

# 2012 3-Year Business Plan

Aiming to be a World Leader in the Non-Ferrous Metal industry  
and an Excellent Company of Japan

February 2013



**SUMITOMO METAL MINING CO., LTD.**

**Nobumasa Kemori**

**President and Representative Director**

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# I. Long-Term Vision (LTV) & Basic Strategy of 12 3-Yr Business Plan



Sierra Gorda Project

## Our Goals

World Leader in the Non-Ferrous Metals industry

Excellent Company of Japan

## 2) Long-Term Vision Targets

Aiming to be a World Leader in the  
Non-Ferrous Metals Industry  
&  
an Excellent Company of Japan





# 3) Long-Term Vision Targets

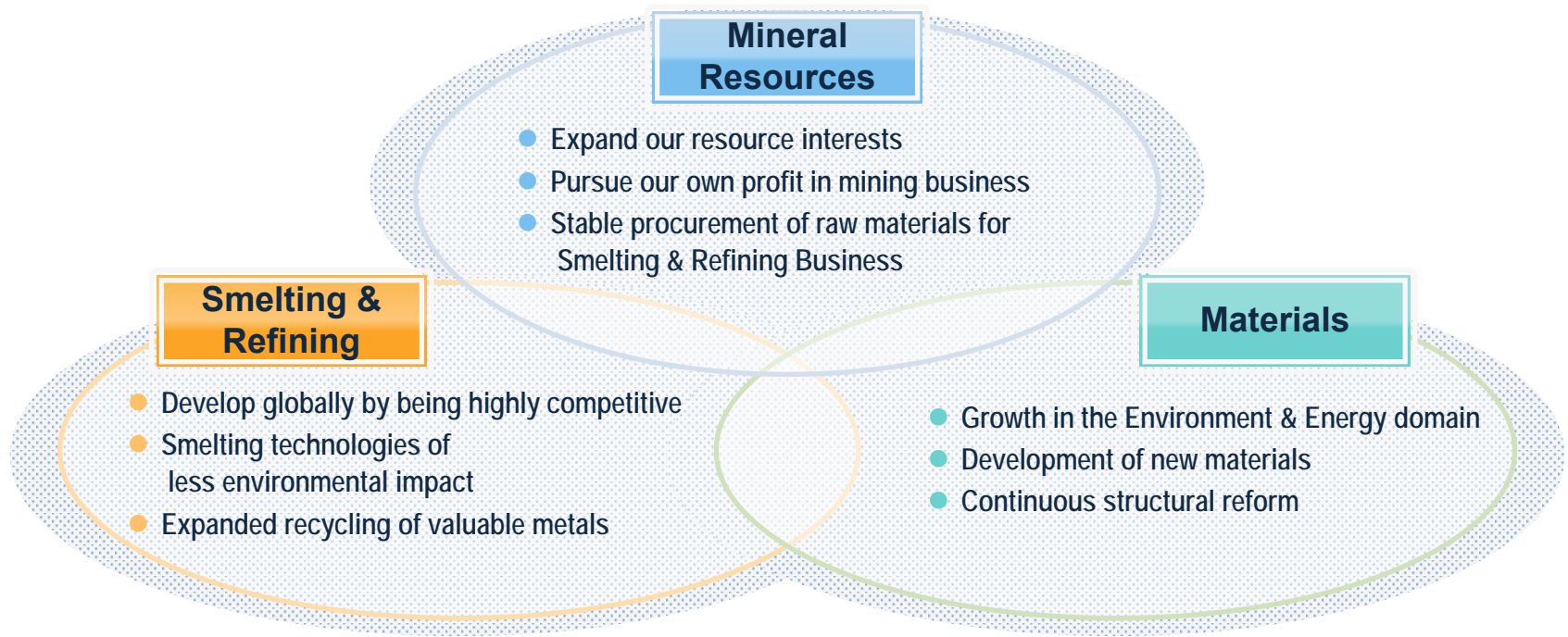
## World Leader in the Non-Ferrous Metals

### World Leader in the Non-Ferrous Metals Industry

We are contributing to society by securing superior mineral resources, smelting and refining those resources into metal, and supplying them to the market. To provide added value in Materials Business that uses non-ferrous metals.

Operates its own  
mines and smelters  
both in Japan and abroad

Among the top 5 companies in  
the world in production volume



## 4) Long-Term Vision Targets

### Excellent Company of Japan

## Excellent Company of Japan

A solid corporate philosophy  
and management vision

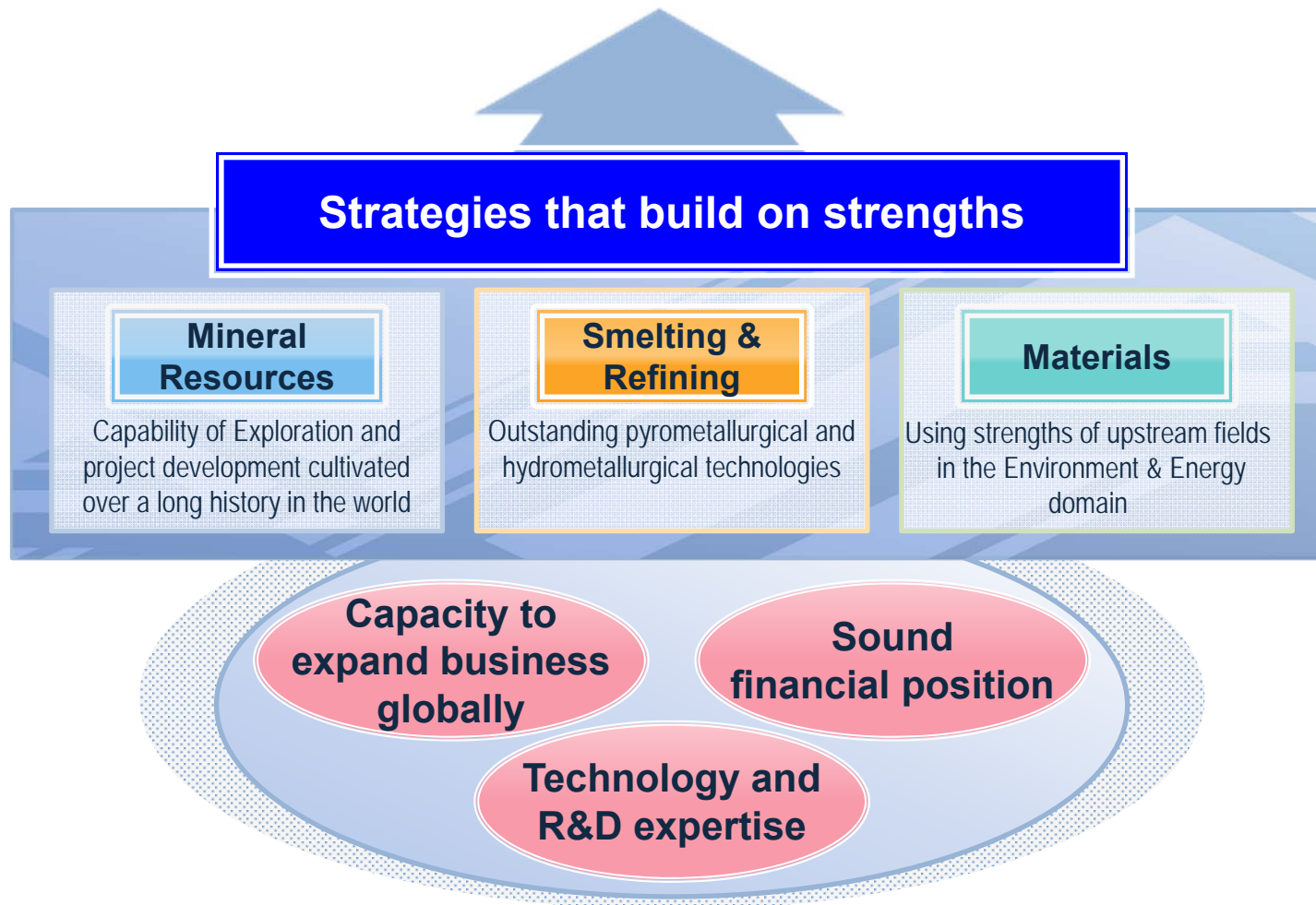
Practicing corporate governance  
and CSR activities as a pillar of  
our business

Net sales: ¥1 trillion  
Net income: ¥100 billion

Lays out continuous  
growth strategy

# 5) Strengths Supporting Strategy

Growing business and improving corporate value  
through the execution of a continuous growth strategy





# 6) Positioning of the 12 3-Yr Business Plan



# 7) Key Strategies of the 12 3-Yr Business Plan

## Top priorities in the 12 3-Yr Business Plan

- Promote and establish operations in the Sierra Gorda Project
- Complete the Taganito Project and ensure a smooth launch of operations
- Implement structural reforms in the Materials Business and stable acquisition of own profit
- Reduce costs by ¥10 billion/year

(Cut costs company-wide to compensate for increases in the costs of overseas locations and head office expenses)

## Strategies for achieving our Long-Term Vision

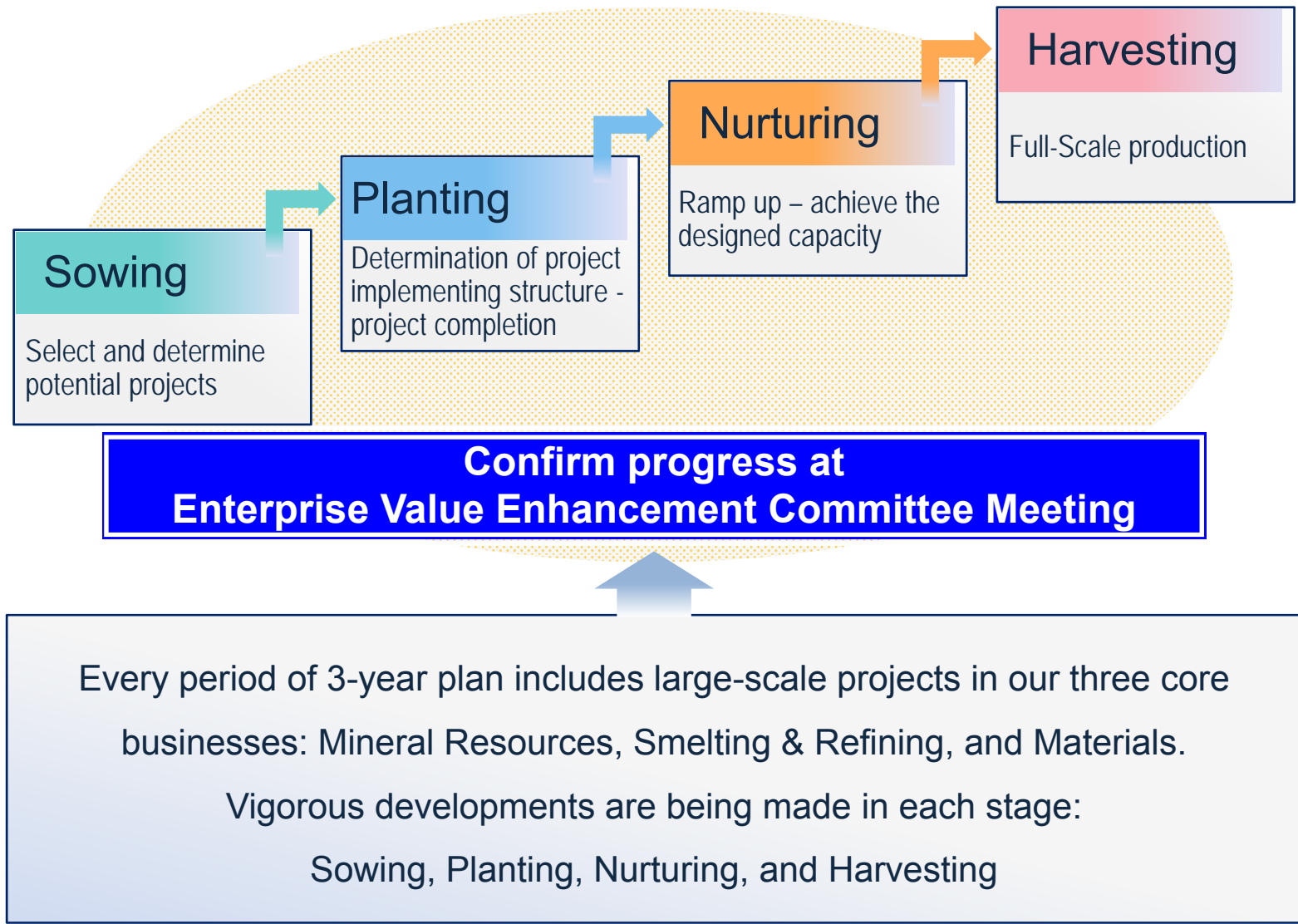
### Planting plans for the period covered in the 12 3-Yr Business Plan

- Existing copper mine expansion project
- Sierra Gorda Phase 2, Oxide Ore Project
- HPAL development, efforts to improve competitiveness
- Recycling of valuable metals
- 3rd and 4th HPAL, 2nd Ni Refinery
- New Ni resources exploration

### Sowing plans for the period covered in the 15 3-Yr Business Plan

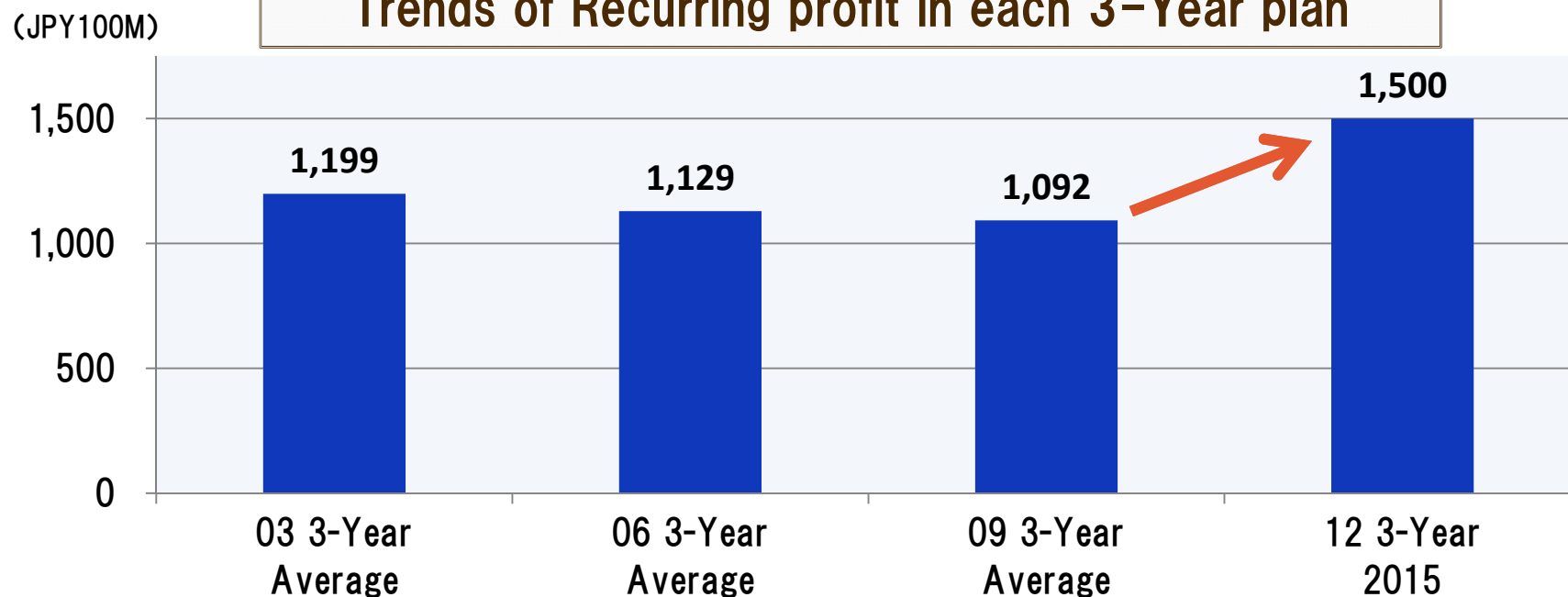
- Own Cu/Au exploration
- Copper mine development projects in North and South America
- Au (Stone Boy, etc.) projects

# 8) Systems Supporting Strategies



# 9) Profit Trends (1)

**Trends of Recurring profit in each 3-Year plan**

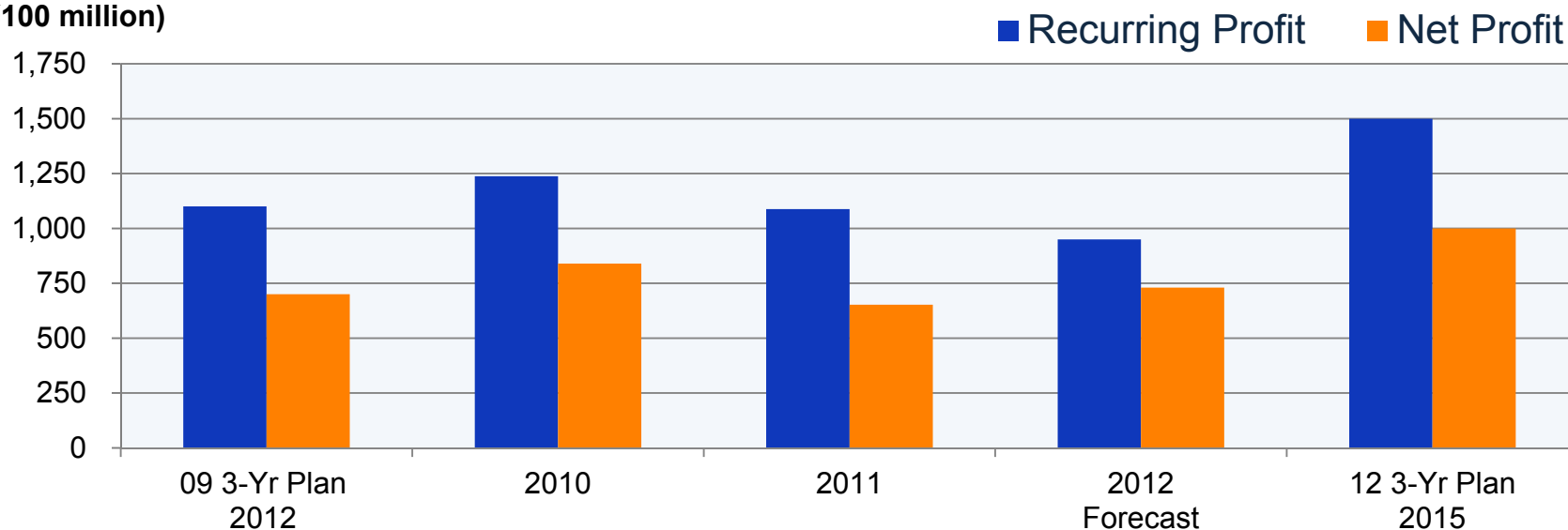


	(JPY100M)			
	03 3-Year Plan	06 3-Year Plan	09 3-Year Plan	12 3-Year Plan 2015
Total of Recurring profit in each 3-Year Plan (Result and 2012 Forecast)	3,597	3,386	3,276	-
Yearly average of each 3-Year plan	1,199	1,129	1,092	1,500

