



JOGMEC's approach for critical metals and efforts for stable supply

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Japan Oil, Gas and Metals National Corporation

Today's Presentation

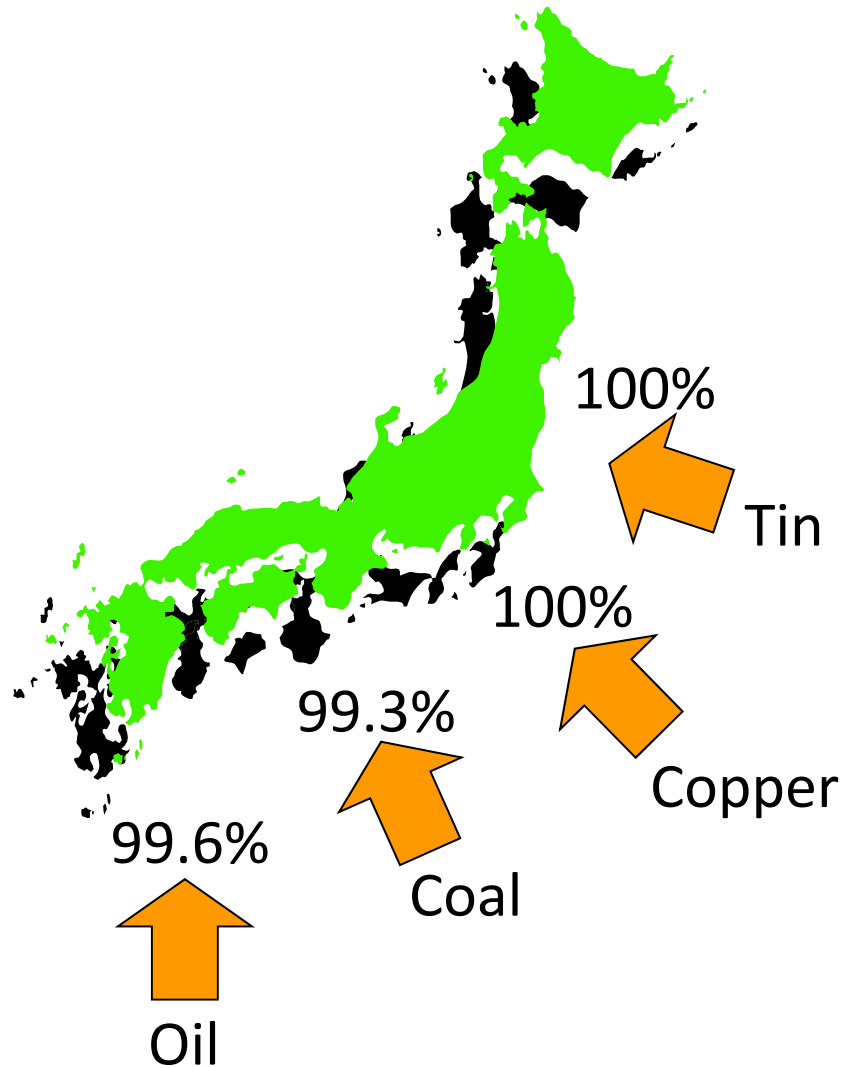
1. JOGMEC's Activity/ Function for Stable Supply on Metals

2. China's Influence on Global Metal Market from the view point of Japanese Economy

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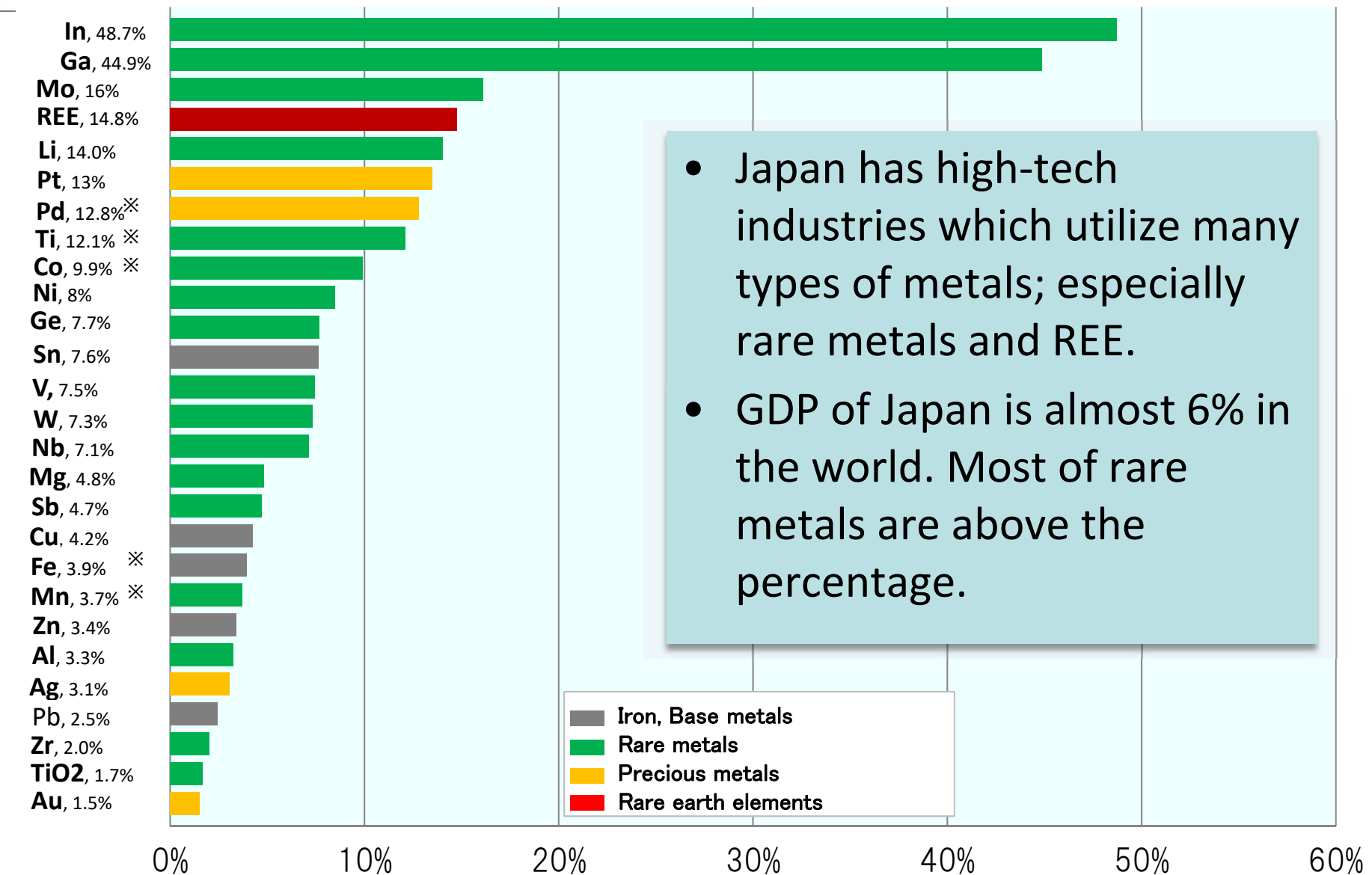
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- Since Japan has few domestic natural resources, Japan depends on imports for almost all of its crude oil, natural gas, non-ferrous metals and minerals.

