

06/18//2015



# The role of China's domestic Mn ore supply

IMNI 2015 Annual Conference – Jian ZHOU



# Disclaimer

## FORWARD-LOOKING STATEMENTS

This presentation contains statements that may constitute forward-looking statements within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Many of those forward-looking statements can be identified by the use of forward-looking words such as “anticipate,” “believe,” “could,” “expect,” “should,” “plan,” “intend,” “estimate” and “potential,” among others.

We caution you that forward-looking statements are not guarantees of future performance and involve risks and uncertainties. Actual results may differ materially from those in forward-looking statements as a result of various factors. These risks and uncertainties include factors relating to (a) economic, political and social issues in the countries in which we operate, (b) the global economy, (c) commodity prices, (d) financial and capital markets, (e) the mining and metals businesses, which are cyclical in nature, and their dependence upon global industrial production, which is also cyclical, (f) regulation and taxation, and (g) the high degree of global competition in the markets in which we operate. For additional information on factors that could cause our actual results to differ from expectations reflected in forward-looking statements, see Risk factors. Forward-looking statements speak only as of the date they are made, and we do not undertake any obligation to update them in light of new information or future developments. All forward-looking statements attributed to us or a person acting on our behalf are expressly qualified in their entirety by this cautionary statement, and you should not place undue reliance on any forward-looking statement.

## NO OFFER OF SECURITIES

Nothing in this release should be construed as either an offer to sell or a solicitation of an offer to buy or sell VALE securities in any jurisdiction.

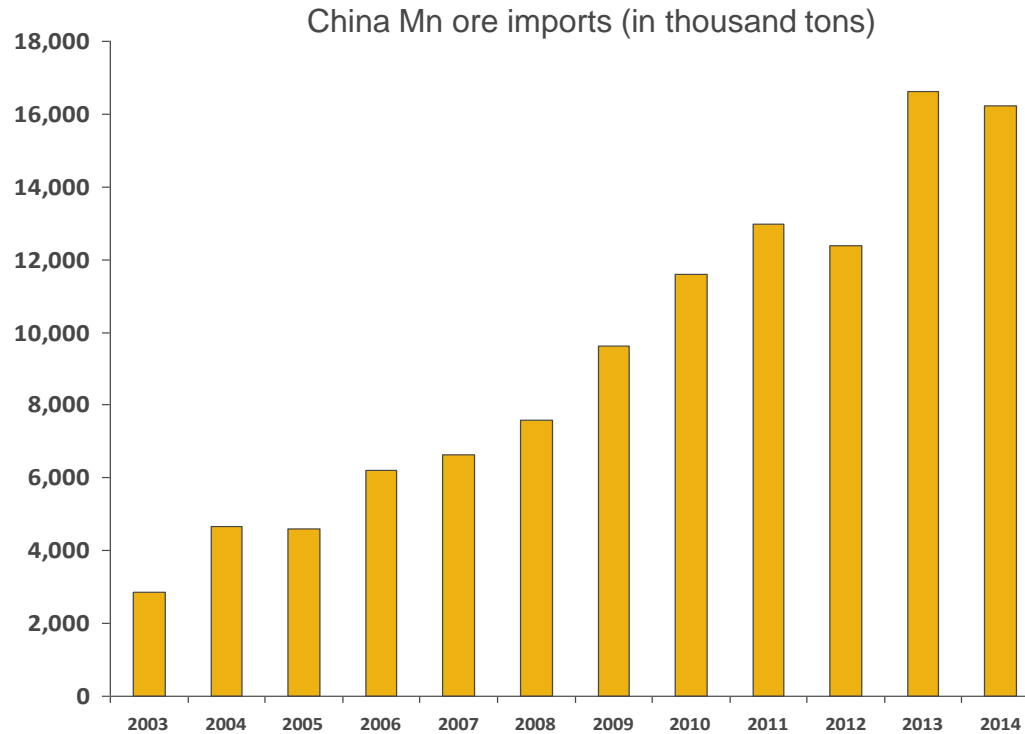
## RELIANCE ON THIRD PARTY INFORMATION

The views expressed in this release contain information that has been derived from publicly available sources that have not been independently verified. No representation or warranty is made as to the accuracy, completeness or reliability of the information. This release should not be relied upon as a recommendation or forecast by VALE.