## 9) Profit Trends (2)



(¥100 million)

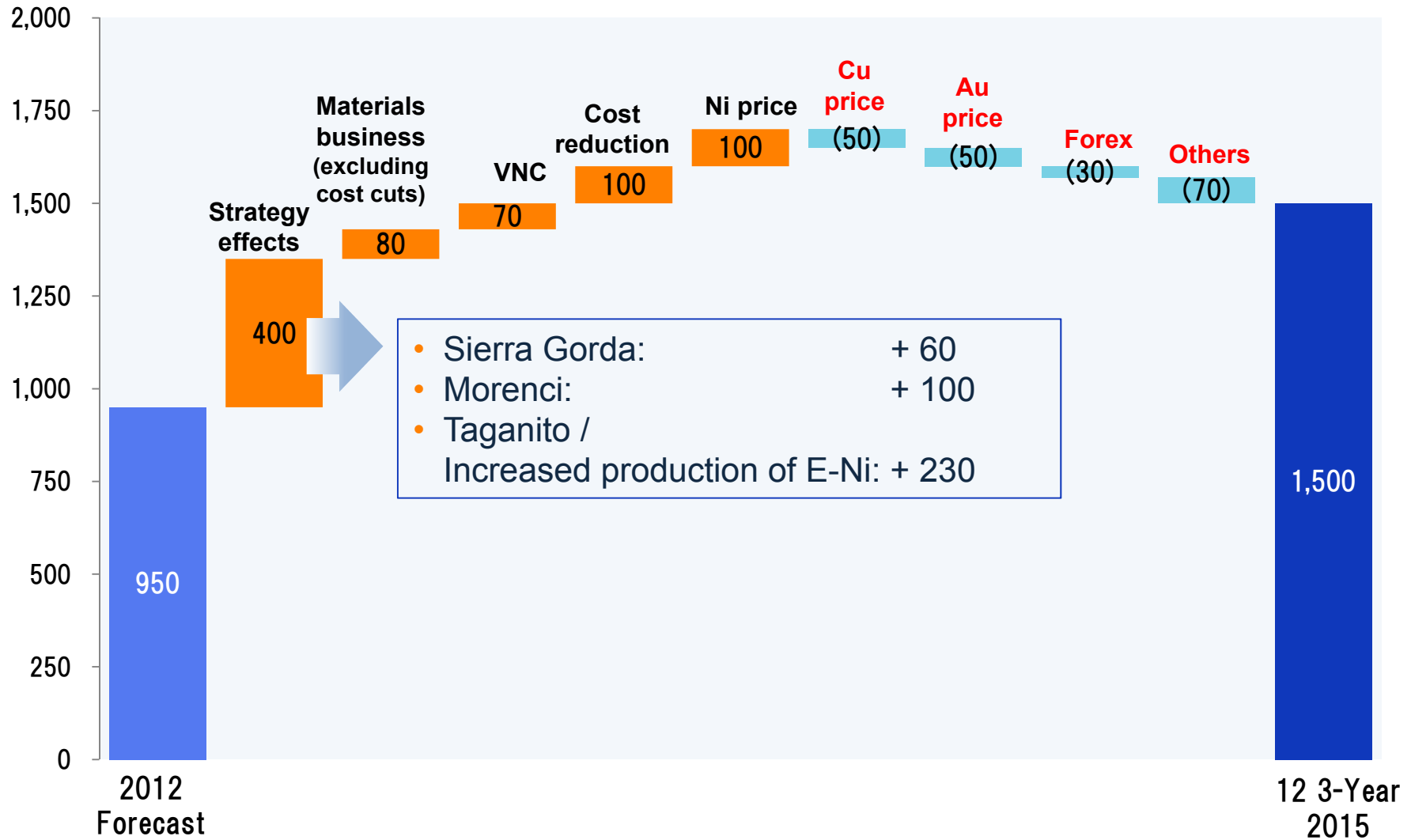


	09 3-Yr Plan 2012	2010	2011	2012 Forecast	12 3-Yr Plan 2015
Recurring profit (¥100 million)	1,100	1,238	1,088	950	1,500
Net income (¥100 million)	700	841	653	730	1,000
Cu price (\$/T)	6,000	8,140	8,485	7,873	7,500
Ni price (\$/lb)	8.0	10.7	9.6	7.7	9.0
Au price (\$/toz)	1,000	1,294	1,646	1,658	1,550
Forex (¥/\$)	90.0	85.7	79.1	81.3	80.0

# 10) Recurring Profit Analysis

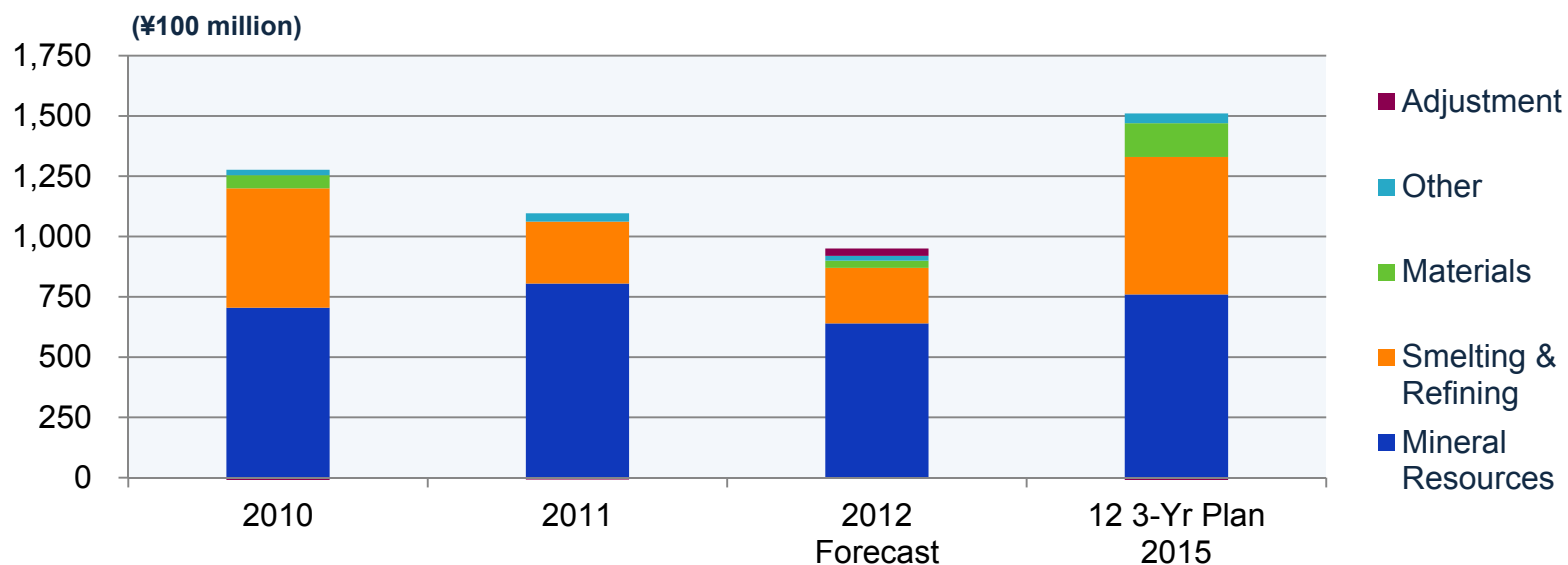
## 12 3-Yr Plan 2015 vs. FY12 Forecast

(¥100 million)





# 11) Profit Trends by Segment



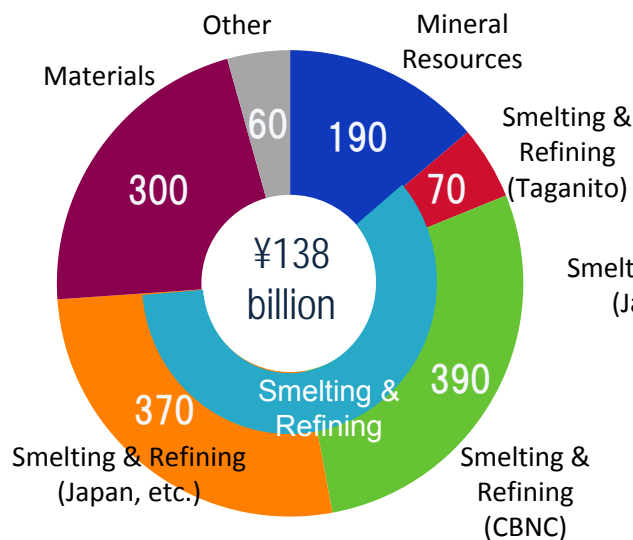
		2010	2011	2012 Forecast	12 3-Yr Plan 2015*
Segment profit	Mineral Resources	705	805	640	760
	Smelting & Refining	495	256	230	640
	Materials	54	-3	30	120
	Other	23	34	20	40
Adjustment		-39	-5	30	-60
Recurring profit		1,238	1,088	950	1,500

\*FY2010-FY2012 : Contribution Margin (Earlier Bases) 12 3-Yr 2015 : New Segment Profit

(Unit: ¥100 million)

# 12) Investments in Large Projects

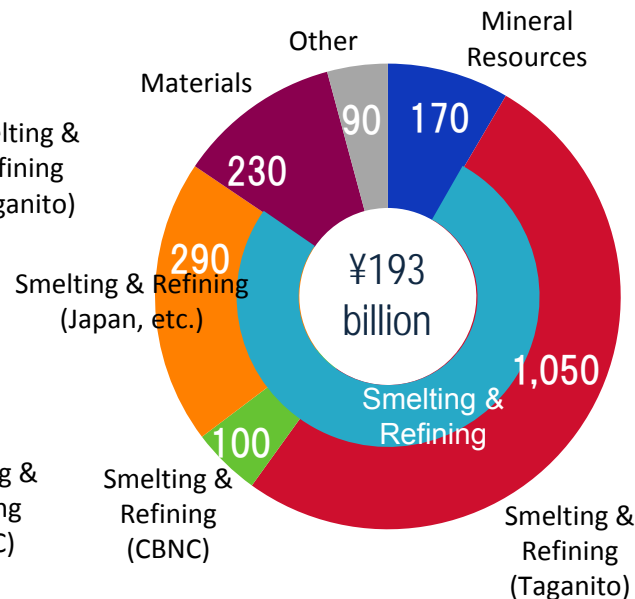
### 06 3-Yr Plan



+

Overseas interest	¥100 million
Pogo	200
Goro	180
NAC	60
<b>Total</b>	<b>440</b>

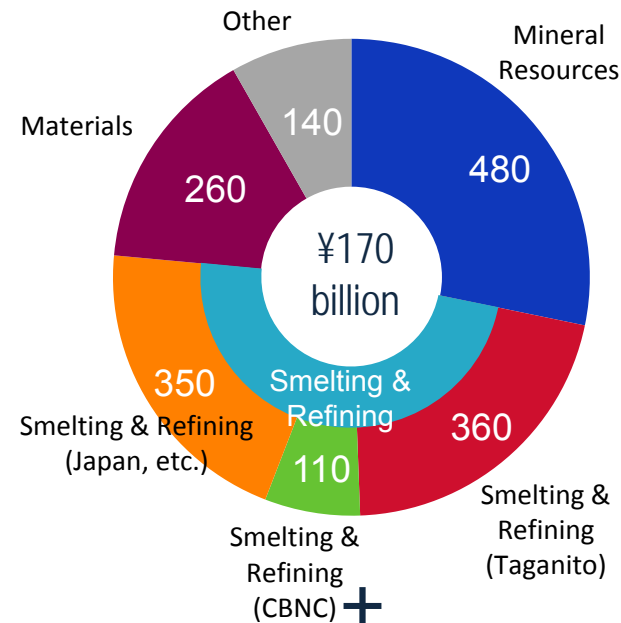
### 09 3-Yr Plan



+

Overseas interest	¥100 million
Sierra Gorda	410
Goro	40
NAC	15
<b>Total</b>	<b>465</b>

### 12 3-Yr Plan

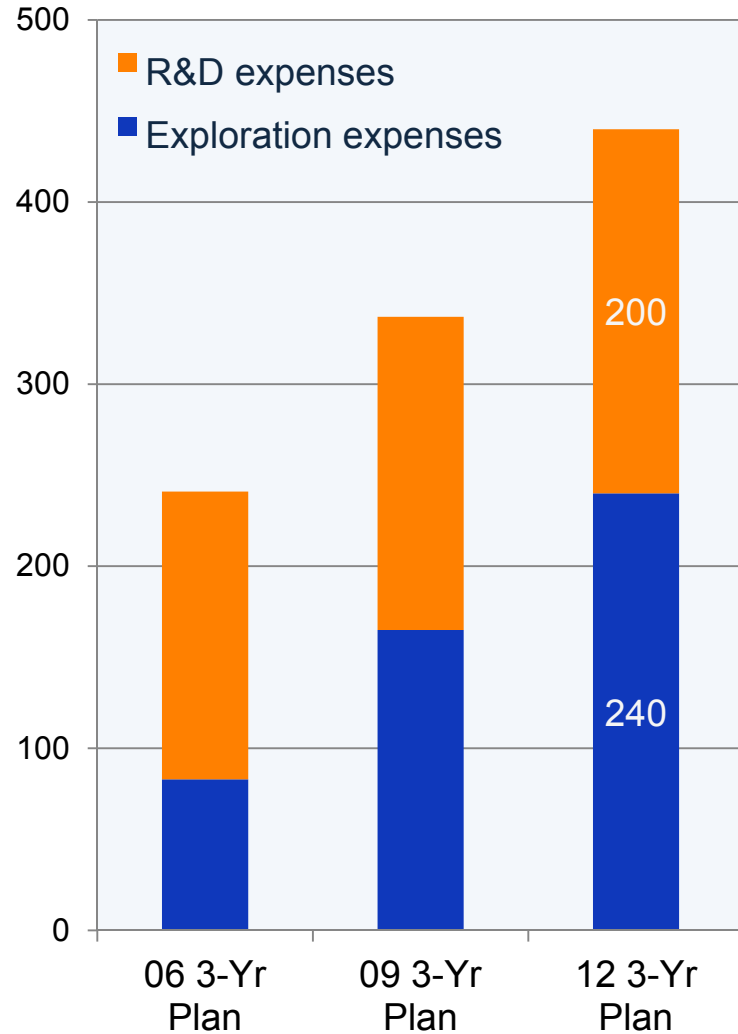


+

Acquisition of overseas interest

# 13) R&D Expenses, Exploration Expenses

(¥100 million)



## R&D

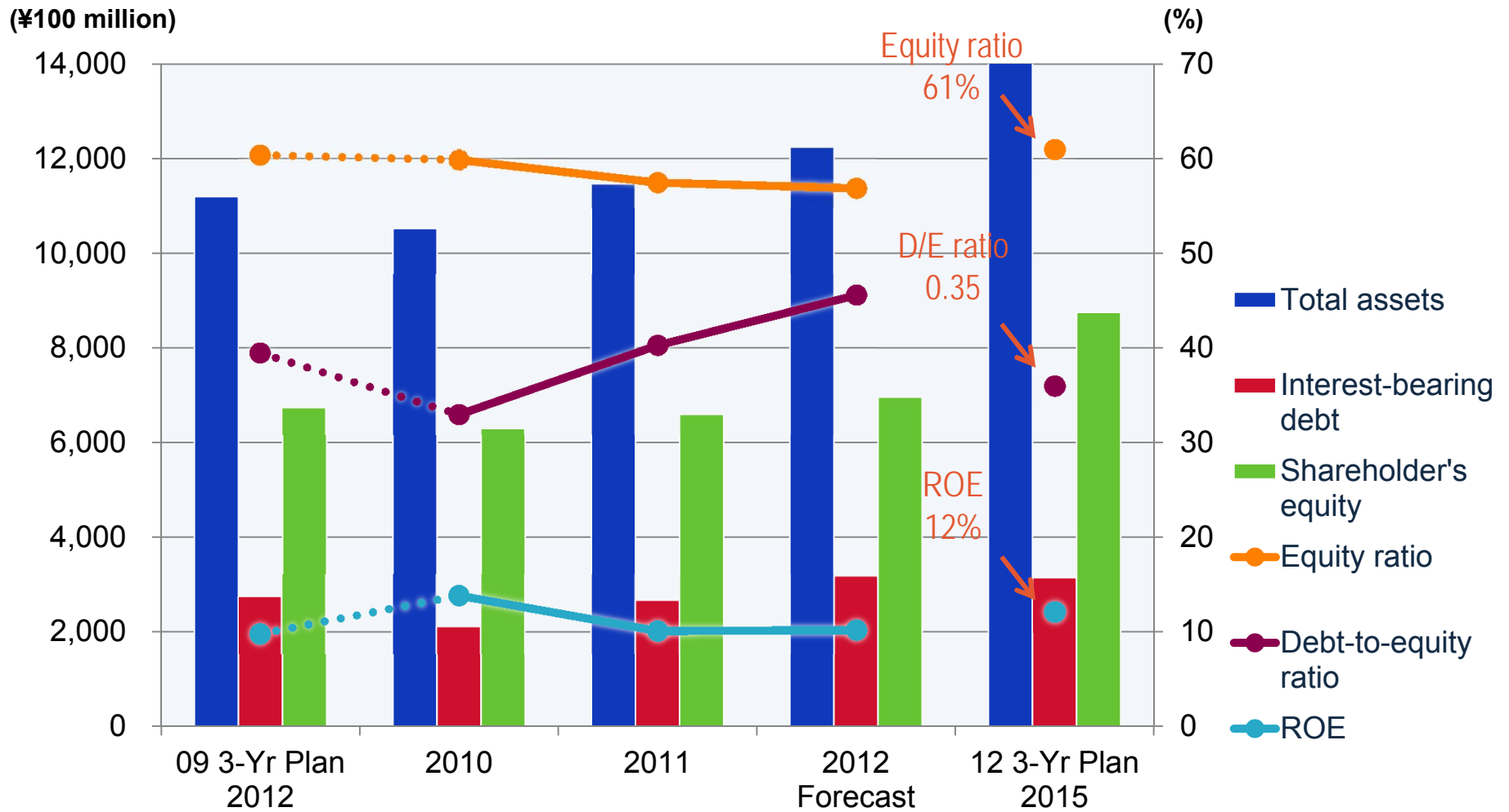
- Acceleration of new product development in Materials Business
- Technological innovations in Mineral Resources and Smelting & Refining
- Promotion of process development