The Importance of Metals for Japanese Industry



- Japan has high-tech industries which utilize many types of metals; especially rare metals and REE.
- GDP of Japan is almost 6% in the world. Most of rare metals are above the percentage.

Source: world metal statistics 2015(WBIMIS), Mineral Commodity Summaries 2015(USGS), INDUSTRIAL RARE METALS NO.130(アールエムエス)

- **Japan Oil, Gas and Metals National Corporation (JOGMEC)**, an incorporated **administrative agency**, is established by the Japanese government.
- The principal role of JOGMEC is to seek a **stable supply of natural resources** for Japanese industry as an agency implementing natural resource policies under jurisdiction of METI.

Since 1963

Metal Mining Agency of Japan
(MMAJ)

Since 1967

Japan National Oil Corporation
(JNOC)

February 2004

**Japan Oil, Gas and Metals National Corporation
(JOGMEC)**

Coal & Geothermal units added

Headquarter: Tokyo

- **Metals Strategy & Exploration Unit**
- **Metals & Coal Financial and Environment Unit**
- **Stockpile Unit**
- Oil & Gas Upstream Business Unit
- Oil & Gas Upstream Technology Unit
- Geothermal Resource Development Dept.

Two research centers in Japan

- **Metals Technology Center**
- Technology & Research Center (oil and gas)

Worldwide network

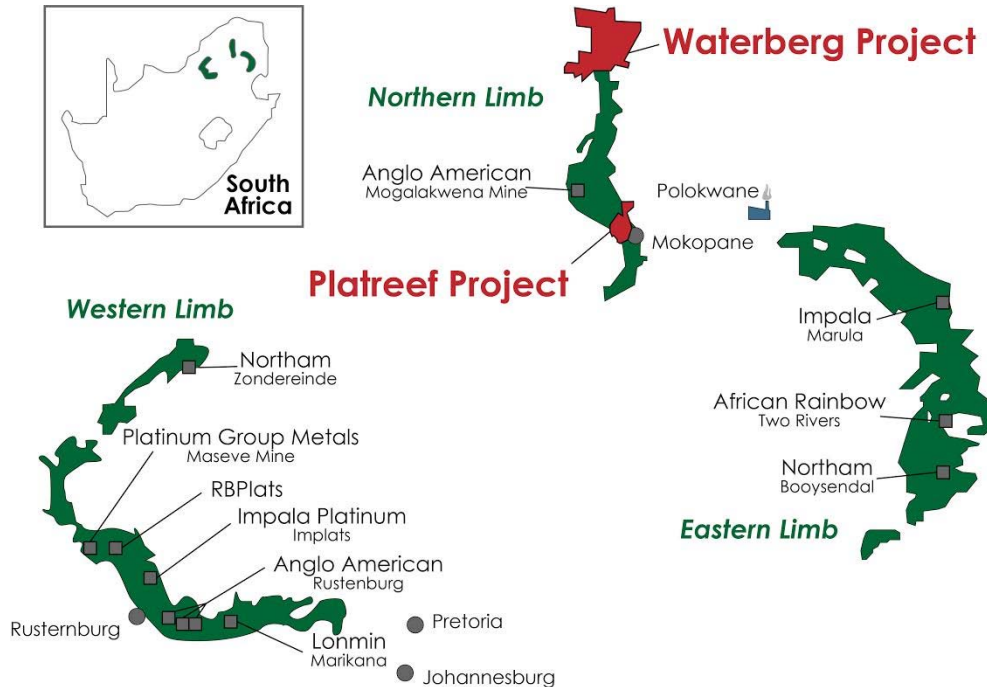
- 13 overseas offices gathering relevant information



- Take early-stage risks to promote overseas explorations
- Program
 - **Typical joint venture style exploration**
 - Farming into an exploration project held by a foreign company, then transferring JOGMEC’s contractual interest to a Japanese company
- Target commodities
 - Base metals (Cu, Zn,...)
 - Rare metals (Ni, Co, REE, Li, ...)

