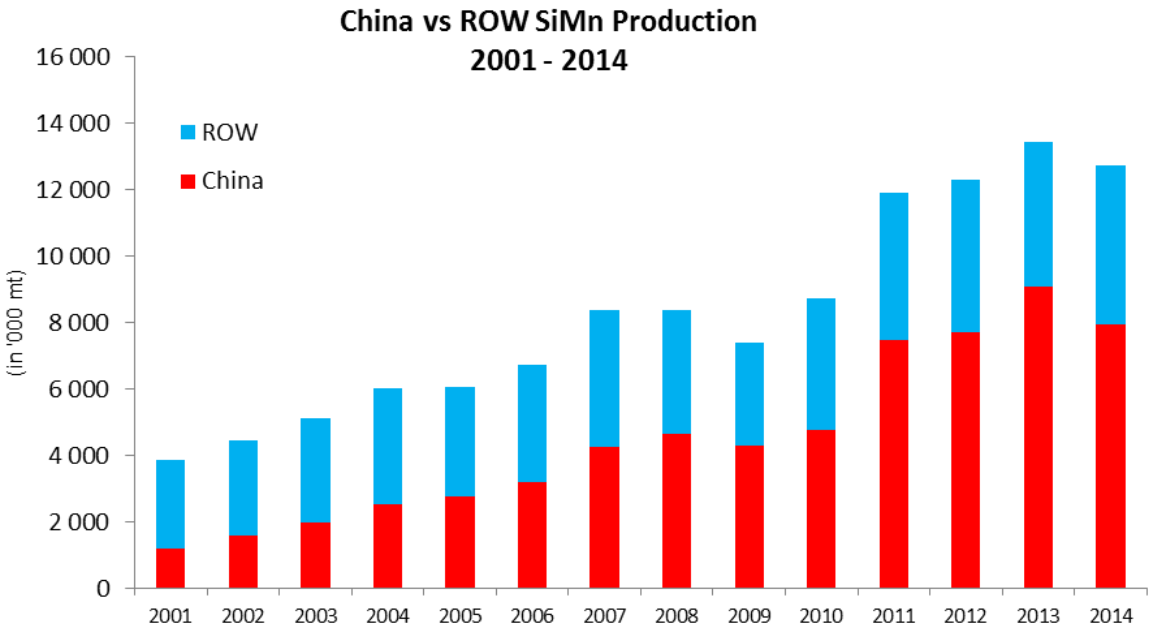
→ a threat for Indian SiMn producers?

In South Africa, Eskom is struggling to supply electricity, rising power prices

II – Mn Alloys – Summary

Lower Mn alloy prices combined with rising power tariffs in Brazil, India, South Africa and China
→ **plant closures** (Indsil in India, Vale in Brazil etc.)

→ **New projects in Malaysia, where electricity is relatively cheap**



Source: IMnI

Excess SiMn supply is reducing in China
→ slowing demand from construction sector
→ high electricity tariffs in Southern China
→ ample stocks
→ stricter environmental regulations

The market is becoming more balanced as excess Mn alloys supply is going down

Outline

Introduction

I – Steel (production, manganese usage intensity)

II – Manganese Alloys (SiMn, HC FeMn, Ref FeM)