## Exploration

- Expand target area
- Acquisition of advance-stage exploration projects

# 14) Financial Strategies

## (1) Maintenance of a Sound Financial Structure



### Dividend policy

- Continue performance linked dividend
- Profit Return  
Consolidated dividend payout ratio raised from 20% or higher ⇒ 25% or higher

### Financial structure

- Keep sufficient cash on hand  
Prepare for large-scale projects
- Maintain an equity ratio of 50% or higher

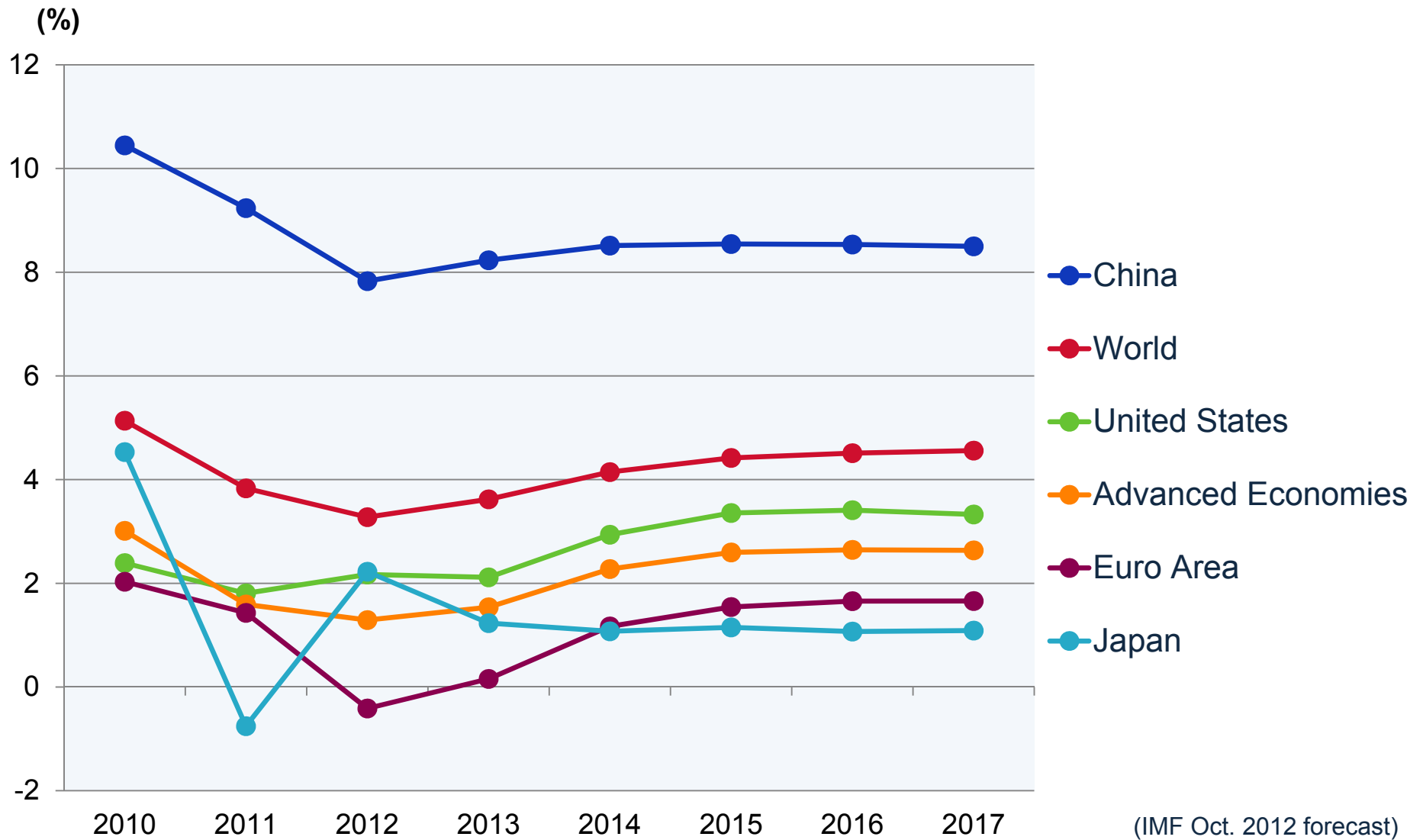
## II. Business Environment



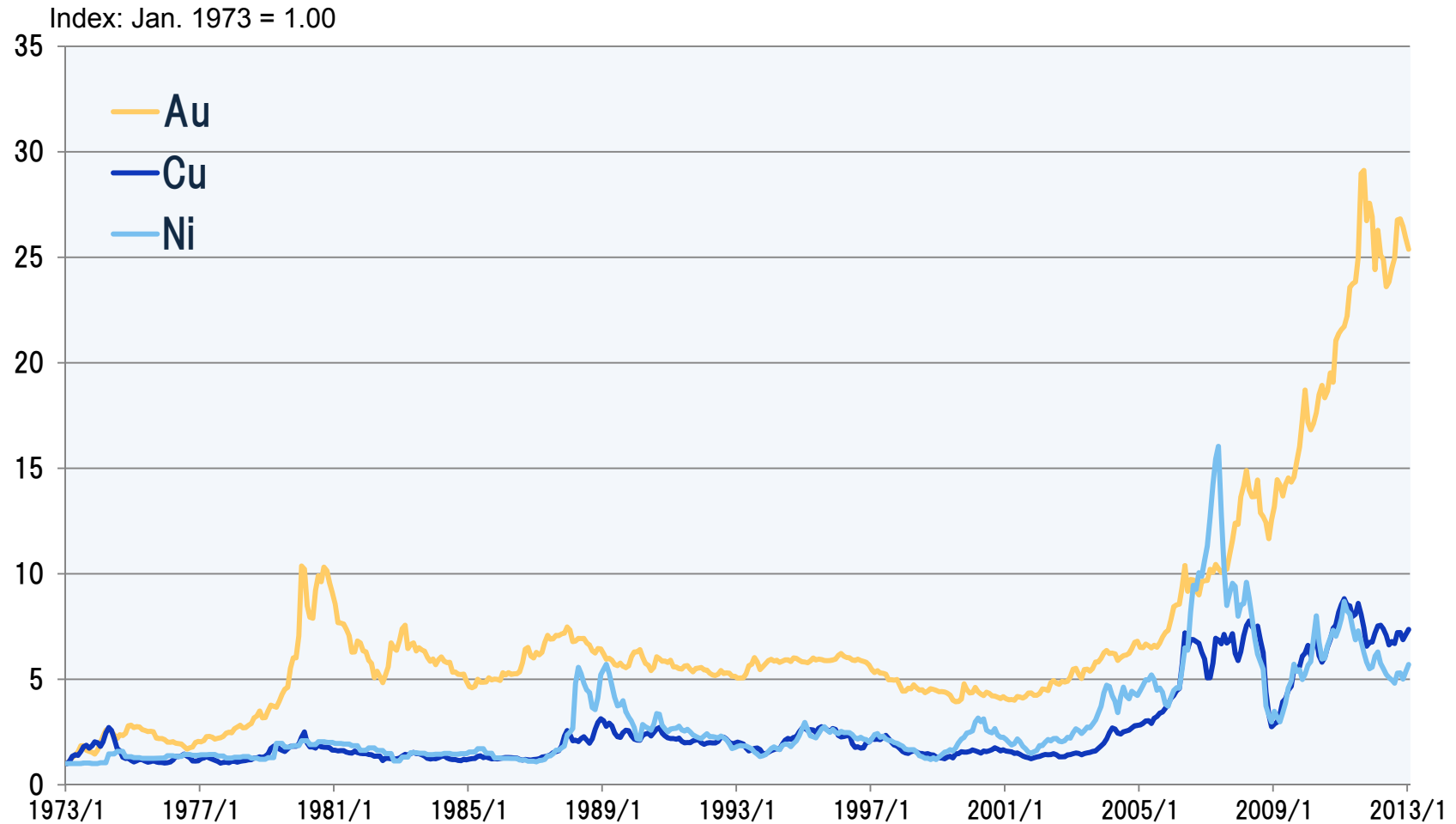
Celebration of Hishikari Mine 30<sup>th</sup> Anniversary and total production of 200 tons



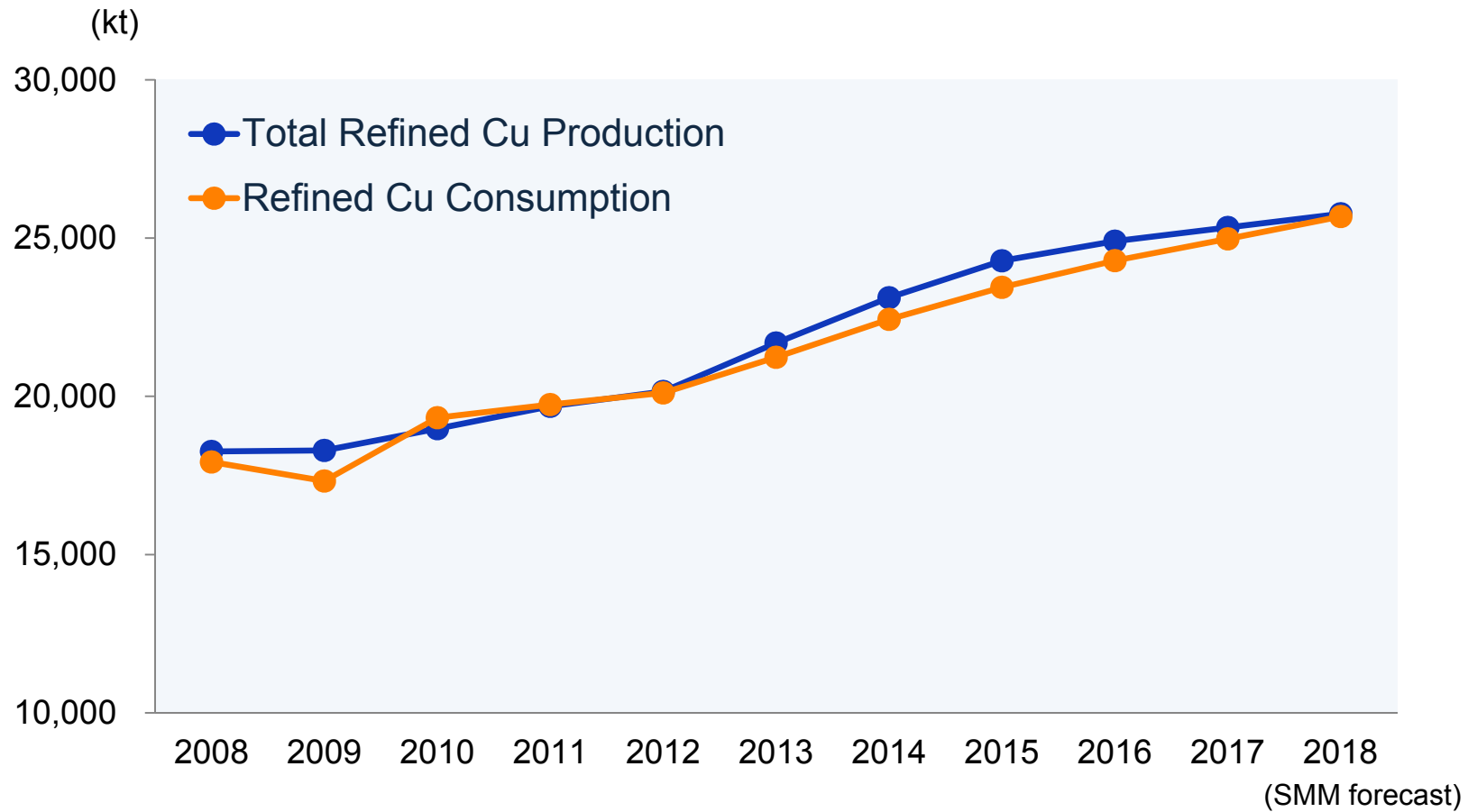
# 1) General Conditions - Global GDP Growth