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg							

La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr



Waterberg Outline

- Exploration started in 2009, Discovery in 2011
- Impala Platinum participated in the project in 2017
- Resources (cut-off grade 2.5 g/t):
 [Indicated] 24.8 Miloz 3PGMs+Au [Inferred] 10.8 Miloz 3PGMs+Au
- Prill Split : Pd 61%, Pt 30%, Au 8%, Rh 1%+ Cu, Ni



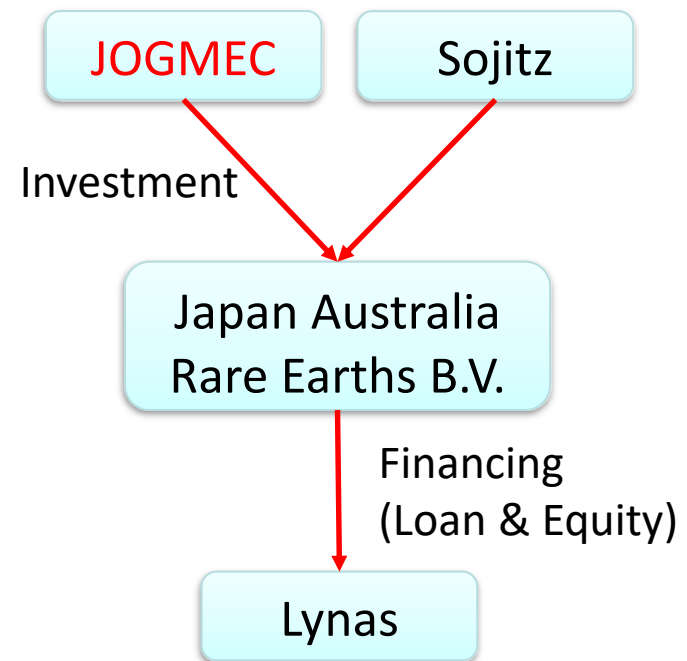
- Financial assistance to **Japanese companies** for overseas mineral explorations or development projects
- Programs
 - Financing for overseas explorations
 - Funding part of the equity capital
 - Guaranteeing the liabilities

Mt. Weld REE mine



Mount Weld Rare Earths Concentration Plant

- Sojitz and JOGMEC agreed to provide a total of US\$ 250M through **loan and equity** to Lynas's Mt. Weld REE mine on March 2011.
- **8,500 tonnes/year of REE products** can be delivered to Japan.
- First REE products were shipped in March 2013.