III – Manganese Ore

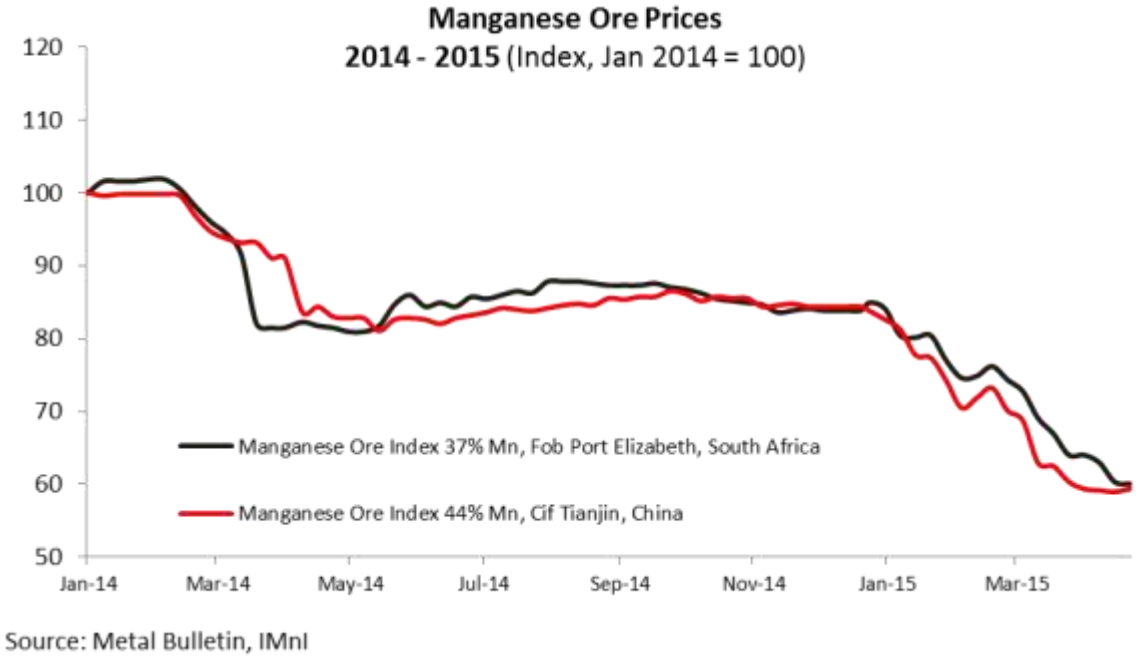
Conclusion

III – Manganese Ore

The price of manganese ore fell in 2014 and continues to drop in 2015

→ excess production

→ ample stocks in China, the key consumer



Source: Metal Bulletin, IMnI

Lower raw material prices do not result in higher margins for Mn alloys producers,
due to the competition between Mn alloys producers, and to the slow demand from the steel sector.
The price gain is passed on to steel mills, which are able to reduce their Mn alloys purchase prices

Lower manganese ore prices contribute to the downtrend of Mn alloys prices

III – Manganese Ore Supply & Demand

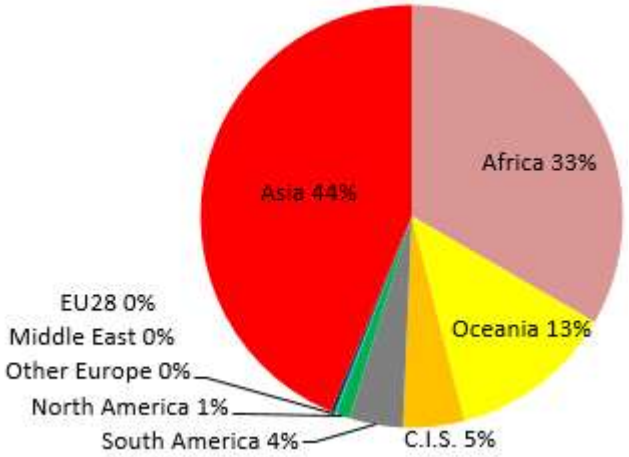
Mn ore (wet) in 2014:
supply: 61 million mt, up 3% from 2013
demand: 56 million mt down 1% from 2013

Change 2013-2014 (in '000 mt)	Supply	Demand
Africa	2 008	-352
North America	72	-97
European Union (28)	25	-105
Middle East	0	61
Oceania	-19	-478
C.I.S.	-50	149
South America	-88	-49
Other Europe	-107	106
Asia	-146	178
World	1 695	-586

New Mn ore miners in South Africa ramped up production in 2014
→ United Manganese of Kalahari (UMK),
→ Tshipi Borwa

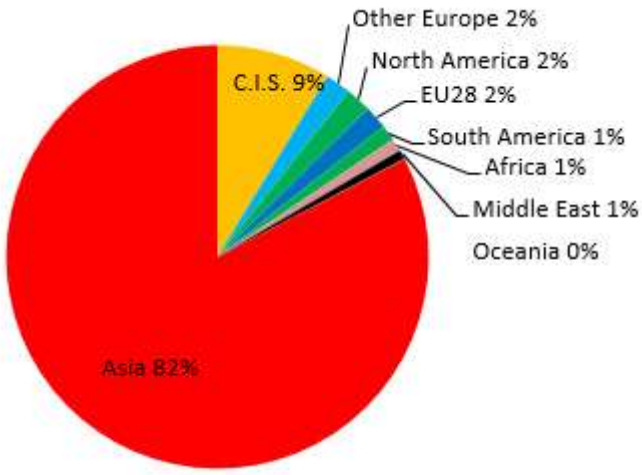
III – Manganese Ore Supply & Demand Balance