## 2) Prices of Metals

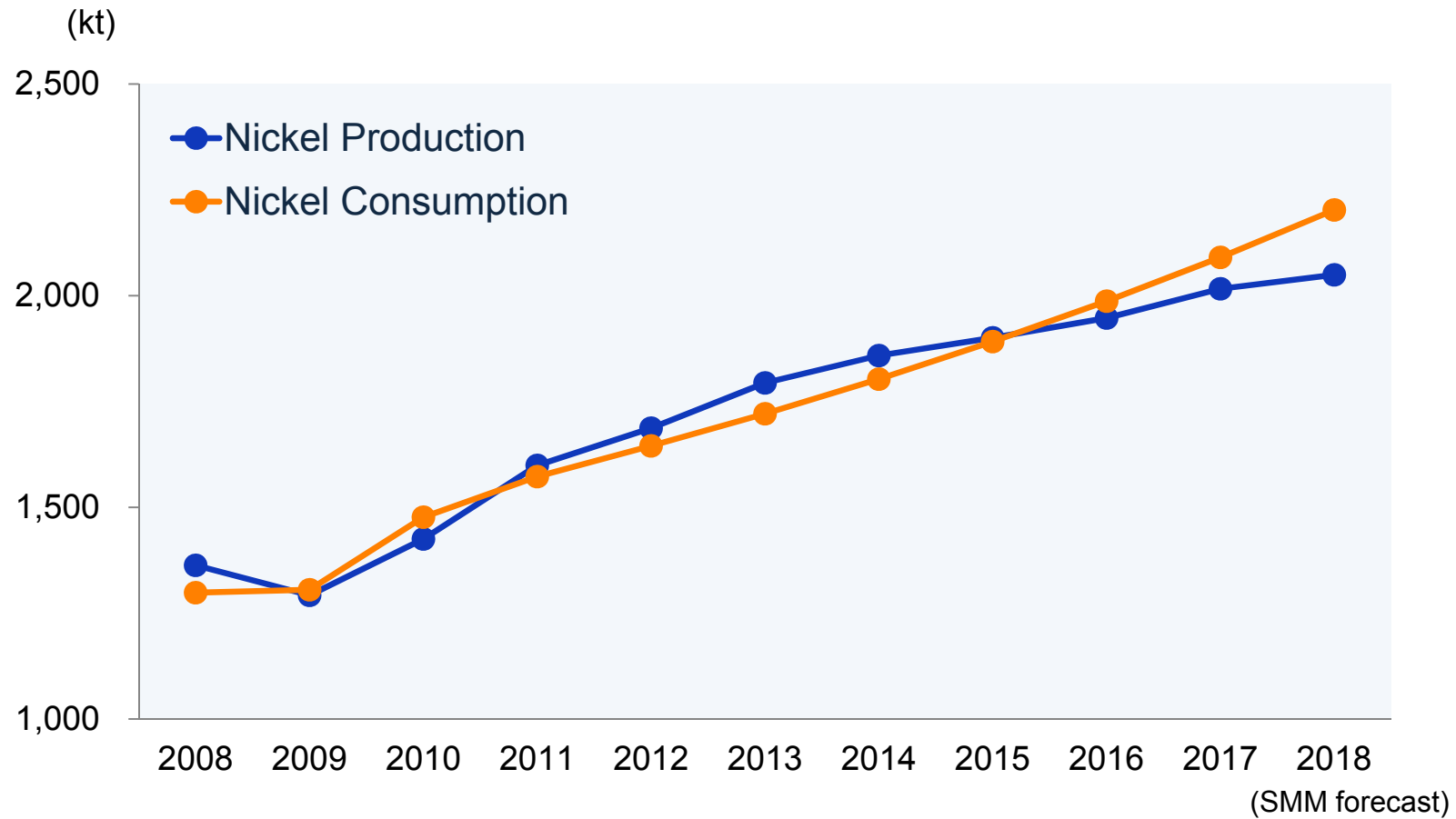


### 3) Long-Term Forecast (Cu)



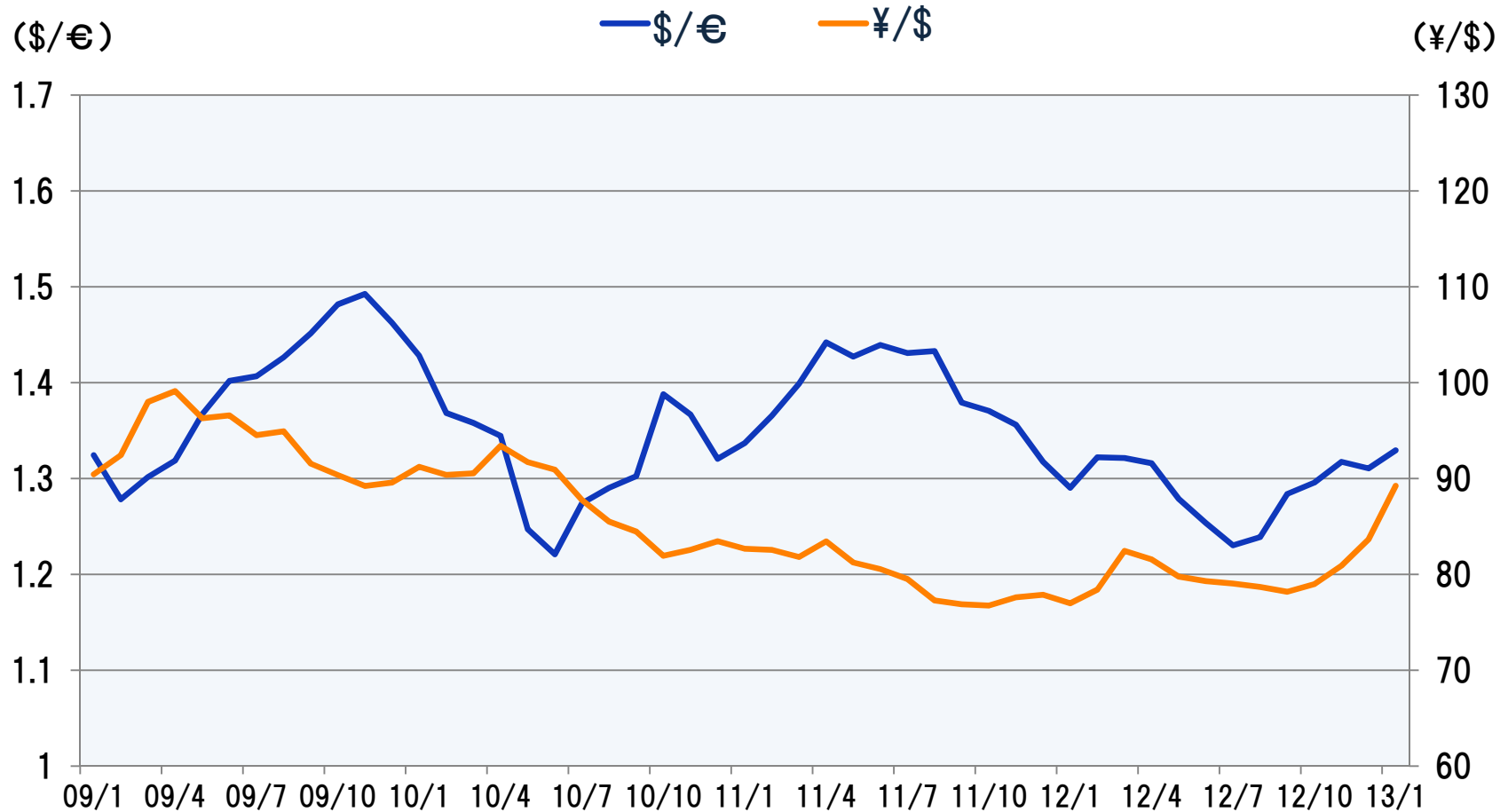
Trending from a slightly excess supply to a supply-demand balance

## 4) Long-Term Forecast (Ni)



Currently there is excess supply, but a supply shortage is forecast for the future

# 5) Forex Trends



### III. Core Business Growth Strategy



Taganito Project



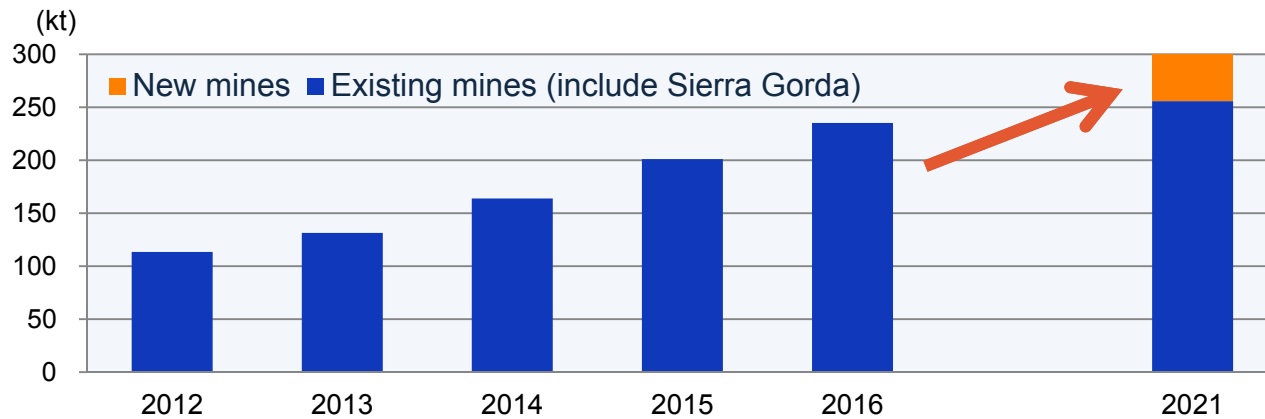
# 1) Mineral Resources

## (1) Roadmap Ahead for Cu, Ni, Au



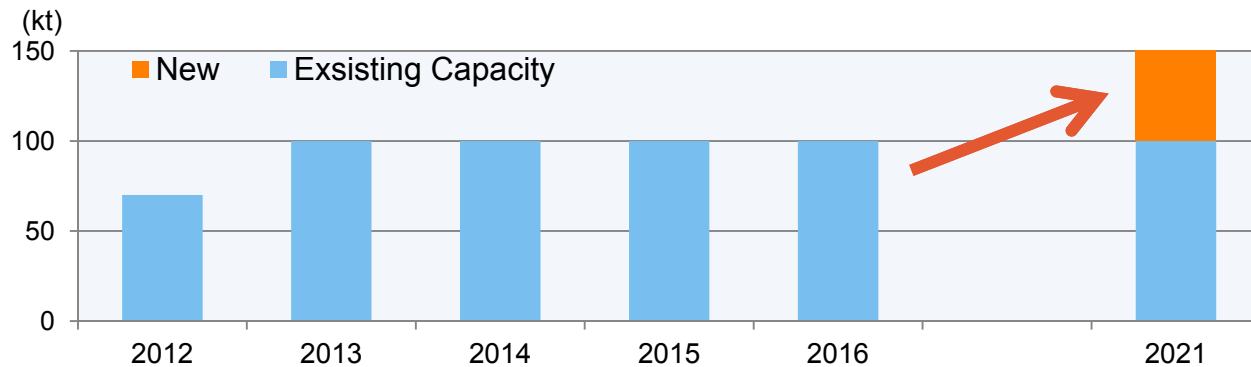
Core Business  
Growth Strategy

Cu



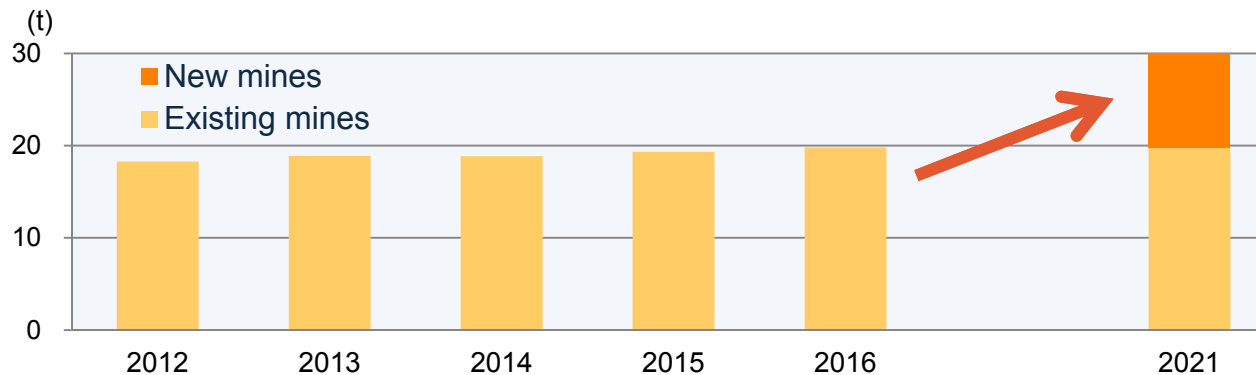
Cu  
300,000t

Ni



Ni  
150,000t

Au



Au  
30t

# 1) Mineral Resources

## (2) Three Methods of Overseas Resource Acquisition



### 1) Exploration by SMM

- Majority acquisition is possible
- Considerable time needed before mining can start

Stone Boy Project (Au) Evaluation stage  
Solomon Project (Ni) F/S development

### 2) Participation in mine development projects

- Operable in a relatively short period
- Difficult to acquire a majority share
- Risks of competition with other companies, increased expenses

Sierra Gorda Project (Cu)  
Established in 2014/Moving to next phase  
Investigating introduction of new projects  
Also actively evaluating proposals prior to F/S

### 3) Increasing production at existing mines

- Pursue a win-win situation with our partners
- There are not many project for large-scale production increases
- Difficult to increase SMM's share of interests

(Cu mines)  
Morenci Full production sch. for 2014Q3  
Cerro Verde Full production sch. for end of 2015  
Northparkes Pre/F/S implementation scheduled

# 1) Mineral Resources

## (3) Participation in Development Projects - Sierra Gorda Project -Cu



Core Business  
Growth Strategy



<b>2013</b>	Phase 1 (110kt annual production capacity): Promote construction work for business launch
<b>2014</b>	Production begins, Phase 1 ramp up
<b>2015</b>	Phase 2 (220kt annual production capacity): Start construction Evaluate Oxide Ore Project, make decision about participation

<b>2018</b>	<ul style="list-style-type: none"> <li>•Oxide Ore Project operations to begin (annual production of 30kt to 40kt with SX-EW)</li> <li>•Operating with 220kt tons in annual production (Concentrate, Cu equivalent)</li> </ul>
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Investment for Phase 1

\$2.9B

Equity interest ratios

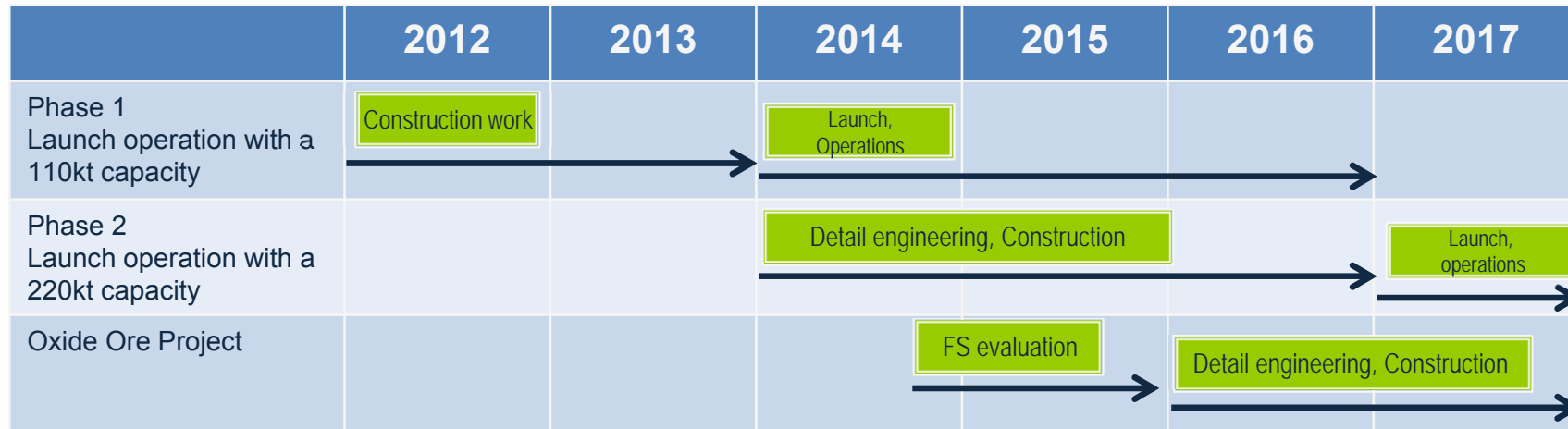
KGHM	55%
SMM	31.5%
Sumitomo Corp.	13.5%

# 1) Mineral Resources

## (3) Participation in Development Projects - Sierra Gorda Project -Cu



Core Business  
Growth Strategy

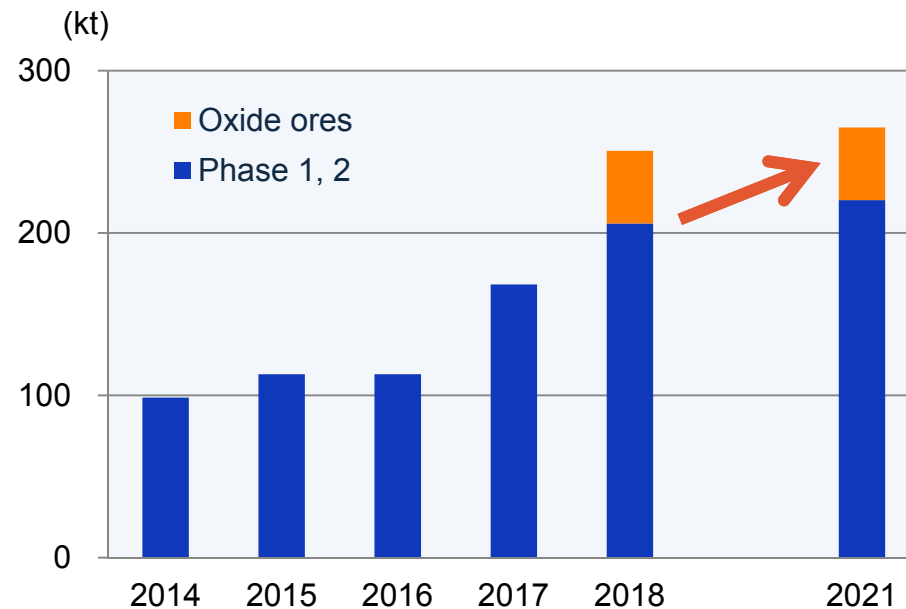


### Phase 2

Operations begin: 2017  
 Investment: \$850M  
 Metal production volumes: Cu 220kt/year  
 Mo 8kt/year

### Oxide Ore Project

Operations begin: Early 2018; 10 years of operation  
 Complete FS, decide on participation in 2015  
 Investment: \$700M  
 Reserves (Ore volume): 146 million t  
 Metal production volumes: Cu 30-40kt/year





### Situation for acquiring new projects

- Decreasing the number of large-scale projects
- Increasing the number of projects located in remote areas and in high altitude
- Decline Cu ore grade
- Initial investment, operating cost increases



- **Expand target areas of our projects**
- **Partnerships with overseas partners and external organizations**
- **Aggressive study of early stage projects**

# 1) Mineral Resources

## (5) Increasing Production at Existing Mines - Morenci -Cu



Core Business  
Growth Strategy



### Morenci Mine Expansion Project (U.S)

Equity interest ratios	FCX	85%	Total investment \$1.7B
	SMM	12%	
	Sumitomo Corp.	3%	

### Upgrade Plan

	Current Status	2014
Mining output	635kt/day	815kt/day
Concentration Capacity	50kt/day	115kt/day
Production volume of copper	280kt/year	400kt/year

SMM +14kt

### Schedule

- 2014 Q2 Complete construction
- 2014 Q3 Full Production

# 1) Mineral Resources

## (5) Increasing Production at Existing Mines - Cerro Verde -Cu



Core Business  
Growth Strategy



### Cerro Verde Mine Expansion Project (Peru)

Equity interest ratios	FCX	53.56%	Total investment \$4.4B
	SMM	16.80%	
	Sumitomo Corp.	4.20%	
	Other	25.44%	

### Upgrade Plan

	Current Status	2016
Mining output	320kt/day	850kt/day
Concentration Capacity	120kt/day	360kt/day
Production volume of copper	300kt/year	500kt/year

➔

SMM +34kt

### Schedule

- 2013 Q2 Complete final planning (including financing)
- 2013 Start construction
- By the end of 2015 Full production
- Planned for 30 years of operation



# 1) Mineral Resources

## (5) Increasing Production at Existing Mines - Northparkes -Cu



Core Business  
Growth Strategy



### Northparkes Mine Expansion Project (Australia)

Equity interest ratios		
	Rio Tinto	80.0%
	SMM	13.3%
	Sumitomo Corp.	6.7%

### Upgrade Plan

	Current Status		2016
Ore dressing capacity	5.8Mt/year	➔	Investigating 30Mt/year
Production volume of copper	38kt/year		150kt/year is under consideration

SMM +15kt

### Step Change Project

Plan to expand the scale of production by developing the bottom of three existing ore bodies and one new ore body (development through block caving)

### Schedule

- 2013 Complete pre-F/S
- 2016 Planned for full production to start



### Hishikari Mine

#### Production volumes in the 12 3-Yr Plan

Total production volume for FY 2013-2015: 21 tons per three years

- Establishment of stable mining systems
- Planned production at of bonanzas (high grade zones)