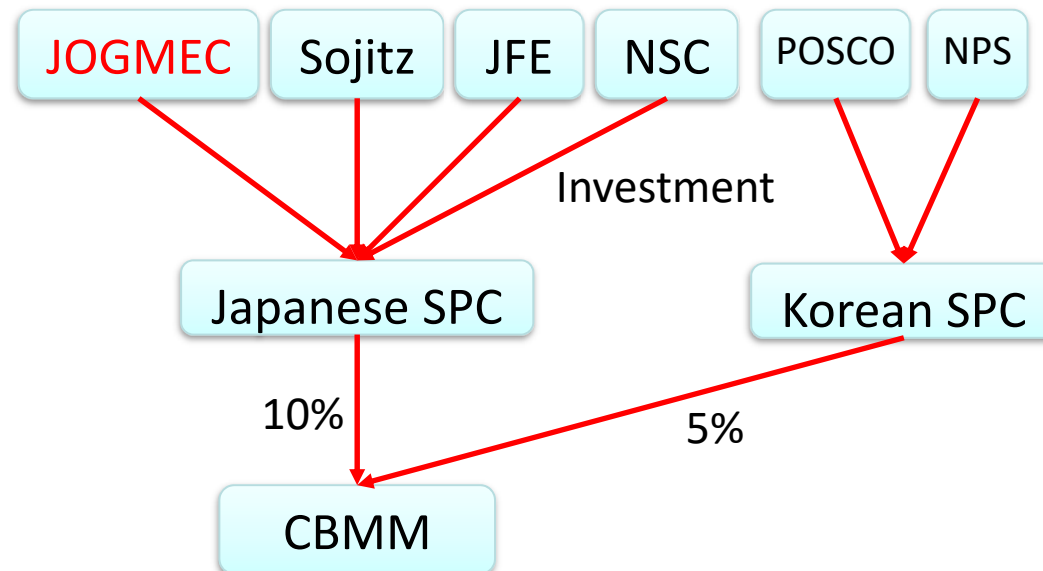


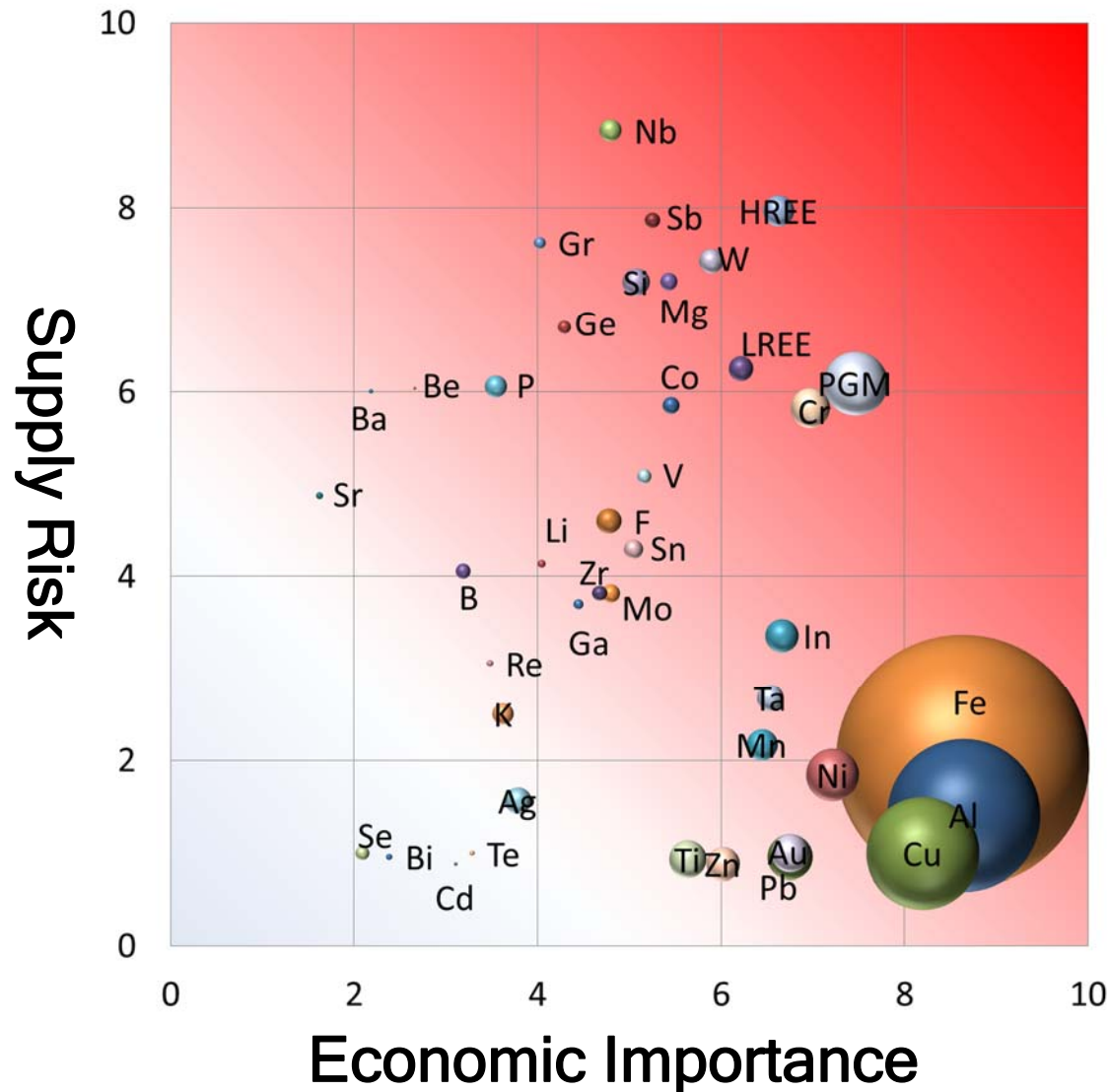
Araxá Niobium mine



Aerial View of Araxá mine

- Japanese group (JFE Steel, Nippon Steel, Sojitz & JOGMEC) **acquire 10% stake** in CBMM on March 2011 by investing US\$ 1.3B.
- **CBMM** owns Araxá niobium mine, refining plant & metallurgical facilities.
- CBMM produces **over 80%** of global supply.
- Reserves of Araxá mine is equivalent to over 200 years of world demand.





- Refers to EU's model
- Adjusts for Japanese industries
- Data used is 2012.
- Now updating