Supply



Mn ore (wet) 2014

Demand



Supply/Demand Balance 2014 (in '000 mt)

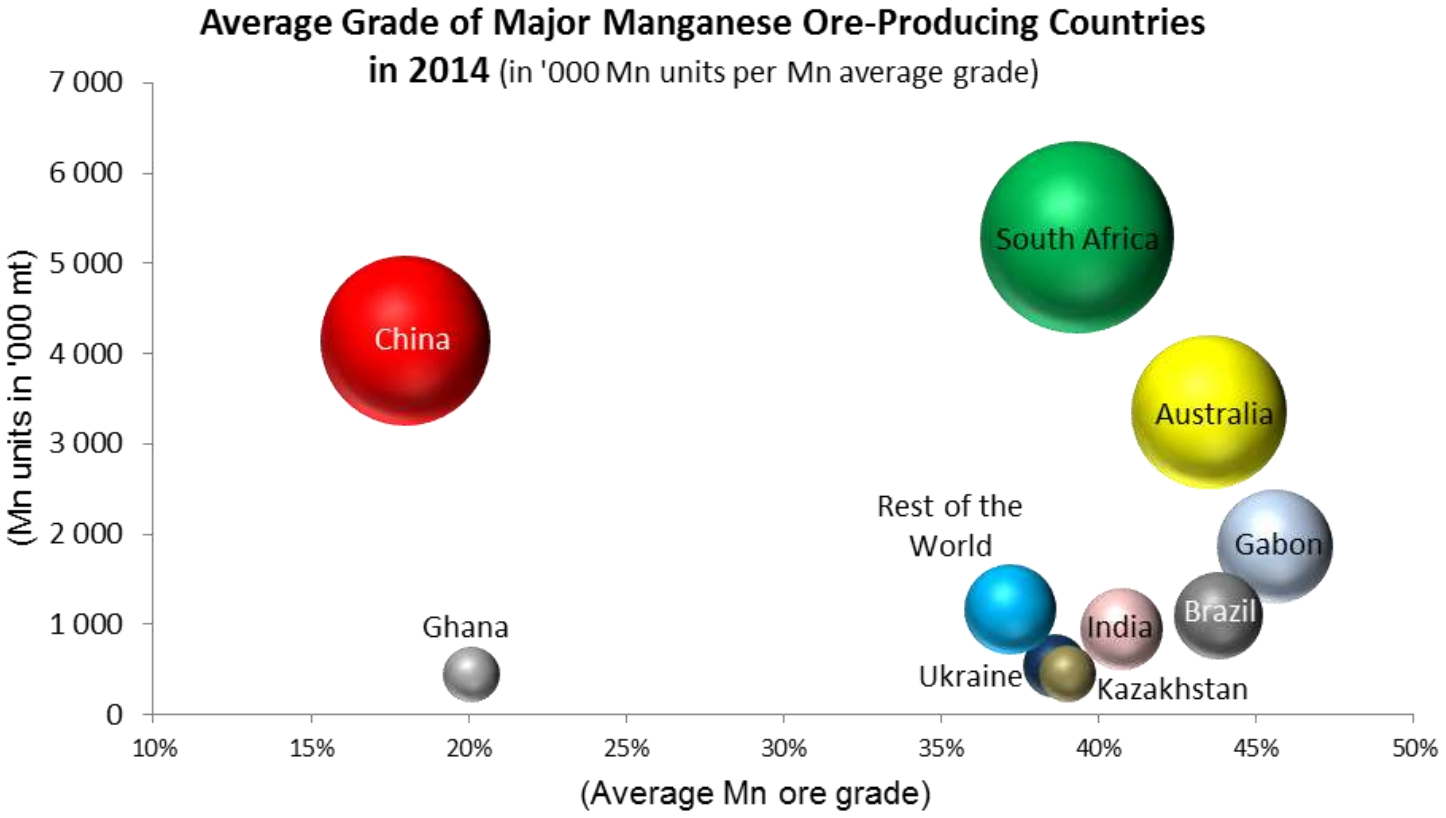
Asia	-19 434
C.I.S.	-2 094
European Union (28)	-994
Other Europe	-962
North America	-427
Middle East	-310
South America	1 820
Oceania	7 686
Africa	19 803
World	**5 089**