# Agenda

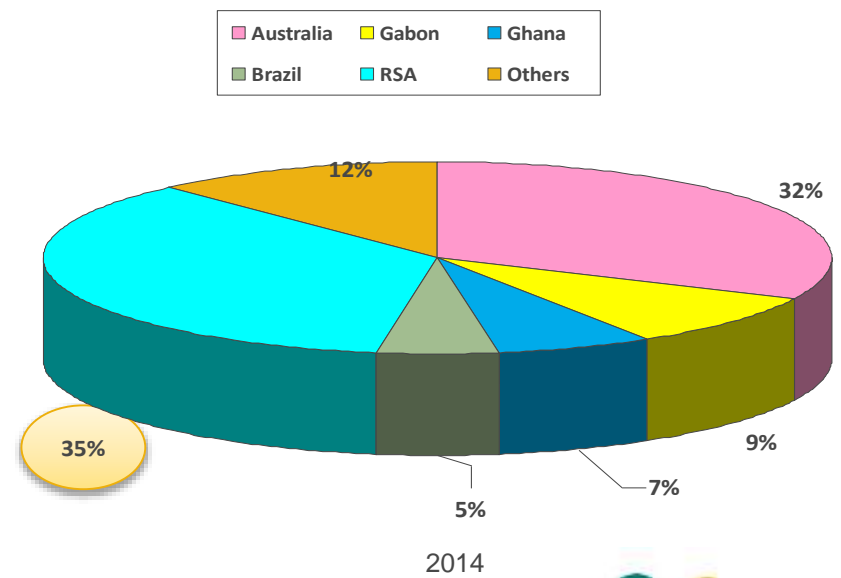
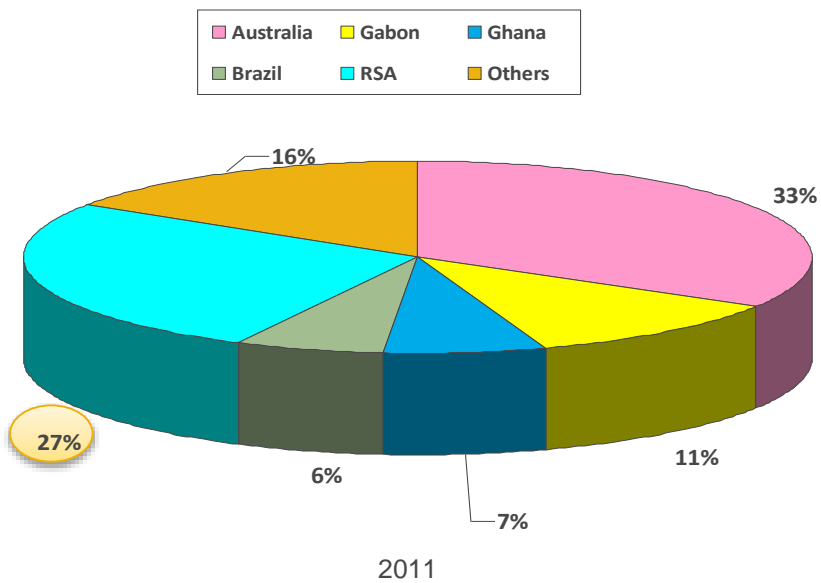
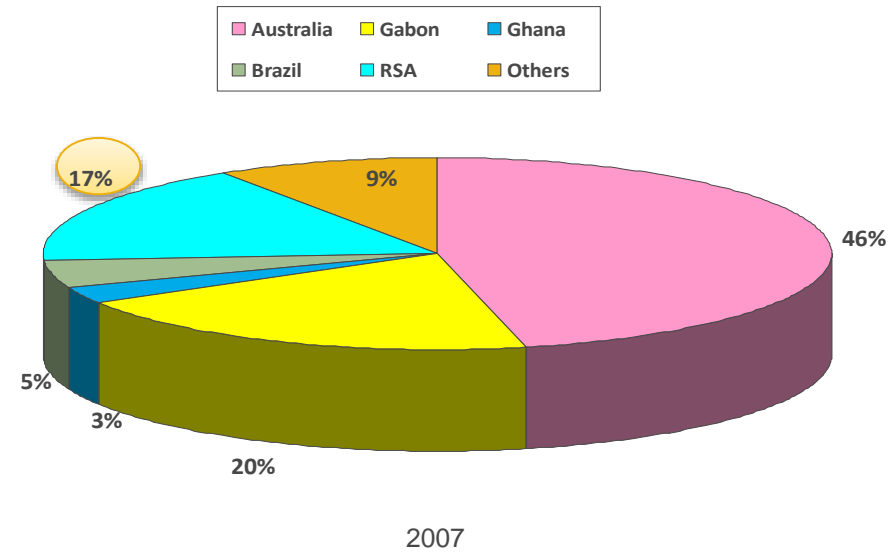
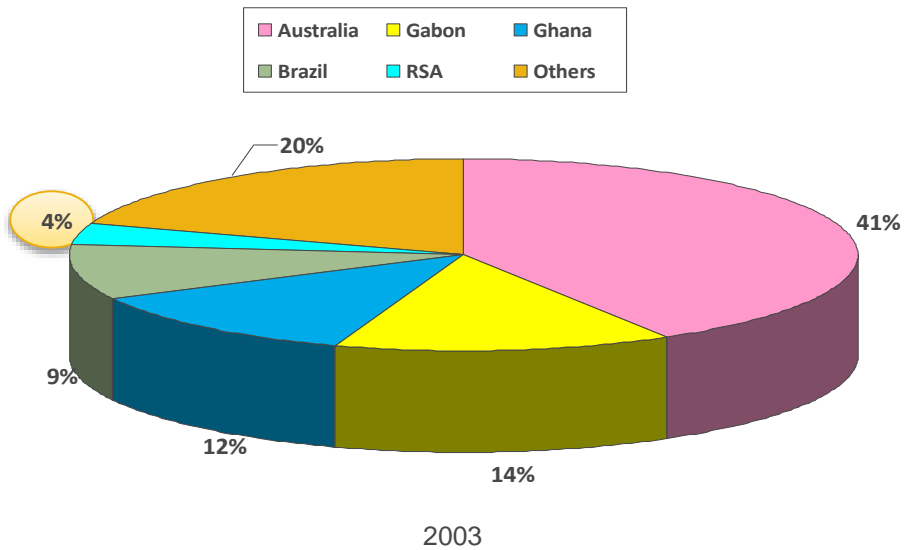
- ❑ Imported Mn ore demand in China grows year by year
- ❑ Local Mn ore production starts to show decrease
- ❑ Brief introduction of major Chinese local mines
- ❑ Typical blend of EMM and Mn alloy production in China
- ❑ Local Mn ore cost breakdown
- ❑ Where is Chinese local Mn ore's future