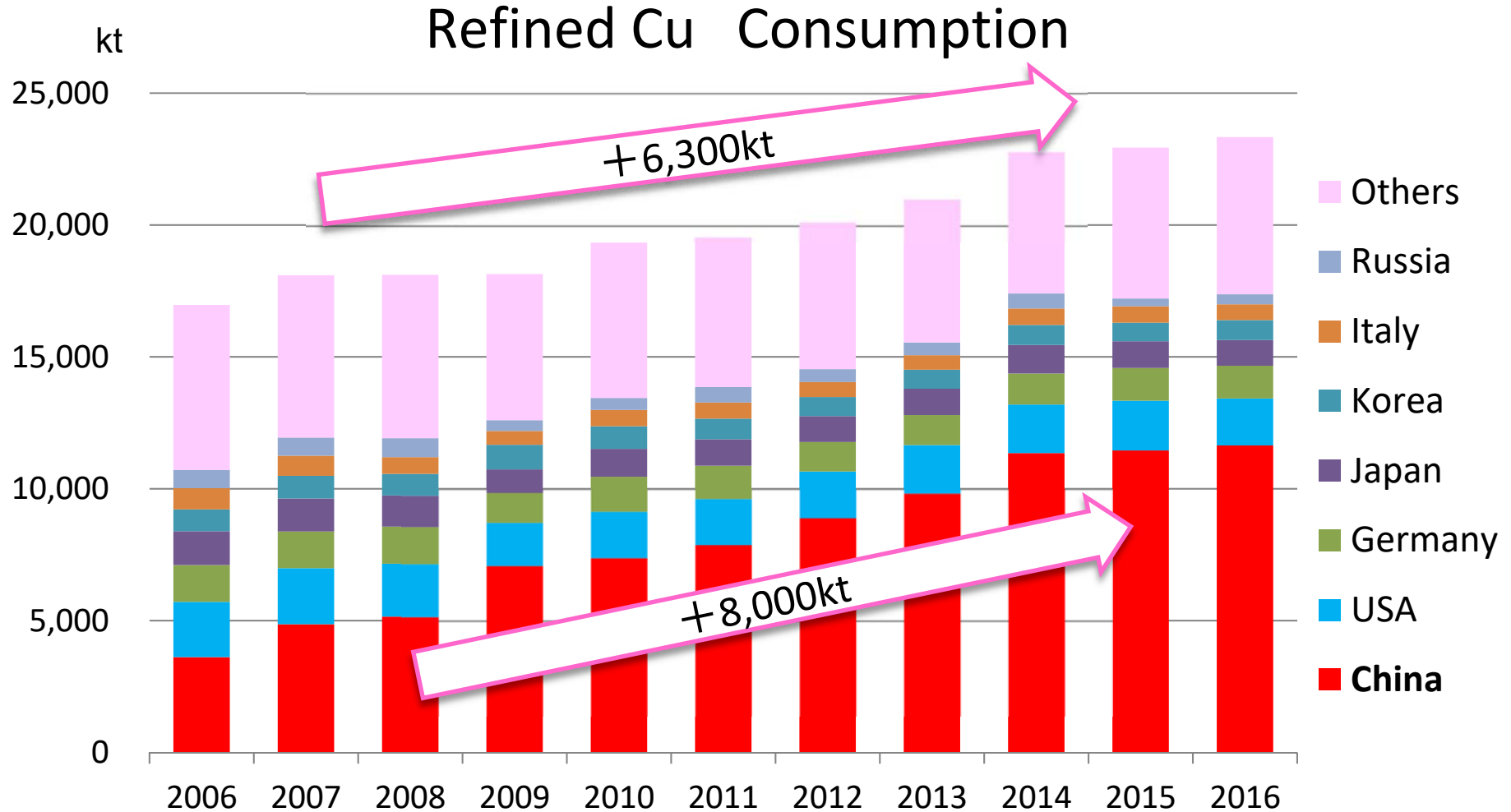
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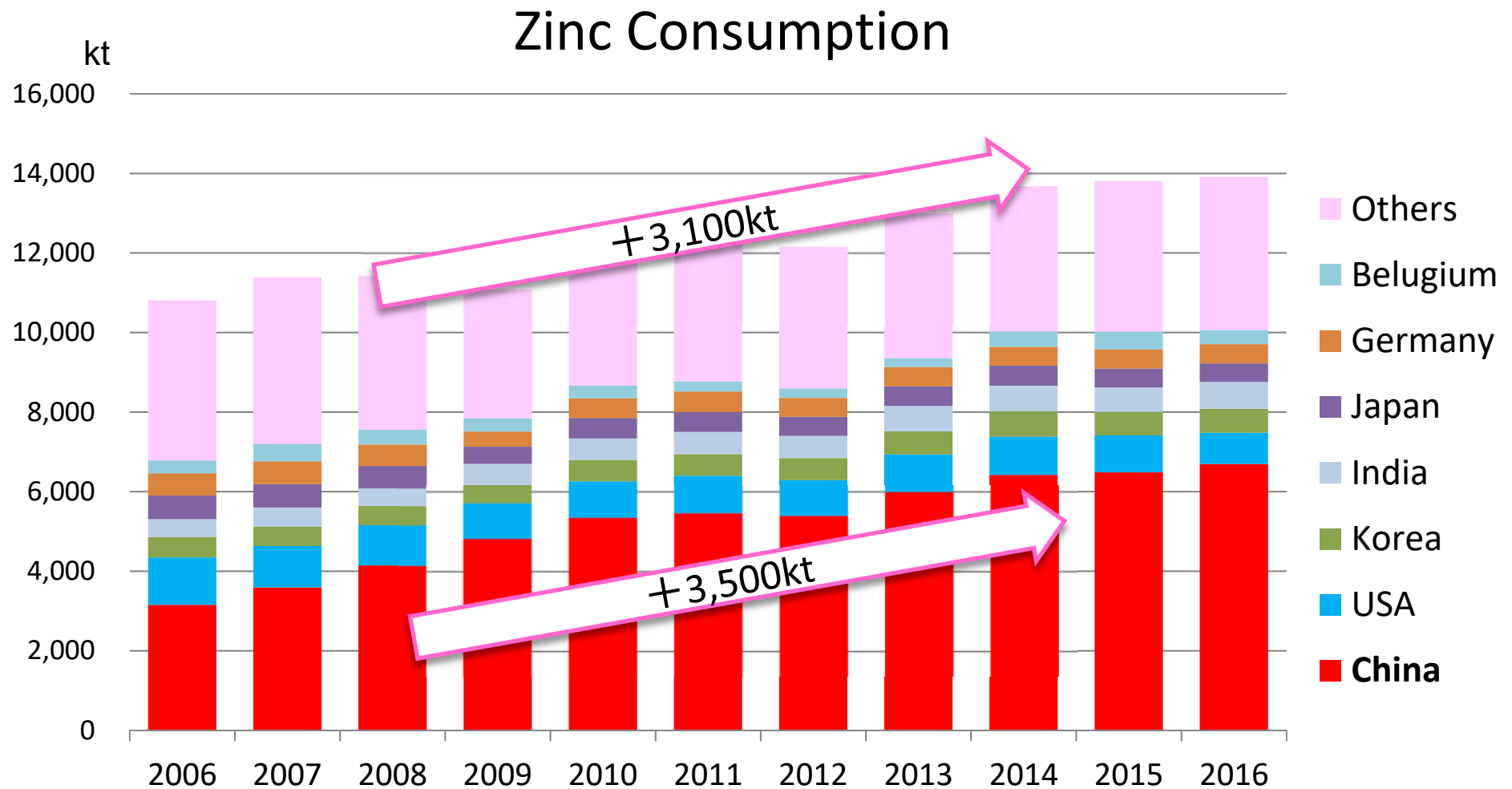
China's share in Copper consumption

- In last 10 years, Chinese Cu consumption expanded by 8 million ton.
- On the other hand, ex-China shrunk
- China's share is about 50%