Mn ore supply

Asia, CIS, Europe and N. America in deficit

Africa, Oceania and S. America in surplus

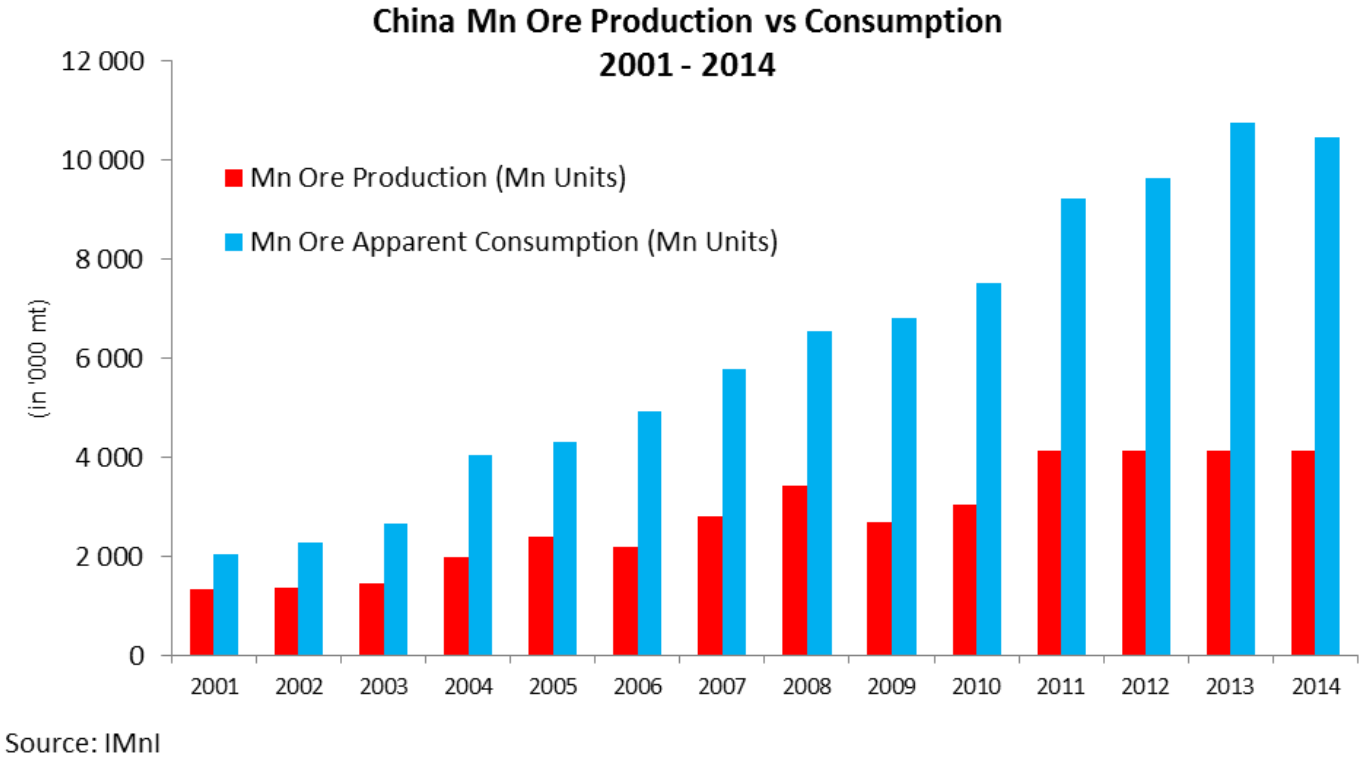
III – Manganese Ore – Grades



Gabon, Australia, Brazil, South Africa are major producers of high grade ore

China is the world's greatest producer of Mn ore on a gross weight basis
But it has mostly low grade ore reserves (18-20% Mn), so it is only the second biggest producer of Mn ore on a metal contained basis, after South Africa