#### Develop lower ore bodies

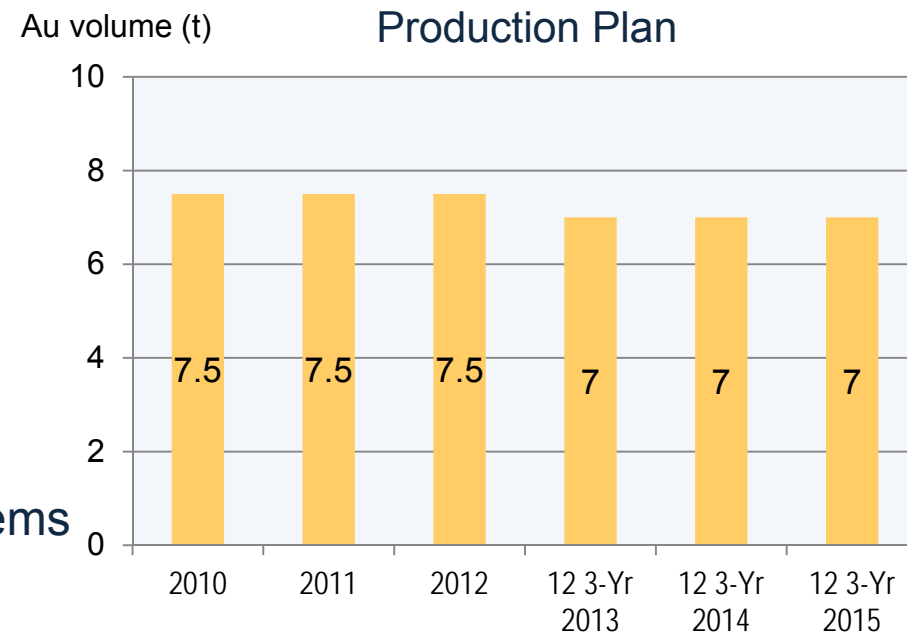
- Installed hot spring drawdown equipment at 80ML below sea level
- Mining scheduled to start in 2018  
Expected new Au : 30t

#### Continue active exploration

- Explore unexplored areas and undeveloped veins

#### Strengthen low-cost operating systems

- Deal with cost increases through deeper mining  
Face consolidation, loss reductions in ore preparation, energy-saving policies





### Pogo Mine

#### Production volumes in the 12 3-Yr Business Plan

Maintenance of stable mined quantities and production quantities through efficiency improvements

- Continue mining from the Liese deposit as planned
- Improve the mill recovery rate

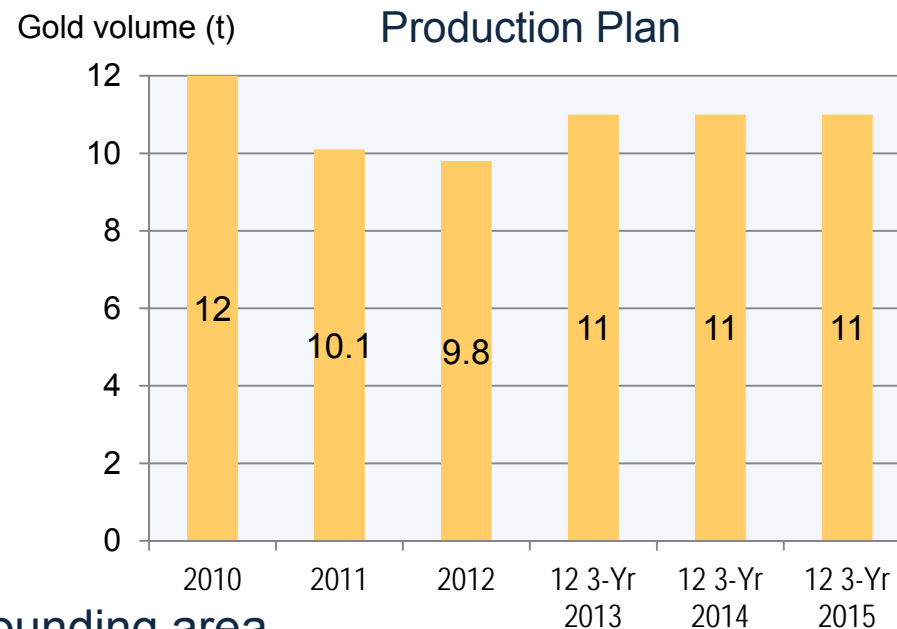
#### East Deep deposit development

- Resource: 40t of gold
- Schedule
  - 2013: Exploratory mining begins
  - 2014: Portal is constructed, Commercial mining begins

#### Cost-cutting efforts

- Deal with increasingly remote locations and lower grade resources

#### Continuation of exploration in surrounding area

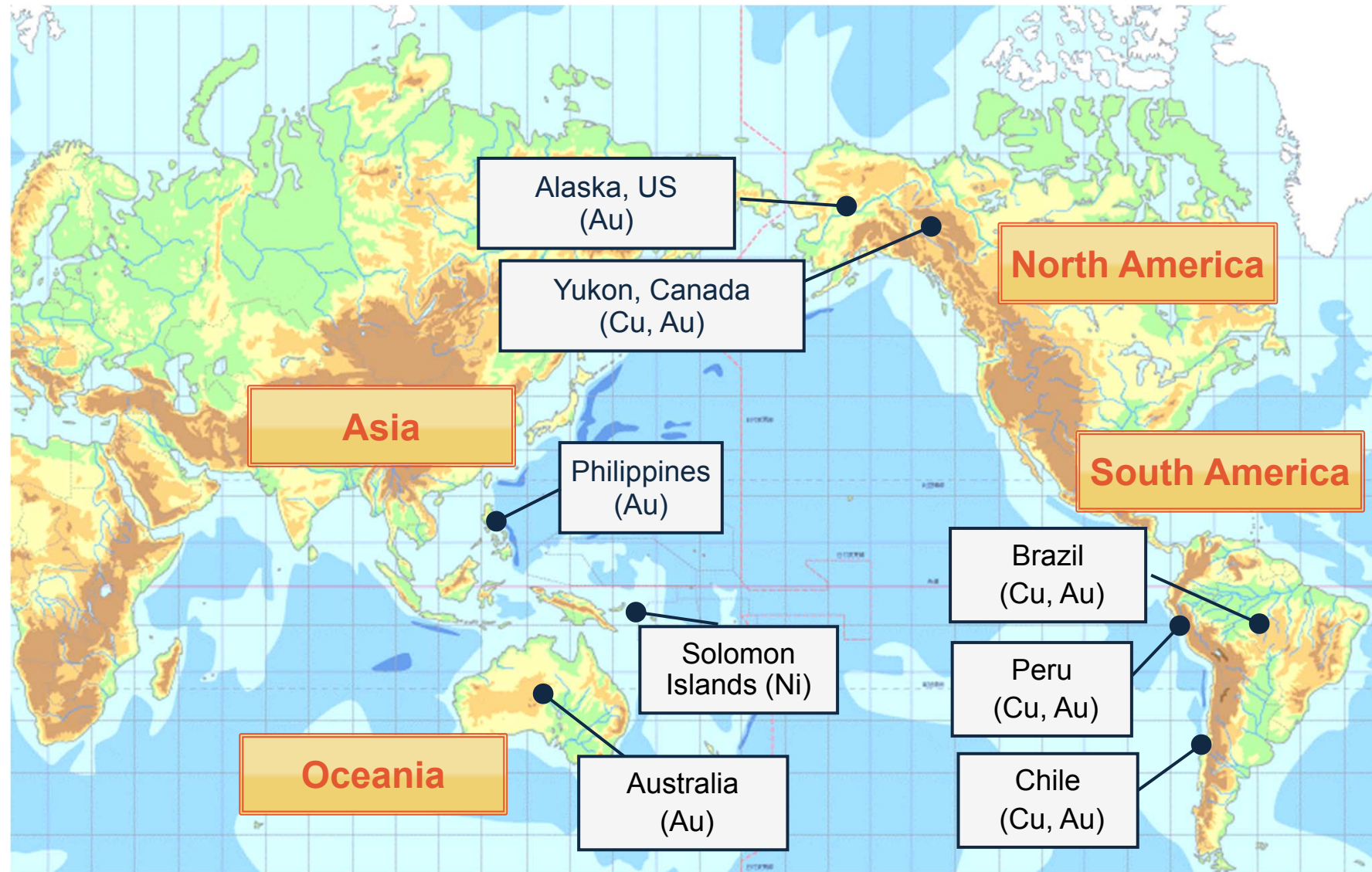


# 1) Mineral Resources

## (7) Exploration by SMM – Worldwide



Core Business  
Growth Strategy





# 1) Mineral Resources

## (7) Exploration by SMM - Stone Boy(Au) / Solomon (Ni)

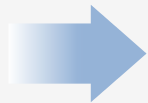


Core Business  
Growth Strategy

### Stone Boy Project

#### 12 3-Yr Plan

- Conduct environmental surveys, pre-FS
- Start the final FS during the 3-Yr Plan period
- Implement permitting procedures



Move toward planting  
during the 15 3-Yr Plan



### Solomon Project

#### 12 3-Yr Plan

- Conduct environmental surveys, pre-FS
- Continue to conduct exploration surveys
- Apply for mining rights, make development preparations

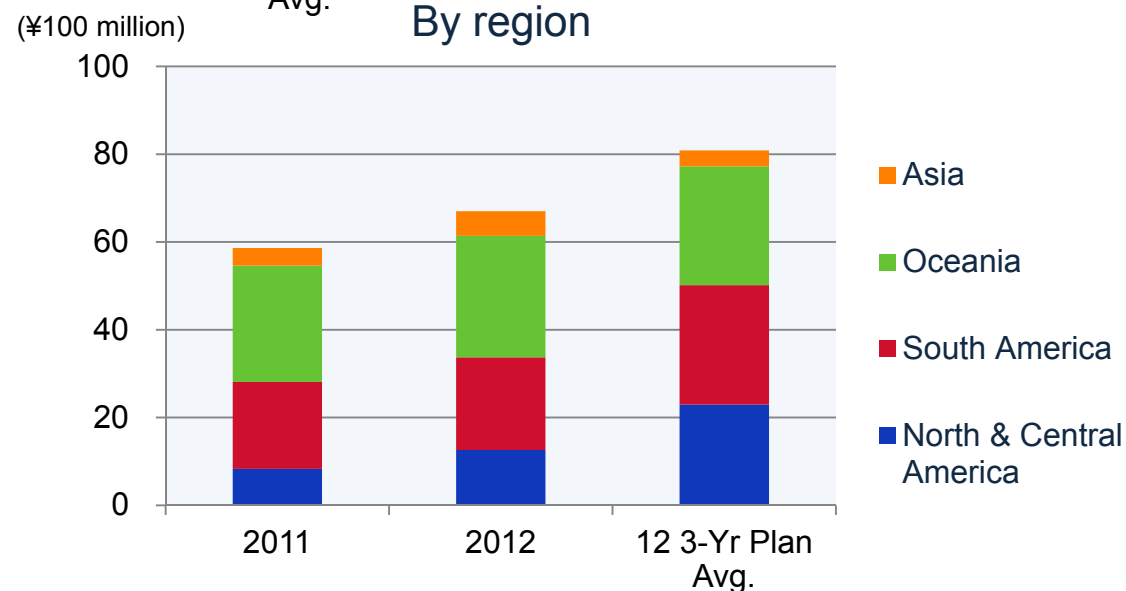
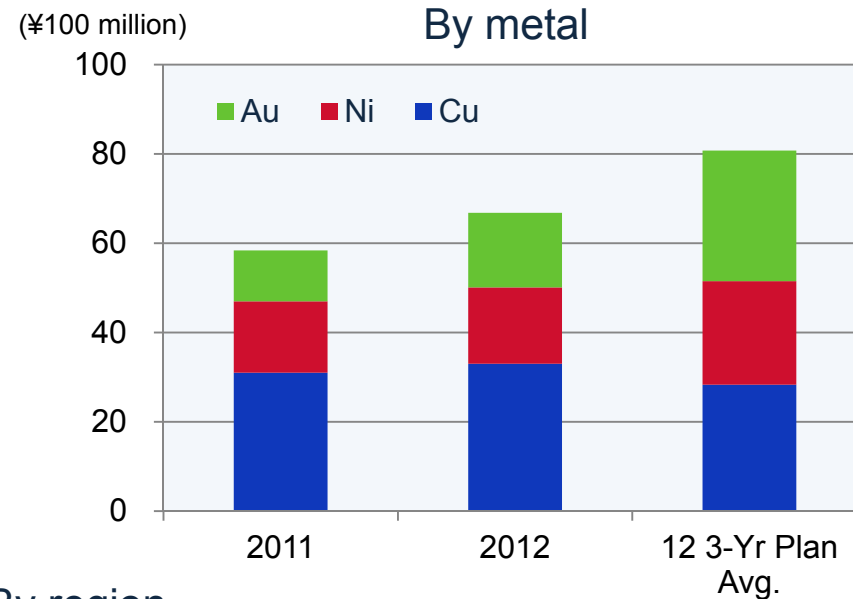
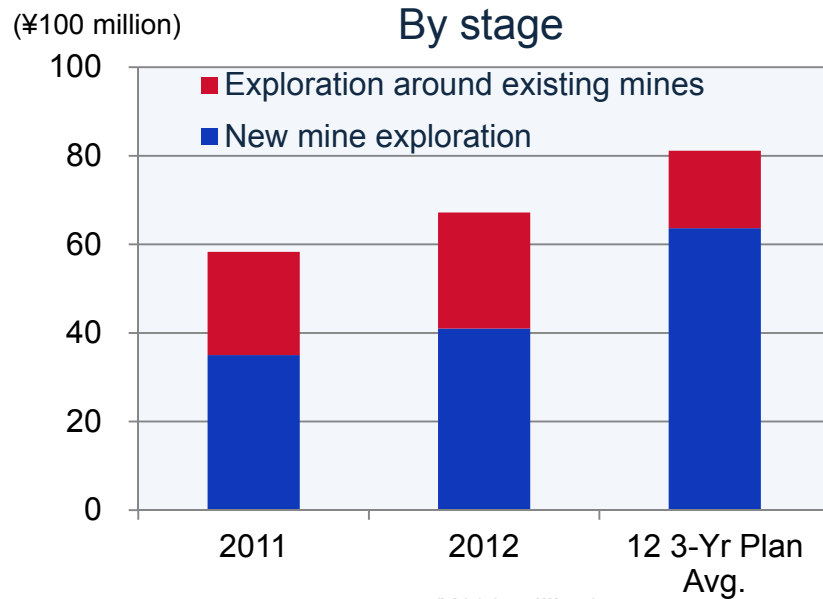


# 1) Mineral Resources

## (7) Promotion of Exploration by SMM - Exploration Costs



Core Business  
Growth Strategy



## 2) Smelting & Refining

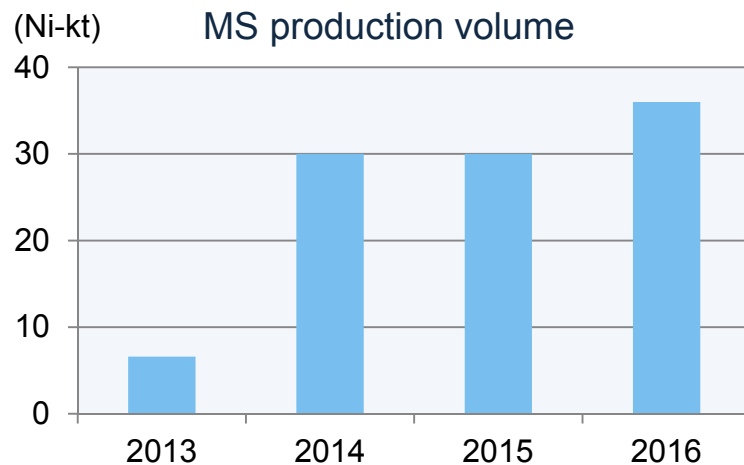
### (1) Establish a 100kt Capacity for Ni - Taganito Project



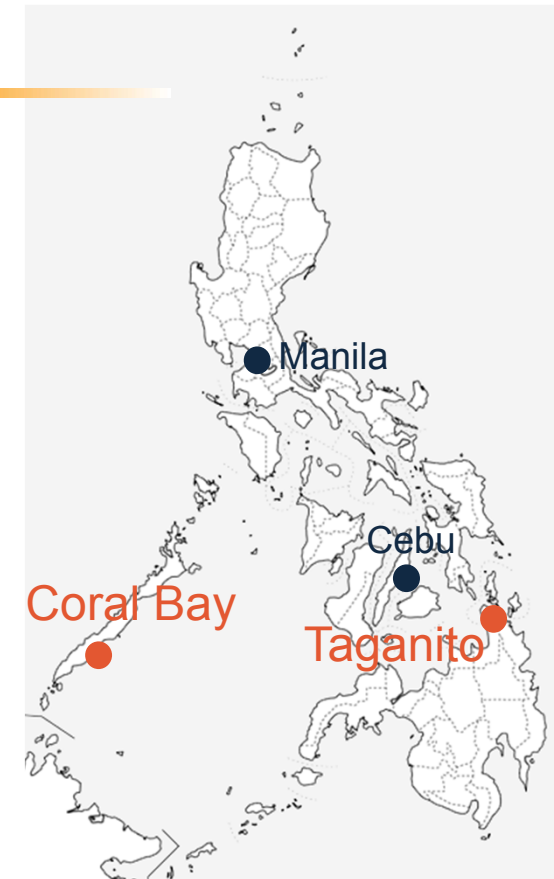
Core Business  
Growth Strategy

## Taganito Project

- Implementation decided in 2009
- Start commercial production in Autumn 2013



Production starts with 30kt per year capacity  
→ **36kt capacity in 2016**  
**(20% increase in production)**



Investment  
amount

**\$1.6B**

(up to the start of  
commercial production)