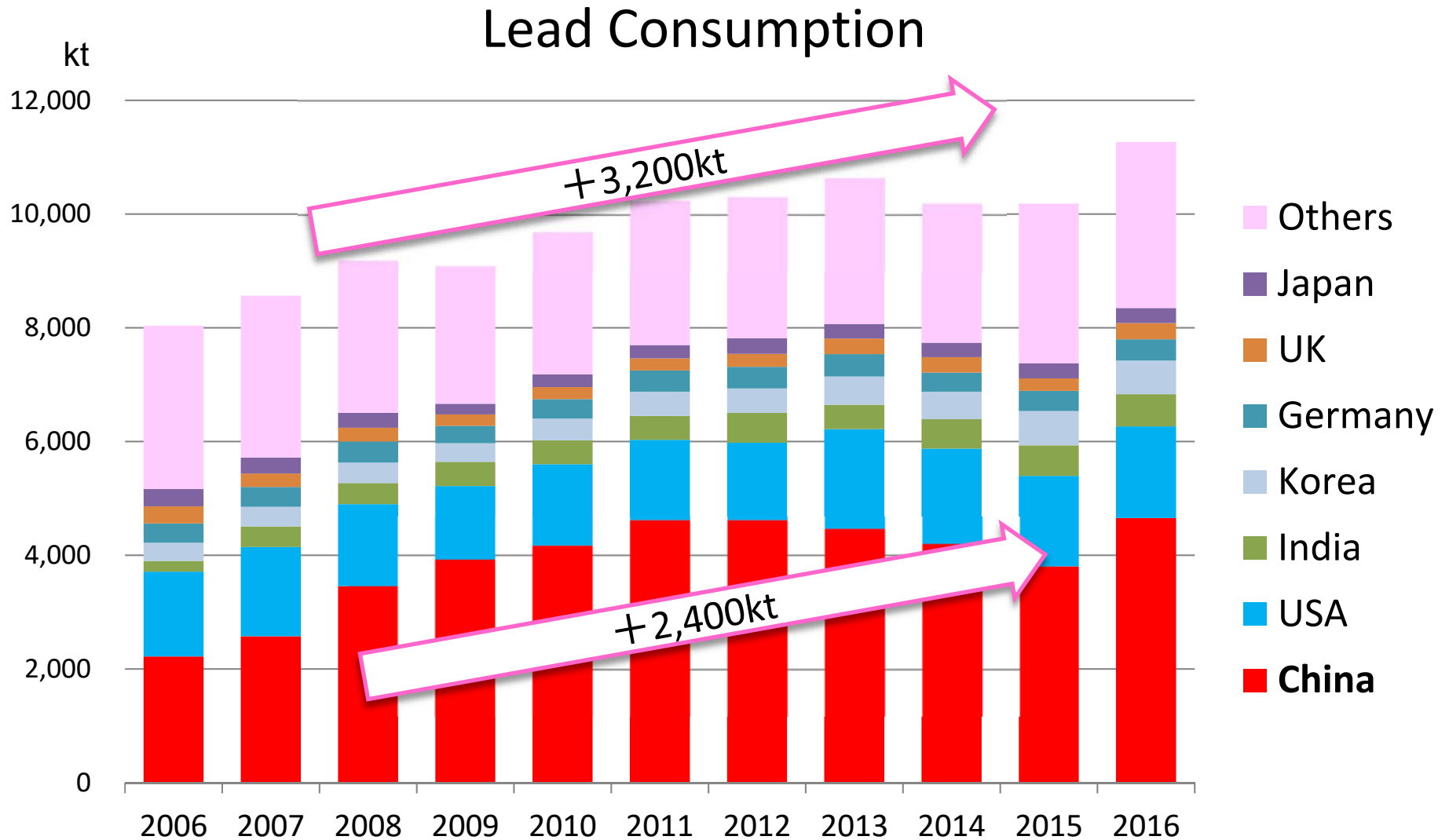
China's share in Zinc consumption

- In last 10 years, Chinese Zn consumption expanded by 3.5 million ton.
- On the other hand, ex-China shrunk



China's share in Lead consumption

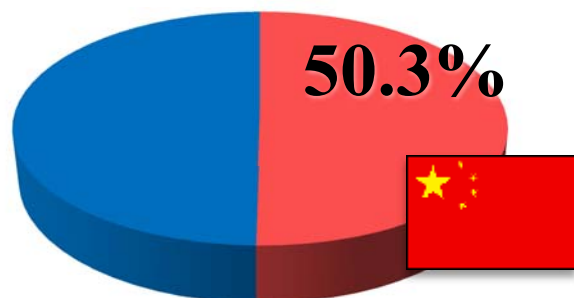
- In last 10 years, Chinese Lead consumption expanded by 2.4 million ton.
- On the other hand, ex-China consumption grew only 800 k ton.



China's Share of Base Metal Consumption (2017)

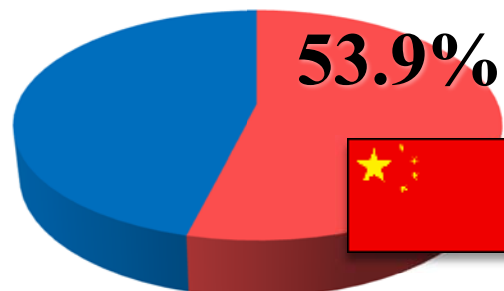
Refined Copper

【World】23,460Kt (Cu t)



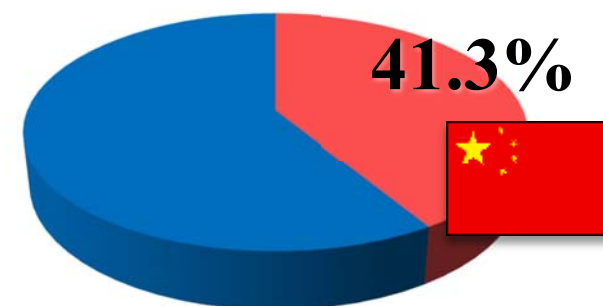
Aluminum

【World】59,190Kt



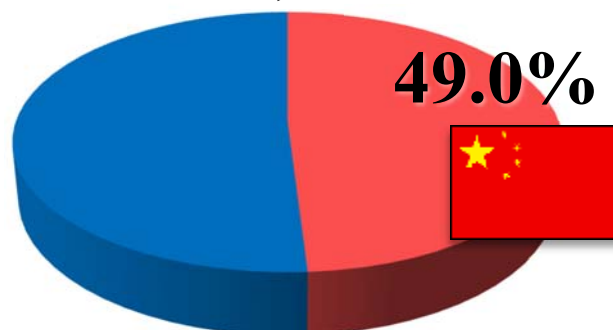
Lead

【World】11,480Kt (Pb t)



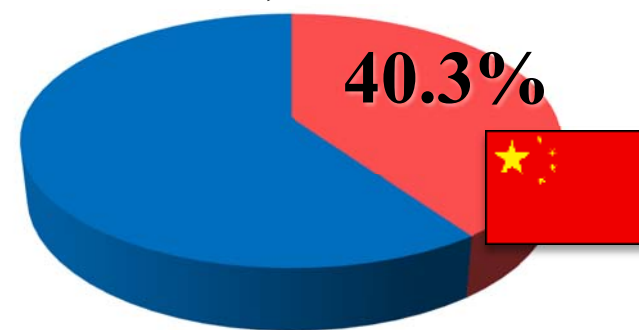
Zinc

【World】14,213Kt (Zn t)