III – Manganese Ore – China



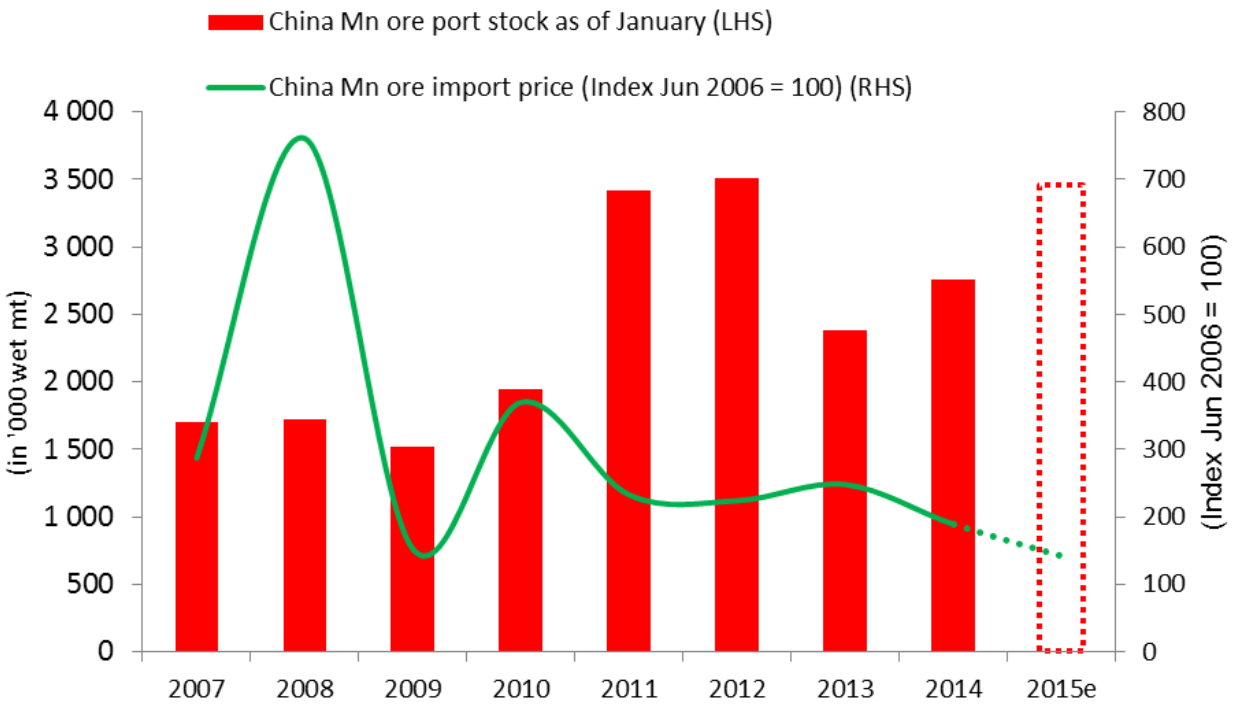
Source: IMnI

China's manganese ore production has stabilised at around 4.14 million mt Mn units
Equivalent to around 40% of its needs in 2014
The gap is filled by imports (mostly from South Africa, Australia, Gabon and Ghana)

China has the potential to produce more manganese ore, but at the moment, given the low price of imported ore, there is no incentive

III – Manganese Ore – China's Inventory

China Mn Ore Port Stock & Import Price
2001 - 2015



Source: GTIS, IMnI

China imported 16.2 million wet mt of manganese ore in 2014, representing 60% of global trade
China drives global manganese ore trade and price

Mn ore inventory at China's ports has increased since 2013, to reach 3.5 million wet mt at the beginning of 2015
Until these stocks are run down, Mn ore prices will remain under pressure

III – Manganese Ore – New Projects

Country	Company/Project	Capacity (in '000 mtpy)	Launch
Malaysia	Pertama Ferroalloys (JV of Asia Minerals, Nippon Denko, Shinsho Corp.)	200 (sintered Mn ore)	H2 2015
Togo	Ferrex - Nayega project	60 (first phase), ramping up to 250	2016
India	Rungta Mines	161	2016
India	MOIL - Kandri project	57	2018
India	MOIL - Ukwa project	105	2019
Indonesia	Gulf Minerals/Asia Minerals	180	2018

Most new manganese ore projects located in Asia

But in Africa, investments in **transportation system and port terminals** to increase exports capacity:

- South Africa: rail-freight state-owned **Transnet is investing in a new Mn terminal at Ngqura port** (expected capacity: 12 million mtpy by February 2019 and 16 million mtpy by October 2020)

- **Congo/Angola: investment in the rail network,** to link the Kisenge manganese mine owned by Entreprise Miniere de Kisenge-Manganese (EMK-Mn), and the port of Lobito on the Atlantic coast of Angola

Outline

Introduction

I – Steel (production, manganese usage intensity)