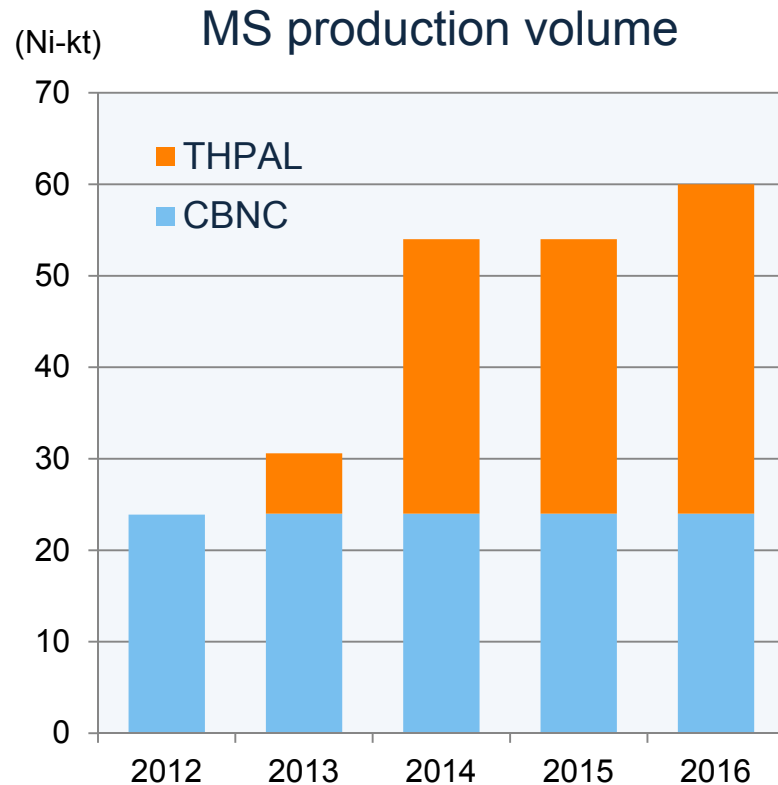


## 2) Smelting & Refining

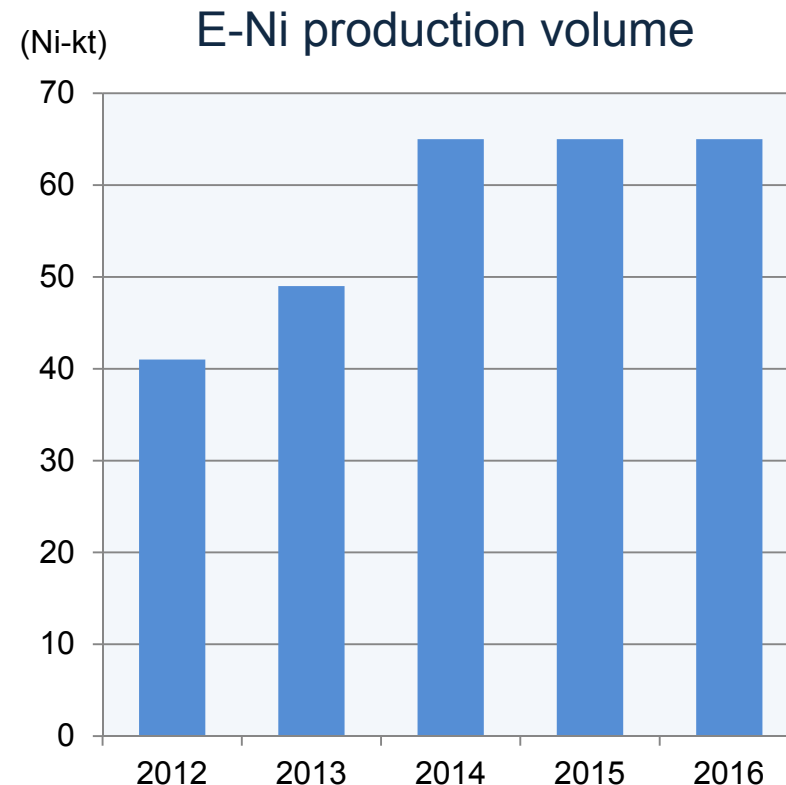
(2) Establish a 100kt Capacity for Ni - MS / Electrolytic Ni Production Volume



Core Business  
Growth Strategy



In 2016, reach MS production volume of 60k tons (Ni equivalent)



65kt capacity was completed at the end of FY12

# 2) Smelting & Refining

## (3) Upgrade to 150kt capacity of Nickel



### Process development for Second Ni Refinery

- Develop hydrometallurgical refining at the RHPC (Resource & Hydrometallurgy Process Center)

### Projects to secure new mine resources

- Investigate projects in the Philippines and Indonesia
- Take measures with the Indonesian Mining Law (national level negotiations and the procurement of raw materials sources)

	Ni kt/year		
	2012	2013	2021
E-Ni	41	65	65
Second Nickel Refinery			**
Fe-Ni	22	22	22
Other Ni chemical products	7	13	Balance
<b>Total</b>	<b>70</b>	<b>100</b>	<b>150</b>



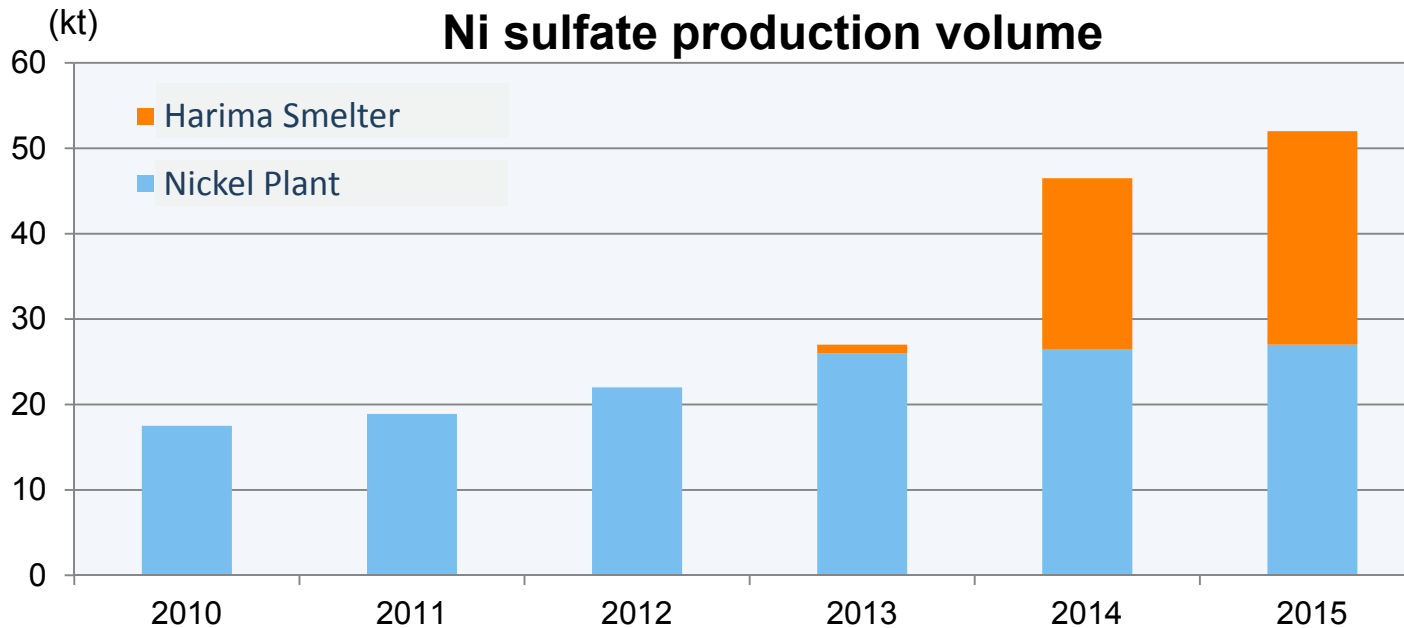
## 2) Smelting & Refining

### (4) Expand the Ni Sulfate capacity



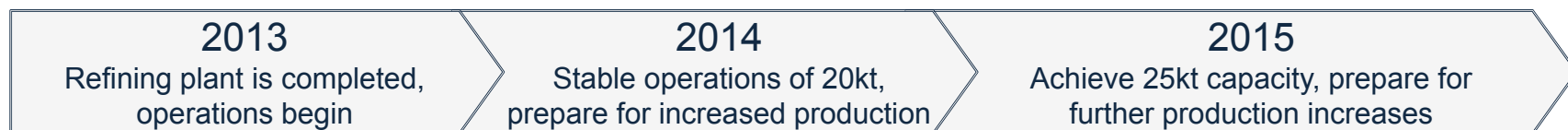
Core Business  
Growth Strategy

(Nickel sulfate volume)



**Expand production capacity  
for the growing battery materials sector**

### Harima's Plant Operations



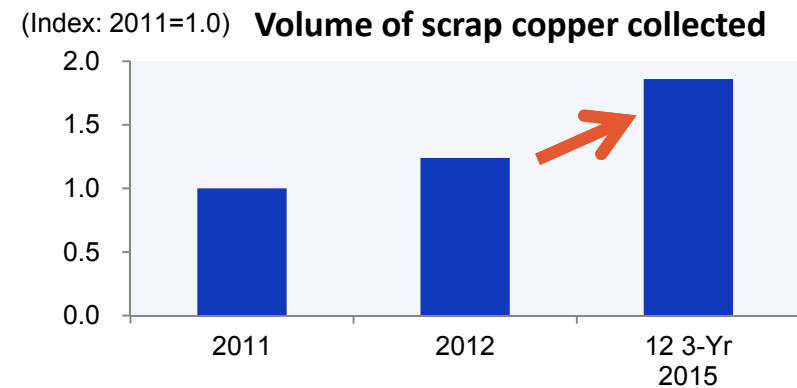
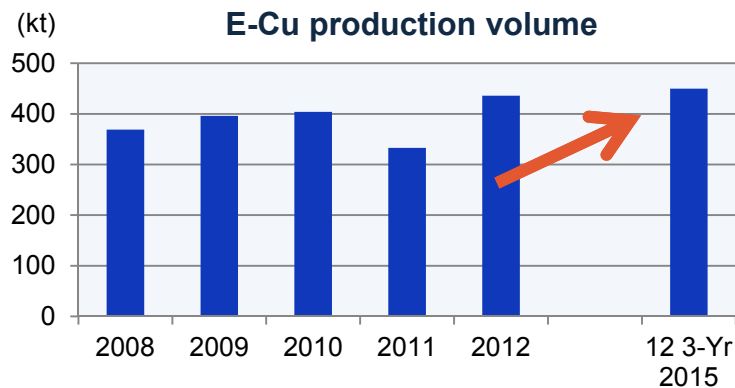
## 2) Smelting & Refining

### (5) Strengthen Competitiveness of Toyo Smelter & Refinery (Cu)



Core Business  
Growth Strategy

## 2015: Achieve electrolytic copper production of 450kt/year

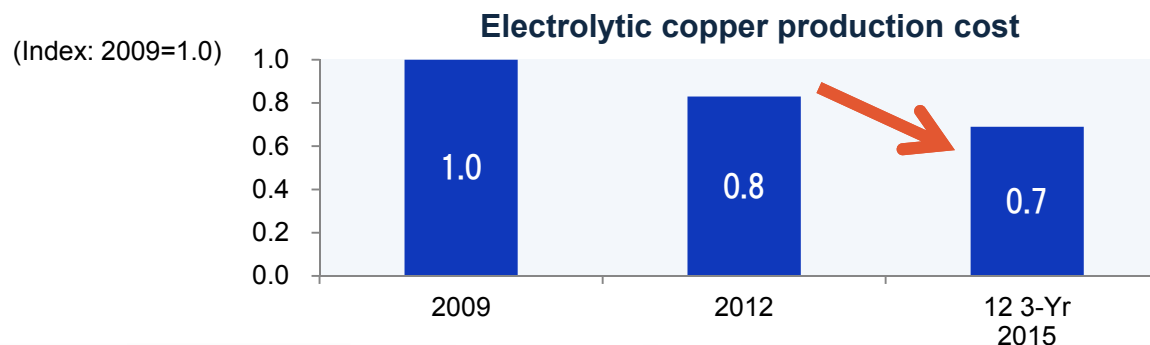


Smelting : Achieve stable operations through burner development, etc.

Electrolysis: Achieve high-load operations while maintaining product quality

⇒ Secure electrolytic copper production volumes

## Improve revenues through cost reductions



# 3) Materials



Core Business  
Growth Strategy

(1) Pursue Selection and Consolidation, Complete Business Structure Changes

## Goals of the 12 3-Yr Business Plan

- Achieve profit goals by investing management resources in growth businesses
- Achieve sound results in our competitive, solid foundation businesses
- Pursue further R&D partnerships, bring new materials to market based on market needs



# 3) Materials

## (2) Expand the Battery Materials Business



Core Business  
Growth Strategy

### Long-Term Vision for the Expansion of the Battery Materials Business



**Increase our share of the worldwide xEV battery materials sector to 25% or higher**

#### 2012 3-Yr Plan strategy and measures

##### Respond to Toyota's xEV expansion strategy

- Maintain our top share of the market nickel hydroxide for HEV
- Take firm steps to adapt to the shift to lithium-ion battery materials

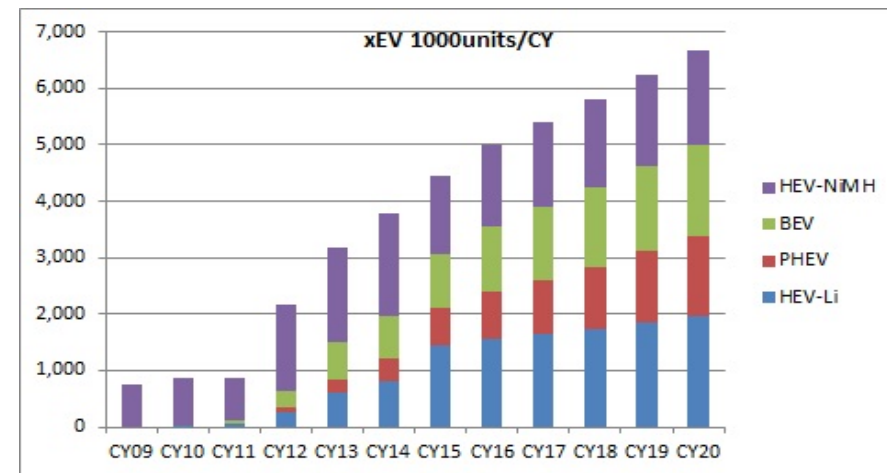
##### Promote for next-generation batteries (develop new markets)

- Make high performance batteries (capacity, output, durability)
- Grow our market share through cost reductions
- New high capacity materials

##### Propose new business models

- Respond to customer needs with a comprehensive business model that includes  
Raw Materials → Precursors →  
Cathode Materials → Recycling

#### Demand forecast for xEV



From survey company's B3 report



## Long-Term Vision



**Sapphire substrates: Secure 30% of the LED lighting market**

### 2012 3-Year Plan strategy and measures

#### Sapphire Substrates

- Achieve 400φ, 3-bar extraction technologies
- Improve cost competitiveness through manufacturing process improvements
- Acquire new customers





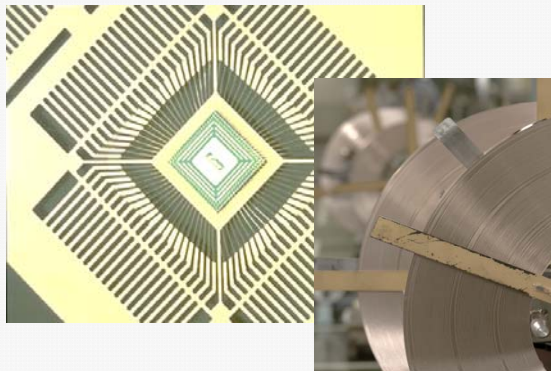
# 3) Materials

(4) Achieve Expected Effects in the Lead Frame Business Integration



Core Business  
Growth Strategy

## Entry into the power semiconductor applications



Synergistic effects of overseas business network

- Expand sales of lead frames for power semiconductors using our overseas business network

Synergistic effects in technology

- SMM's precision processing technologies
- Hitachi Cable's thicker material bending technologies
- Work on new products

## Vertical integration

Improve competitiveness in materials development and procurement through capital investment in Hitachi Cable's copper products business

## Structural reforms

Make effective use of production equipment and facilities  
Construct efficient production systems



Total effect: ¥1 billion/year

# 4) R&D - Process and Equipment Development



## Resource & Hydrometallurgy Process Center (RHPC) (Specializing in Ni meantime)

	2012	2013	2014	2015	2016	2017
Process development for the Second Ni Plant		RHPC Building construction				
			Pilot demo plant testing			
MCLE technology innovations				Mid-scale testing		
HPAL technology innovations					Mid-scale continuous process test	

## Battery Research Laboratories

Multifaceted involvement in vehicle batteries	Cost reductions	New product development, strengthening of proprietary technologies
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## Materials Research & Development Center