# Imported Mn ore demand in China grows year by year

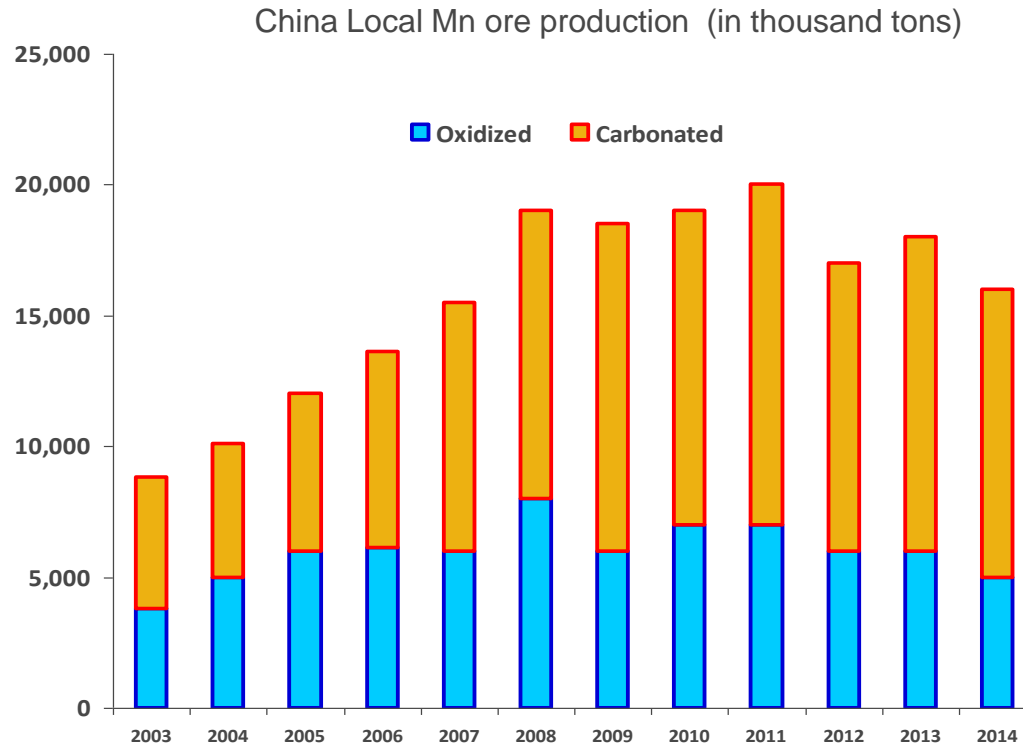


- Growth of imported Mn ore demand in China driven by:
  - Growth of Mn alloy and EMM production
  - **Depletion of local Mn ore**
  - Technical requirement from newly-built large closed furnaces

# Imported Mn ore supply growth mainly comes from South Africa



# Local Mn ore production starts to show decrease



- Depletion of existing mines
- Increase of mining cost
- Unstable quality and supply
- Low Value in use for high energy cost producers

Local Mn ore production excludes the production of high Fe and low Mn content local ore (Mn<15%) for rich slag

# Brief introduction of major Chinese local mines

- According to the statistics from National Bureau of Resources, by 2010, total Mn ore resources in China was 890 million tons, 73% is carbonated. Average Mn content for the resources is only 19%.
- Current local Mn ore production capacity is around 25 million tons per year, however, actual production in recent years is much lower than that because of its low competitiveness.

	Production capacity	Number of mines	Total capacity
Large scale	>300ktpy	15	6 mln tpy
Medium scale	100-300ktpy	30	4 mln tpy
Small and mini	<100ktpy	500	15 mln tpy

- Hunan, Guangxi and Guizhou are the 3 largest local Mn ore production provinces, all of these 3 provinces are located in Southeast of China. Total production from above 3 provinces accounts for 65% of China's total.