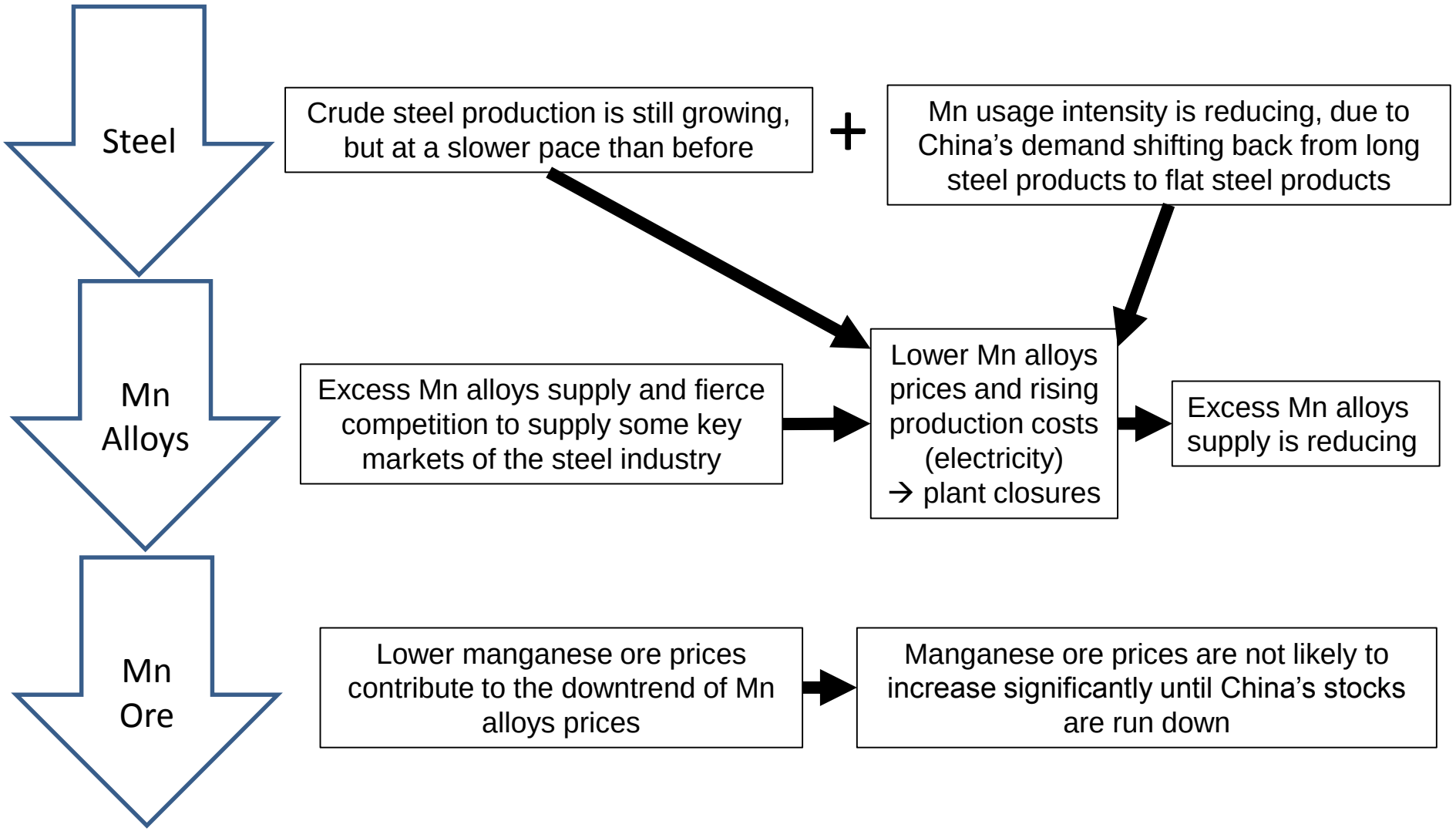
II – Manganese Alloys (SiMn, HC FeMn, Ref FeM)

III – Manganese Ore

Conclusion

Conclusion – Mn Alloys Outlook

Why are prices for Mn alloys depressed, if steel production increases?



Conclusion – Mn Alloys Outlook

The Mn alloys market will take time to become balanced, what do we do in the meantime?

Buy, plan, produce and sell with profits in mind.

1. Use competitively priced raw materials,
2. Seek to minimize power costs via renegotiations, captive generation, effective utilization, etc.,
3. Strategically plan production of Mn products that will be in demand,
4. Be compliant with applicable regulations, be they domestic or abroad,
5. Seek to be profitable!!

Industry Sustainability

Will depend on macro-economic growth, particularly in emerging markets,
In the long-term, Mn units needed should continue to grow.

Individual Producer Sustainability

Will depend on their ability to remain competitive within the dynamics of the developing industry.

Thank you!

adharambure@manganese.org