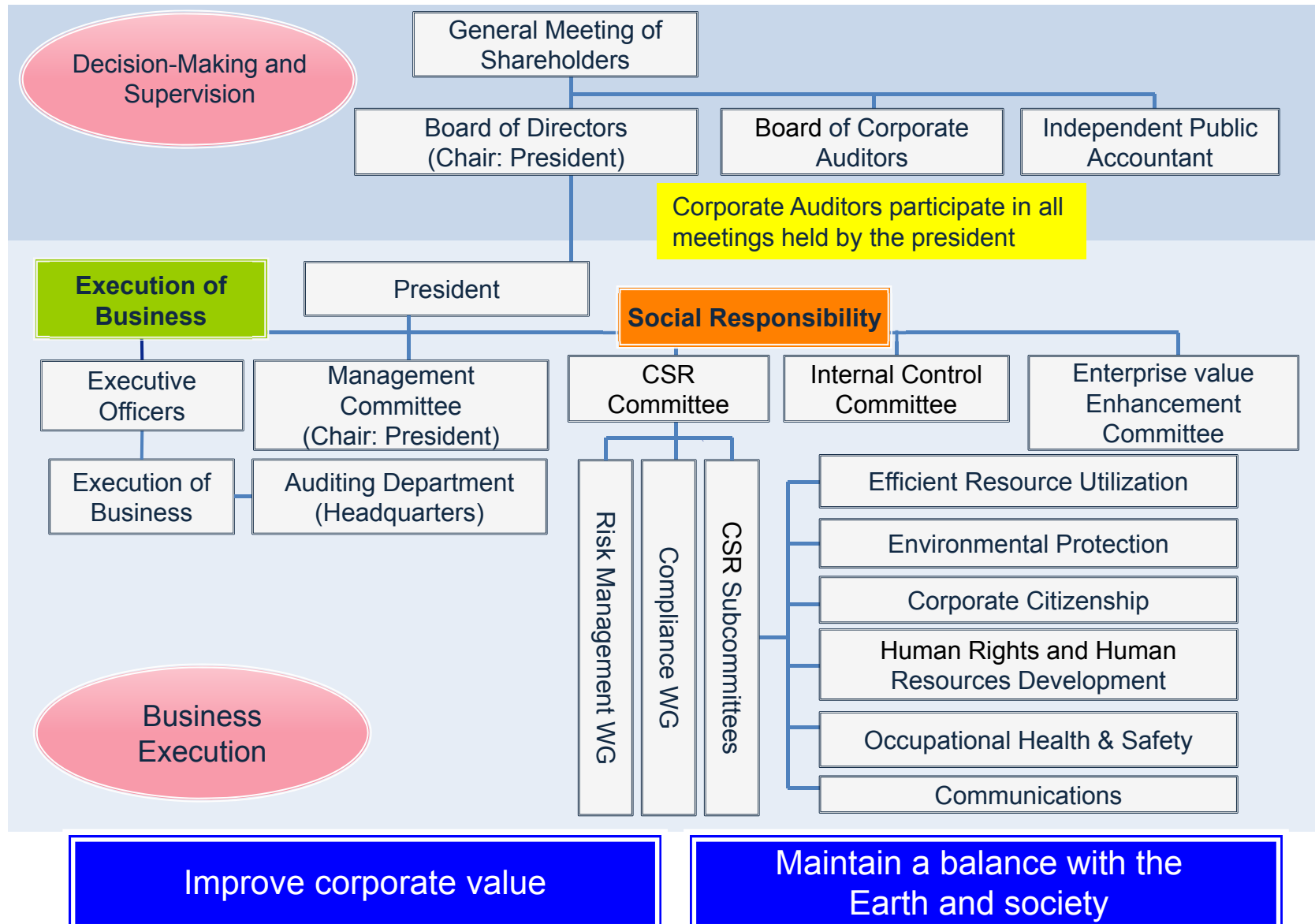
Acceleration of new product development through consolidation of engineers
--

## IV. Platform Reinforcement



Water quality measurements being taken around Coral Bay Nickel Corp.

# 1) Corporate Governance Structure





## 2) CSR Activities

### (1) CSR Policies



Platform  
Reinforcement

1

SMM shall work to **combat global warming** by promoting recycling and effective resource utilization while also targeting technological innovation and continuous improvements in energy efficiency.

2

SMM shall promote **sustainable co-existence with society** by respecting the needs of local communities in which we operate around the world.

3

To continue sound business activities, SMM shall **respect human rights** and shall try to be a company in which **diverse human resources take active parts**.

4

According **safety the highest priority**, SMM shall **provide safe, comfortable working environments** and **seek to eliminate occupational accidents**.

5

SMM shall **strengthen communications with all stakeholders** to build healthy, trust-based relationships.

## 2) CSR Activities



Platform  
Reinforcement

### (2) Vision for 2020 in Six Key CSR Areas

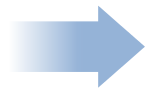
Effective Use of Resources	<ul style="list-style-type: none"> <li>● A company that generates resources using innovative technology</li> </ul>
Environmental Preservation Reduced CO2 emissions (energy savings) and conservation of biodiversity	<ul style="list-style-type: none"> <li>● A company that meets international anti-global warming standards by using advanced technologies</li> </ul>
Contribution to Society and Local Communities	<ul style="list-style-type: none"> <li>● A company in which employees are proud to work along with the company on social contribution activities rooted in the area</li> </ul>
Respect for People and Human Rights	<ul style="list-style-type: none"> <li>● A company that respects human rights and diversity of employees, develops employees with high awareness of human rights, and gives equal opportunities depending on motivations to work and abilities of employees</li> <li>● A company that respects human rights of people who are affected by business activities of the SMM Group</li> <li>● A company that does not get involved in complicity with an entity that causes violations of human rights at areas with undeveloped social infrastructure and at troubled areas</li> </ul>
Occupational Health & Safety	<ul style="list-style-type: none"> <li>● A company that accords safety the highest priority and provides comfortable working environments</li> </ul>
Stakeholder Communication	<ul style="list-style-type: none"> <li>● A company that is open to communication with stakeholder groups worldwide</li> </ul>

# 3) Safety & Health Initiatives

## Vision for 2020

Occupational Health & Safety

A company that accords safety the highest priority and provides comfortable working environments



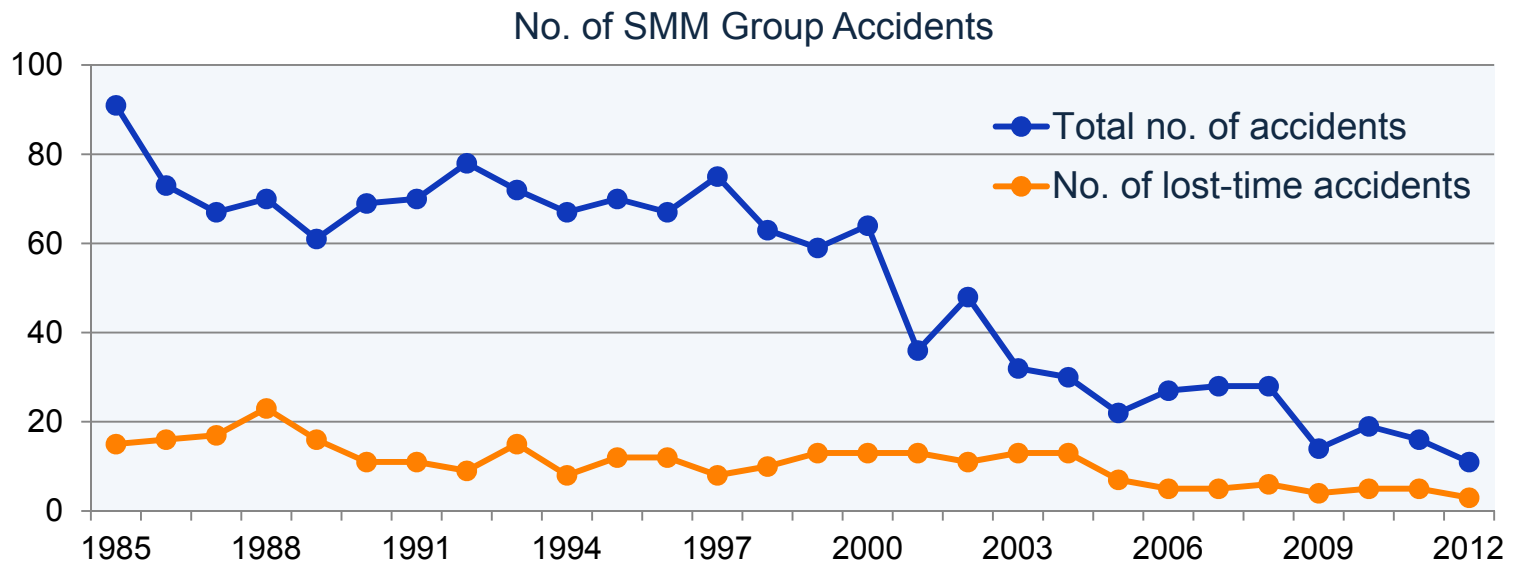
2013 Target

**SMM Group**

3 or fewer lost-time accidents, 10 or fewer total accidents

**Partner Companies**

2 or fewer lost-time accidents, 4 or fewer total accidents





### SMM Group human rights policies (key elements)

1. Compliance with domestic laws and ordinances, as well as international standards in regards to human rights
2. No discrimination
3. Prevention of child labor and forced labor
4. Establishment of appropriate measures and procedures for responding to human rights problems if they should occur
5. Ongoing implementation of human rights awareness and outreach activities

Development of new human rights training in response to globalization

Survey of human rights initiatives in the supply chain

Encouragement of a strong awareness of human rights among employees

### Human resources development initiatives

International employee development

Next-generation senior management development

Securing a diverse workforce and engaging work environments

### Changes in our takeover defense measures

- Introduced at 2007 General Meeting of Shareholders (GMS), renewed at 2010 GMS
- A proposal for renewal is expected to be submitted at the 2013 GMS

#### No change in basic approach

Large scale acquisition that does not contribute to our corporate value or the common interest of the shareholders

Need to secure our corporate value and the common benefit of shareholders by taking necessary and reasonable measures

Minor revisions to takeover defense scheme to achieve improved transparency and clarity



## V. Financial Information and Supplementary Materials



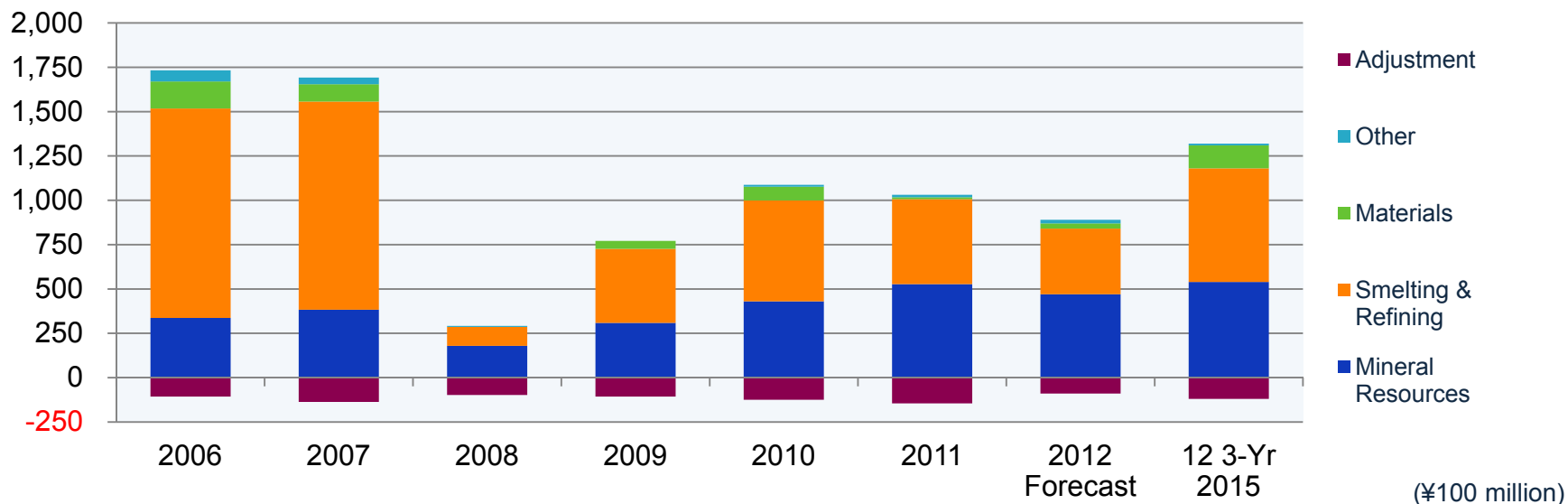
The Old Besshi Copper Mine  
(Kanki-ko/Kanto-ko Pits)

# 1) Performance Trends

	2006	2007	2008	2009	2010	2011	2012 Forecast	12 3-Yr 2015
Net sales (¥100 million)	9,668	11,324	7,938	7,258	8,641	8,479	7,790	9,100
Operating income (¥100 million)	1,627	1,555	107	663	962	886	800	1,200
Recurring profit (¥100 million)	2,054	2,179	328	879	1,238	1,088	950	1,500
Equity method profit (¥100 million)	467	740	315	261	348	232	160	360
Net income (¥100 million)	1,261	1,379	221	540	841	653	730	1,000
ROA (%)	14.8	13.6	2.2	5.8	8.3	5.9	6	7
ROE (%)	29.0	25.4	4.0	9.9	13.8	10.1	10	12
Dividend per share (¥)	27.0	30.0	13.0	20.0	32.0	28.0	28.0	N/A
Copper (\$/T)	6,970	7,584	5,864	6,101	8,140	8,485	7,873	7,500
Nickel (\$/lb)	14.0	15.5	7.5	7.7	10.7	9.6	7.7	9.0
Gold (\$/toz)	629	766	867	1,023	1,294	1,646	1,658	1,550
Zinc (\$/T)	3,579	2,986	1,560	1,934	2,187	2,101	1,942	1,800
Forex (¥/\$)	117.0	114.4	100.7	92.9	85.7	79.1	81.3	80.0

## 2) Operating Income by Segment

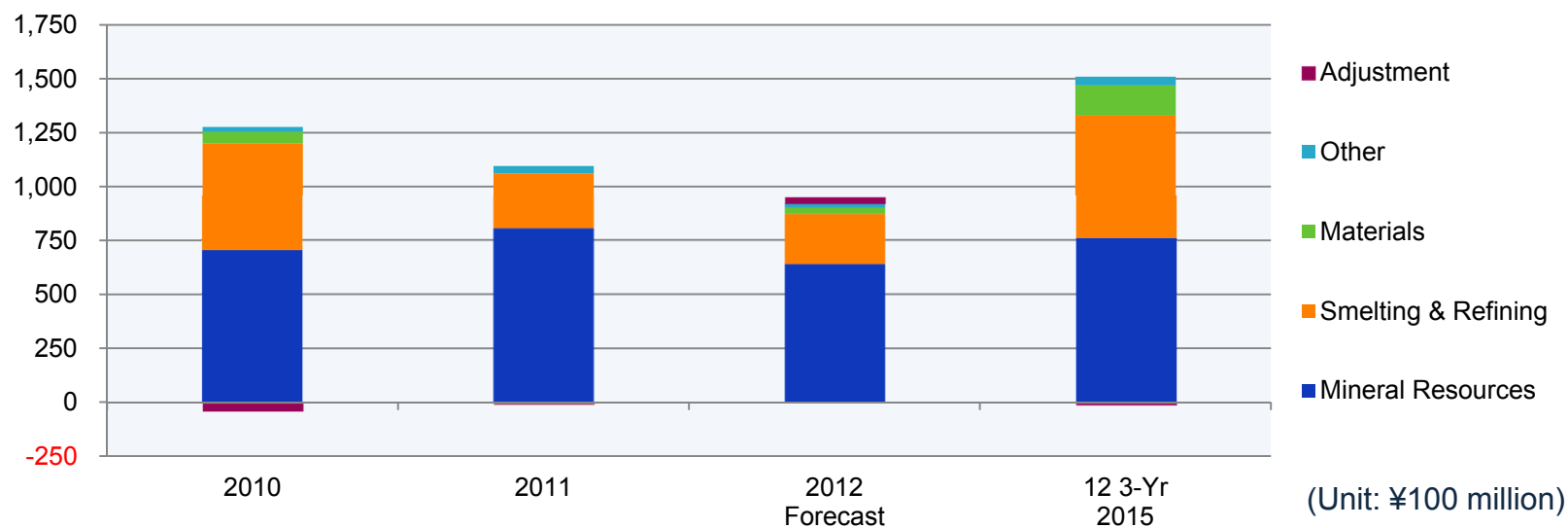
(¥100 million)



	2006	2007	2008	2009	2010	2011	2012 Forecast	12 3-Yr 2015
Mineral Resources	338	384	181	309	432	528	470	540
Smelting & Refining	1,181	1,174	107	417	569	480	370	640
Materials	152	98	-87	45	78	10	30	130
Other	63	37	6	-1	10	14	20	10
Adjustment	-107	-138	-100	-107	-127	-146	-90	-120
Total	1,627	1,555	107	663	962	886	800	1,200

# 3) Segment Profit

(¥100 million)



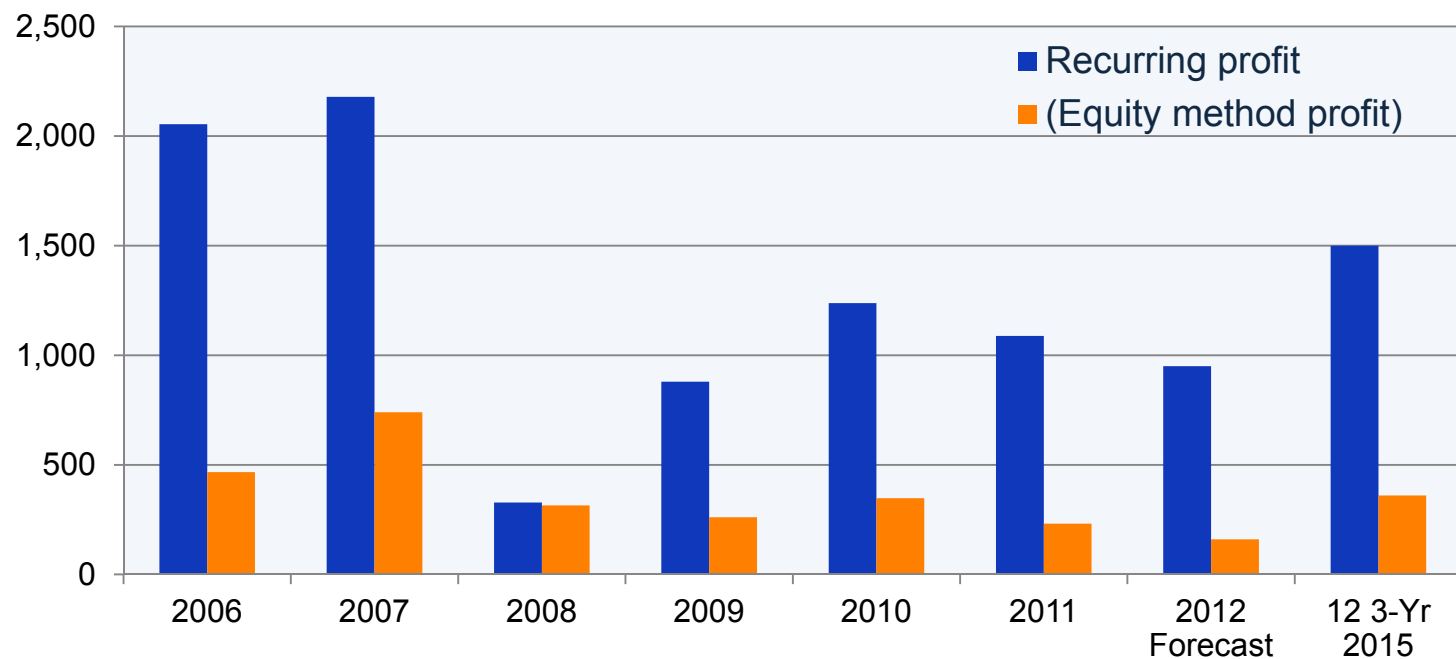
		2010	2011	2012 Forecast	12 3-Yr 2015※
Segment profit	Mineral Resources	705	806	640	760
	Smelting & Refining	495	256	230	640
	Materials	54	-3	30	120
	Other	23	34	20	40
Adjustment amount		-39	-5	30	-60
Recurring profit		1,238	1,088	950	1,500