# Brief introduction of major Chinese local mines

Hunan: Huayuan Minle Mine, Guzhang Mine, Yongzhou Dongxiangqiao Mine

Guizhou: Songtao Mine, Zunyi Changgou Mine

Guangxi: CITIC Dameng, Jingxi Mine





# Evolution of typical blend of EMM and Mn alloys production in China

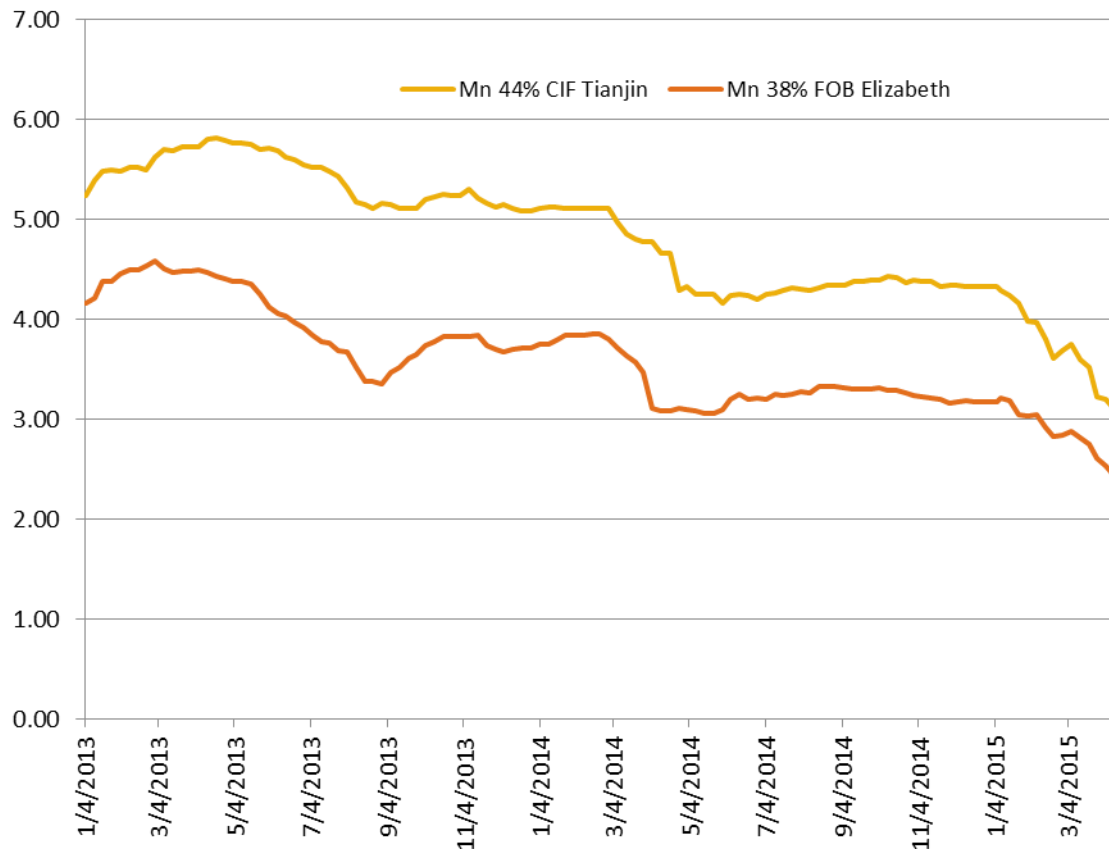
## Before

	EMM	70HCFEMN	6517SIMN	6014SIMN
Imp. Oxidized ore	0	70%	40%	20%
Imp. Semi-carbonated ore	0	0	0	0
Local Mn ore	100%	30%	30%	70%
Rich slag	0	0	30%	10%

## Now

	EMM	70HCFEMN	6517SIMN	6014SIMN
Imp. Oxidized ore	10%	80%	45%	40%
Imp. Semi-carbonated ore	0	15%	30%	20%
Local Mn ore	90%	5%	15%	35%
Rich slag	0	0	10%	5%

## Mn ore price continuously declines since 2013



- Price gap between 44% and 38% Mn ore is narrowing
- Local Mn ore lost its competitiveness if they cannot further reduce the price

# Local Mn ore production cost breakdown

Mining cost:  
80-200 RMB/MT

Provincial taxes:  
80-100 RMB/MT

Total cost



+



=

**160-300  
RMB/MT**

OR **1.25-2.37  
USD/dmtu**

- ❑ Only several easily mining open-pit mines can have mining cost at level of 80 RMB/MT, average mining cost for all mines shall be 120-150 RMB/MT
- ❑ In order to protect local economic development, local government charge mining companies extra taxes if their ore flows out of the region.

Assumption: Mn content at 24%

# Where is Chinese local Mn ore's future

**A big question mark**



# Thank you!

ZHOU Jian  
Vale Mn ore

Phone: 021 2215 0233

Email: [jian.zhou@vale.com](mailto:jian.zhou@vale.com)



For a world with new values.