Nickel

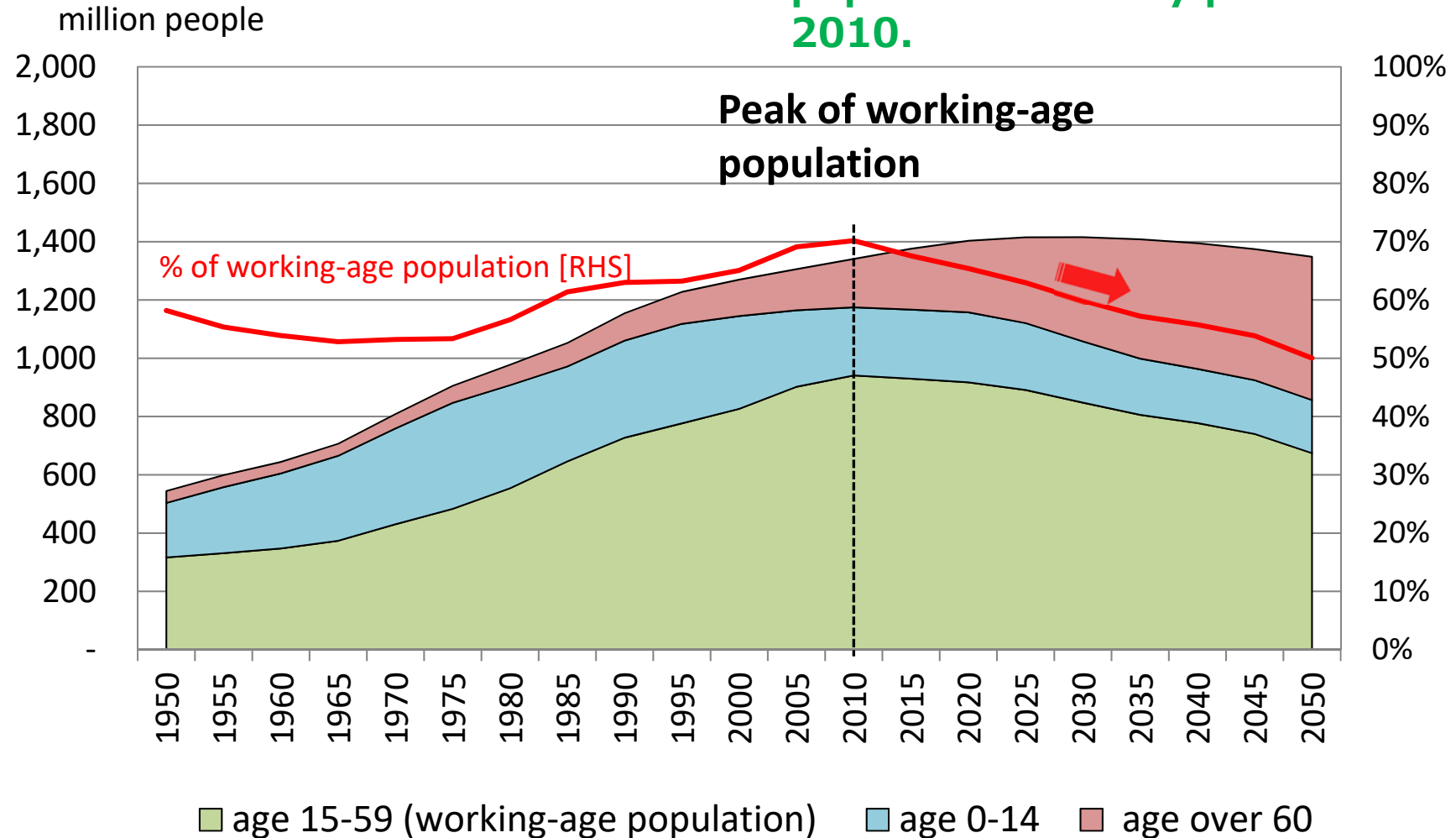
【World】1,910Kt (Ni t)



Maturing China's Economy and Society

Decreasing Working-age Population

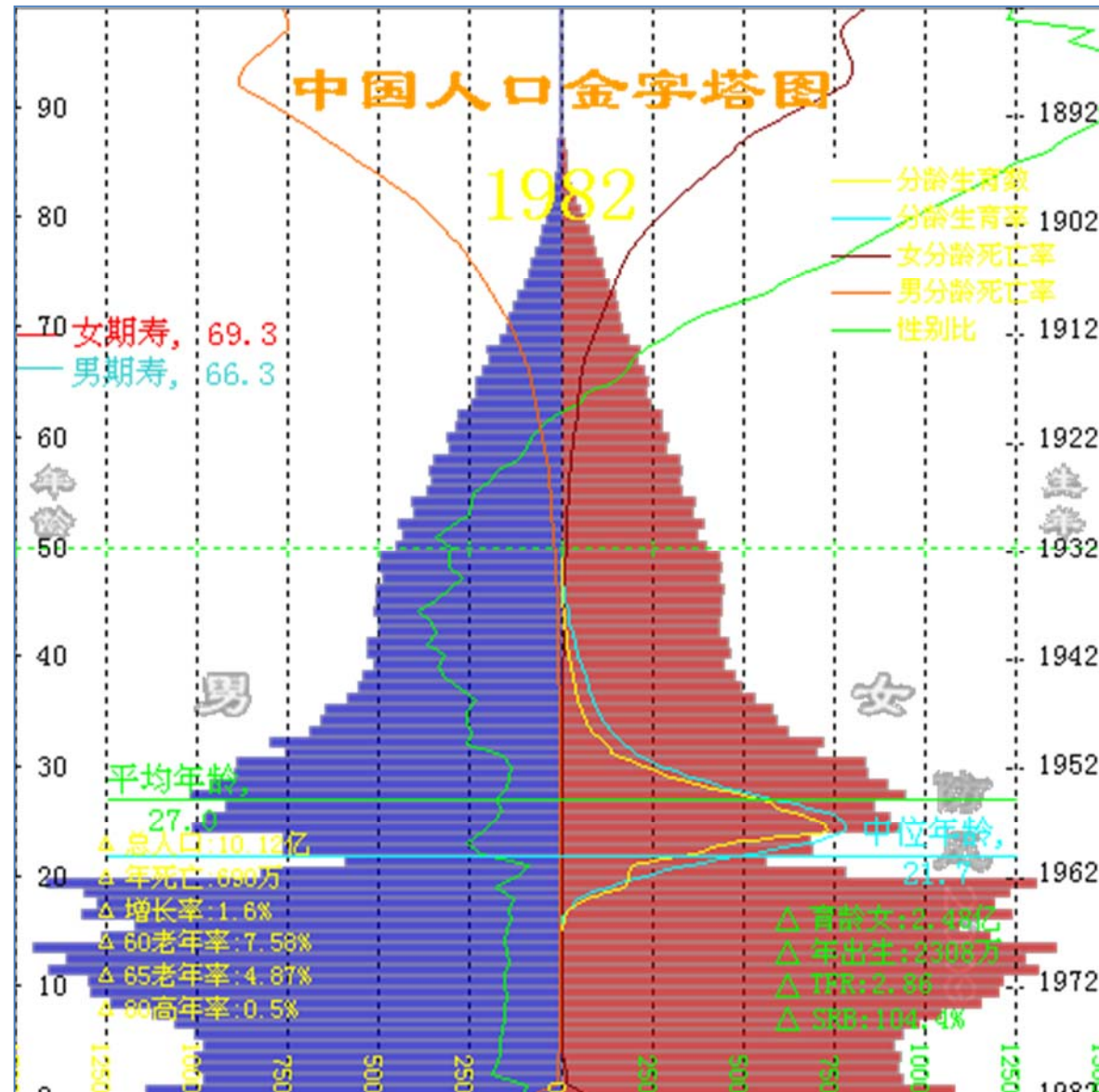
- The peak of total population will come in 2030; 1.4 billion people.
- But that of working-age population already peaked in 2010.