※FY2010-FY2012 : Contribution Margin (Earlier Bases) 12 3-Yr 2015 : New Segment Profit



## 4) Recurring Profit / Equity Method Profit

(¥100 million)

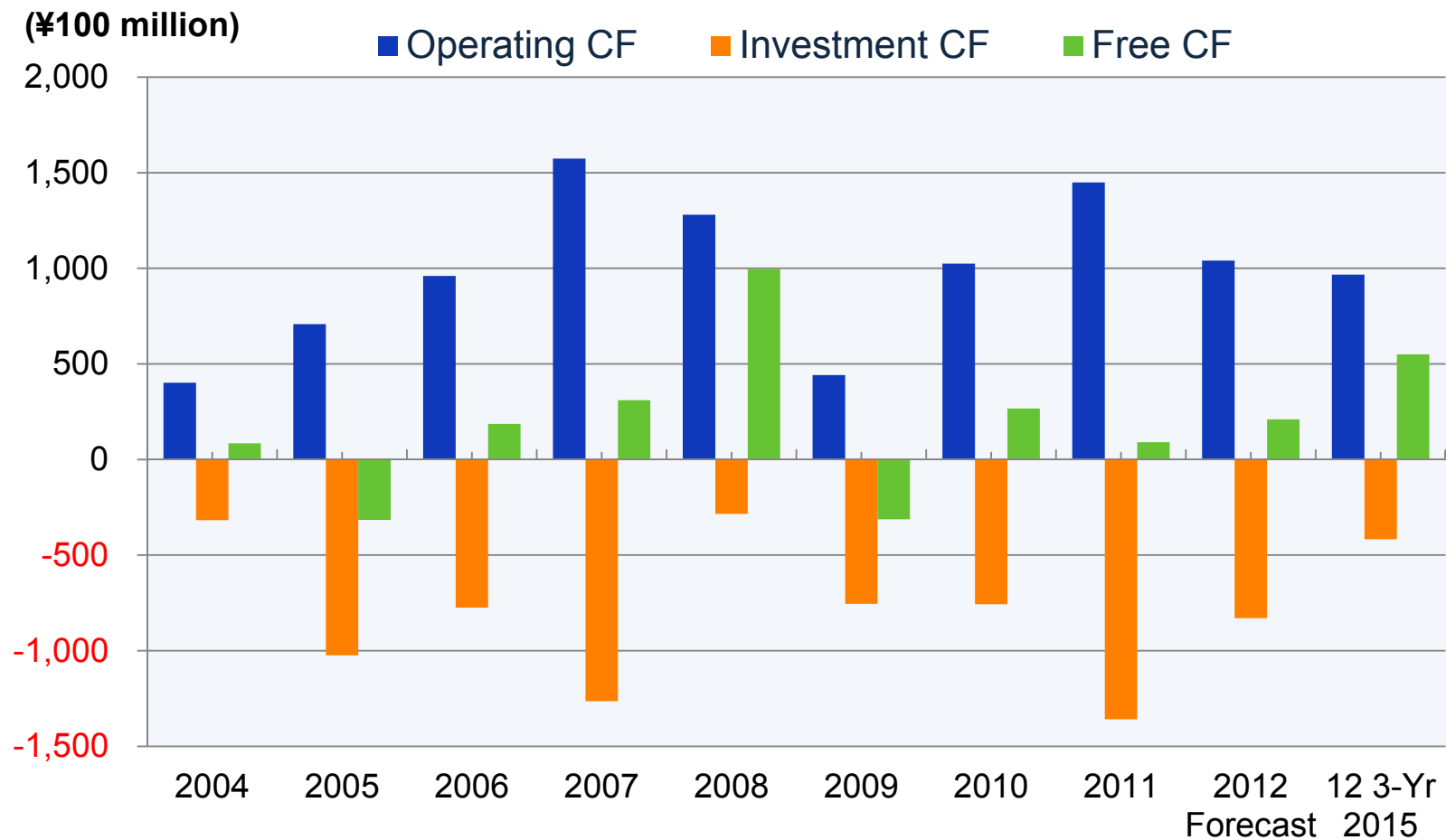


(Unit: ¥100 million)

	2006	2007	2008	2009	2010	2011	2012 Forecast	12 3-Yr 2015
Recurring profit	2,054	2,179	328	879	1,238	1,088	950	1,500
(Equity method profit)	467	740	315	261	348	232	160	360



# 5) Cash Flow Trends



## 6) Balance Sheet and Cash Flow Projections

### Balance Sheet Projections

(¥100 million)

	End Mar. 2016 projection	2013 March Forecast	Change
Current assets	5,900	5,190	710
Fixed assets	8,400	7,050	1,350
<b>Total assets</b>	<b>14,300</b>	<b>12,240</b>	<b>2,060</b>
Interest-bearing debt	3,100	3,170	-70
Other liabilities	1,500	1,390	110
<b>Total liabilities</b>	<b>4,600</b>	<b>4,560</b>	<b>40</b>
<b>Total net assets</b>	<b>9,700</b>	<b>7,680</b>	<b>2,020</b>
<b>Total liabilities &amp; net assets</b>	<b>14,300</b>	<b>12,240</b>	<b>2,060</b>
Equity ratio (%)	61%	57%	4%
D/E ratio	0.35	0.46	-0.11
Equity	8,750	6,960	1,790

### Cash Flow Projection (3-Yr Plan)

(¥100 million)

	3-Year Total
Profit before tax	2,400
Depreciation	1,100
Working capital	▲400
Equity method profit/loss	▲900
Equity method dividends	300
<b>Operating cash flow</b>	<b>2,500</b>
<b>Investment activity cash flow</b>	<b>▲1,700</b>
<b>Financial activity cash flow</b>	<b>▲500</b>
<b>Net cash flow</b>	<b>300</b>

## 7) Sensitivity Analysis

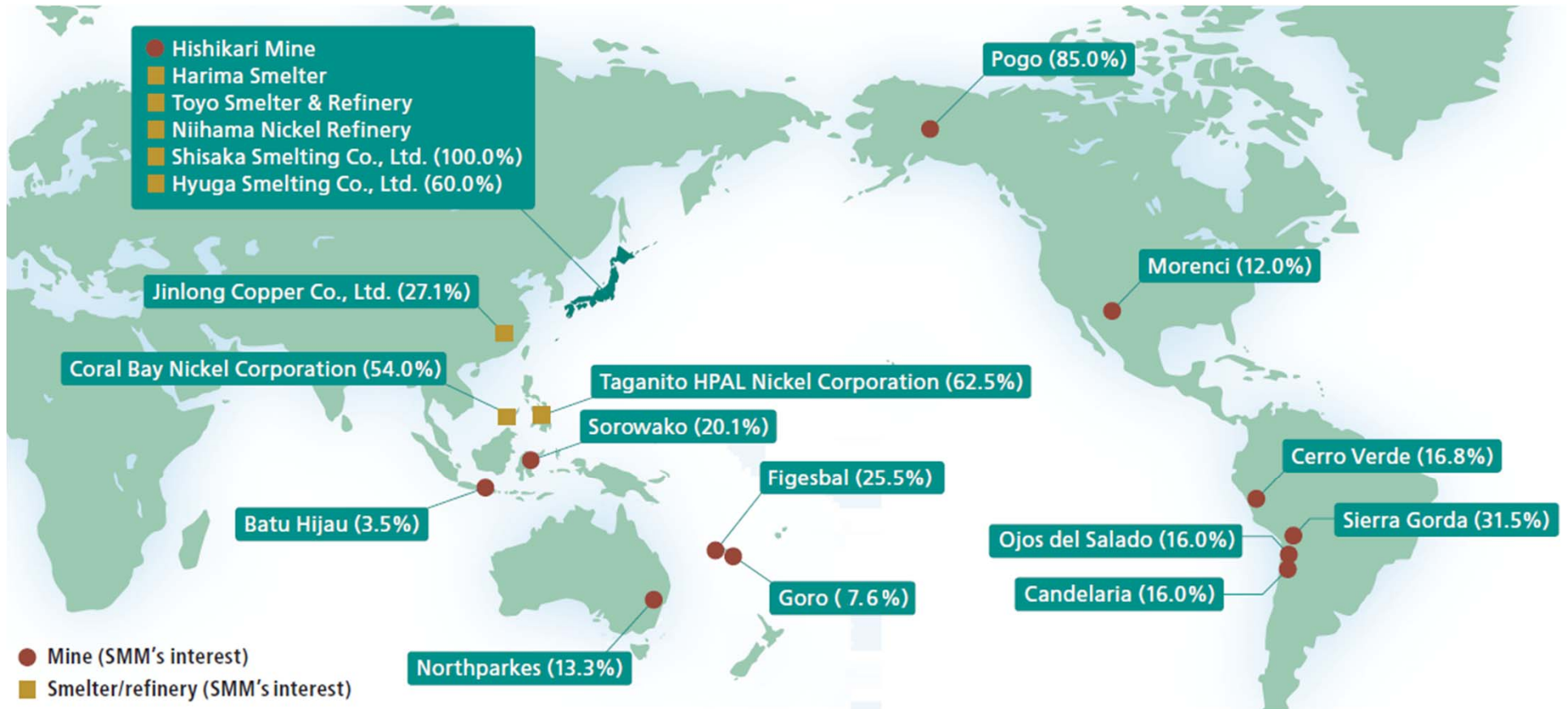
(Unit: ¥100 million)

Element	Degree of variation	FY15 Projection Operating income/ Recurring profit
Cu	±100\$/t	7/17
Ni	±10¢/lb	12/14
Au	±10\$/toz	4/4
¥/\$	±1¥/\$	13/13

Note:

The ¥/\$ figure only reflects exchange rate differences attributed to earnings on metal processing. Exchange rate differences on the performance of overseas subsidiaries when consolidated figures are calculated are not included.

# 8) SMM's Mines and Smelters / Refineries



## Mineral resources and metals

### 1) Metal trading

#### London Metal Exchange (LME)

The LME specializes in trading of non-ferrous metals such as copper, nickel, aluminum, lead and zinc. The LME trading prices for metals are used as the international pricing benchmarks for sales of refined metal and purchases of refining ores.

#### TC/RC

Treatment Charge (TC) and Refining Charge (RC) are commonly used in the terms of purchase for copper concentrate or nickel ore for refining. They are amounts designed to cover refining costs. For example, copper concentrate contracts may define a purchase price based on the LME price at a certain date, minus the TC and RC being used at the time.

#### London fixing

Gold is not traded on the LME. Its price is determined for each transaction between market participants. The financial institutions in the London Bullion Market Association (LBMA) agree a standard price for gold based on these transactions and publish it on the morning and afternoon of each trading day. This “London fixing” price is the benchmark for trading in gold.

#### Pound (lb)

The pound is the standard unit of weight used in measuring and pricing base metals such as copper and nickel, and in TC/RC calculations. One pound is equal to 453.59 grams; a metric ton equals 2,204.62lb.

#### Troy ounce (toz)

The troy ounce is the standard unit of weight for precious metals such as gold and silver. It equals approximately 31.1 grams. It is named after Troyes, a city in the Champagne region of central France that was the site of a major market in Europe in medieval times. Originally used as a unit of exchange for valuing goods in terms of gold or silver weights, the troy ounce is still used today in gold trading.

### 2) Metal refining

#### Smelting and refining

Refining processes extract valuable metals from ores or other raw materials. They fall into two basic types: hydrometallurgical (wet) and pyrometallurgical (dry). At SMM's Toyo facilities in Ehime Prefecture, the copper concentrate pre-processing undertaken at Saijo uses pyrometallurgical processes and the nickel refining at the Niihama site uses hydrometallurgical processes entirely. The term 'smelting' is used for the extraction of metal from ores using melting and heating (pyrometallurgy). The term 'refining' refers to any process that increases the grade or purity of a metal.

#### Pyrometallurgical Smelting

The precursor ore is melted at high temperature in a furnace, and refining techniques are applied to separate the metal in a molten state. Although large amounts of ore can be processed at one time, the equipment needs periodic maintenance for heat proofing.

#### Hydrometallurgical refining

The ore and impurities are dissolved in a solution, and chemical reactions are used to separate out the metal. This approach allows continuous and stable refining, but incurs additional costs due to the refining chemicals consumed.

### 3) Metal ores

#### Sulfide ores

These ores contain copper, nickel or other metals chemically bonded to sulfur. Since the application of heat breaks these bonds, releasing the sulfur, such ores are generally refined using pyrometallurgical techniques.

#### Oxide ores

These ores contain metals in oxidized forms. Unlike sulfide ores, oxides need much more energy to achieve melting. For this reason, the hydrometallurgical approach is generally used to refine these ores.

#### Copper concentrates

Used as raw materials in copper smelting, copper concentrates have a copper content of about 30% by weight. The remainder consists mostly of sulfur and iron. Copper concentrates are made mostly from sulfide ores. Ores extracted from overseas mines have a typical grade of about 1%. The ores are then “dressed” at the mine to increase the purity and produce concentrate. Most of the copper ores imported by SMM for smelting in Japan are concentrates.

#### Nickel oxide ores

Whilst the higher-grade sulfide ores are used predominantly in nickel refining, nickel oxide ores are more prevalent than nickel sulfides. The sulfide-oxide ratio in current nickel reserves is believed to be about 3:7. High refining costs and technical issues have limited use of oxide ores in nickel refining to date, but SMM has succeeded in refining nickel from low-grade oxide ores based on HPAL technology.

#### Mixed sulfide (MS)

CBNC and Taganito produce a mixed nickel-cobalt sulfide intermediate containing about 60% nickel by weight. This is used as a raw material in electrolytic nickel production.

#### Matte

A matte is another term for metal sulfides. For raw material, electrolytic nickel production at SMM also uses a nickel matte (of about 75-80% purity) sourced from PT Inco.

#### 4) Nickel production process

##### Coral Bay Nickel Corporation (CBNC)

Based in the Philippines, this SMM subsidiary produces mixed nickel-cobalt sulfides using HPAL technology and exports the raw materials to the SMM Group's nickel refining facilities in Niihama, Ehime Prefecture.

##### High Pressure Acid Leach (HPAL)

HPAL technology enables the recovery of nickel from nickel oxide ores that traditionally were difficult to process. SMM was the first company in the world to apply it successfully on a commercial scale. The oxide ores are subjected to high temperature and pressure and reacted under stable conditions with sulfuric acid to produce a nickel-rich refining intermediate.

##### Matte Chlorine Leach Electrowinning (MCLE)

MCLE is the technology used in the manufacturing process at SMM's nickel refinery. The matte and mixed sulfide ores are dissolved in chlorine at high pressure to produce high-grade nickel using electrolysis. MCLE is competitive in cost terms, but poses significant operational challenges. Other than SMM, only two companies are producing nickel based on this kind of technology.

#### 5) Main applications for metals

##### Copper

Copper is fabricated into wires, pipes and other forms. Besides power cables, copper is used widely in consumer applications such as wiring in vehicles or houses, and in air conditioning systems.

##### Electrolytic nickel

This form of nickel, which has a purity of at least 99.99%, is used in specialty steels, electronics materials and electroplating, among other applications. SMM is the only producer of electrolytic nickel in Japan.

##### Ferronickel

Ferronickel is an alloy containing nickel (about 20%) and iron. Its main use is in the manufacture of stainless steel, which is about 10% nickel by weight. Based in Hyuga, Miyazaki Prefecture, SMM Group firm Hyuga Smelting produces ferronickel.

##### Gold

Gold is in demand worldwide for investment and decorative purposes. Gold is widely used in Japanese industry within the electronics sector because of its high malleability and ductility.

#### Materials

##### Copper-clad polyimide film (CCPF)

CCPF is a polyimide film that is coated using a copper base. It is used as a material for making COF substrates.

##### Chip-on-film (COF) substrates

COF substrates are electronic packaging materials used to make integrated circuits for LCD drivers. They connect these circuits to the LCD panel.

##### Lead frames (L/F)

Lead frames are electronic packaging materials used to form connections in semiconductor chips and printed circuit boards. They contain thin strips of a metal alloy containing mostly nickel or copper.

##### Secondary batteries

Secondary batteries are ones that can be recharged and used again. SMM supplies battery materials that are used in the anodes of nickel metal hydride batteries and lithium-ion rechargeable batteries, which supply power for hybrid vehicles or notebook computers, among other consumer applications.



# Note

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