China's Age Pyramid to 2050

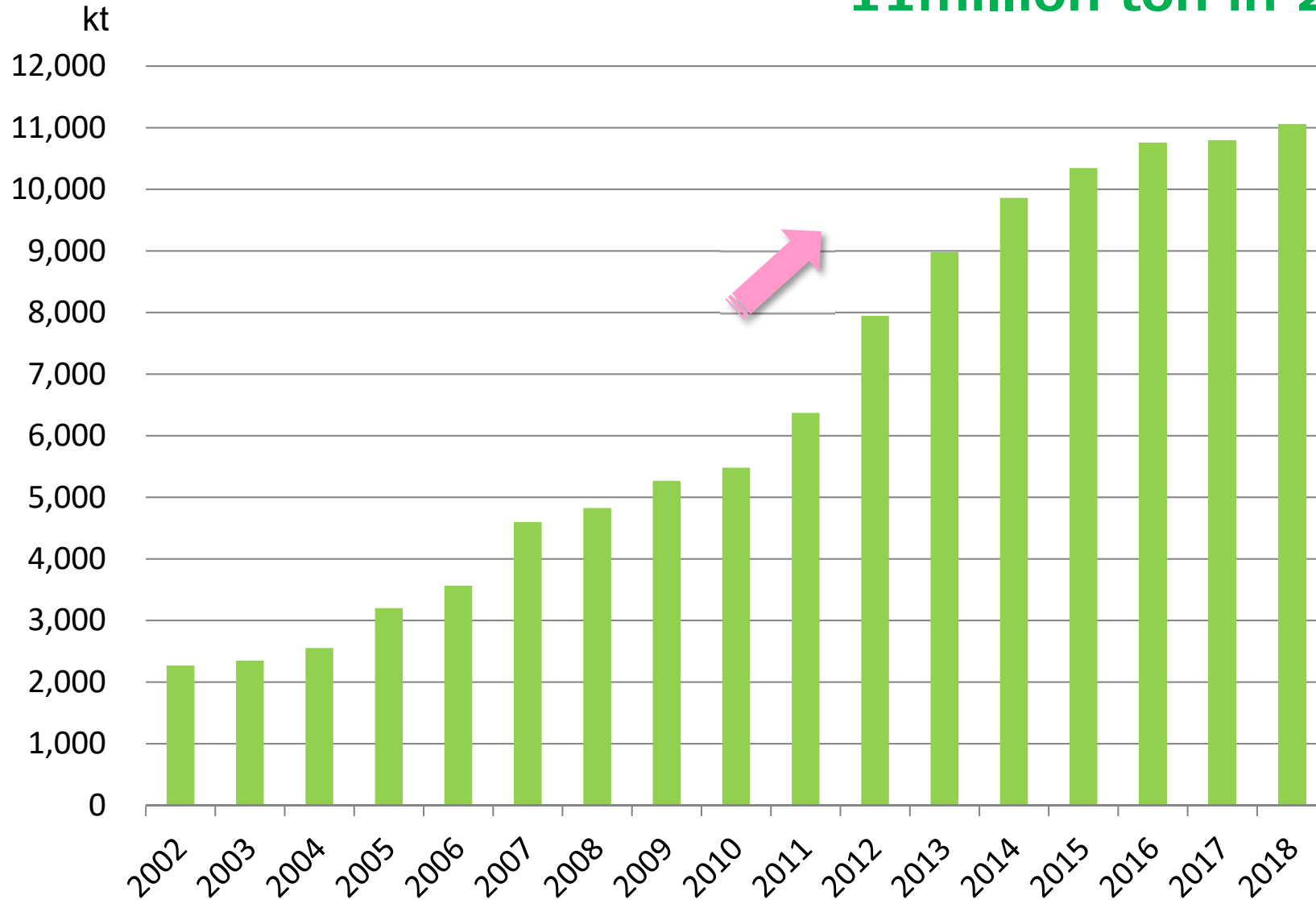
- Ending one-child policy was too late to stop decreasing working-age population.
- Many people hesitate to have the 2nd child because of weak social welfare.

Age



Cu Refinery Capacity in China

• Cu Refinery capacity in China expands to 11million ton in 2018



- JOGMEC is a governmental agency seeking to stable supplies of natural resources for Japan.
- The impact of China's growth in metal consumption affect to metal market.
- Economic tie between Japan and China is very strong, China's economic and social change would give effect on Japan's material industry.
- Mine development takes 10 – 15 years, we should imagine future economy/society in the world in order to keep stable supply of metals.

Thank you for your attention!!

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