

2nd Quarter of FY2013

Progress of Business Strategy

November 2013



SUMITOMO METAL MINING Co., Ltd.

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I .12 3-Yr Business Plan: Management Policy



Inauguration Ceremony, Taganito HPAL

1) Long-Term Vision Targets

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

Targets

World Leader in the Non-Ferrous Metals Industry

FY 2021

Nickel 150kt

Copper
interests 300kt

Gold
interests 30 t

New
materials
Recurring
profit
¥5 billion

Excellent Company of Japan

Net Sales ¥1 trillion

Net Income ¥100 billion

2) Positioning of the 12 3-Yr Business Plan



3) 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 (Mineral Resources)
- Complete the Taganito Project and ensure a smooth launch of operations (Smelting & Refining)
- Implement structural reforms in the Materials Business
and stable acquisition of own profit (Materials)
- 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

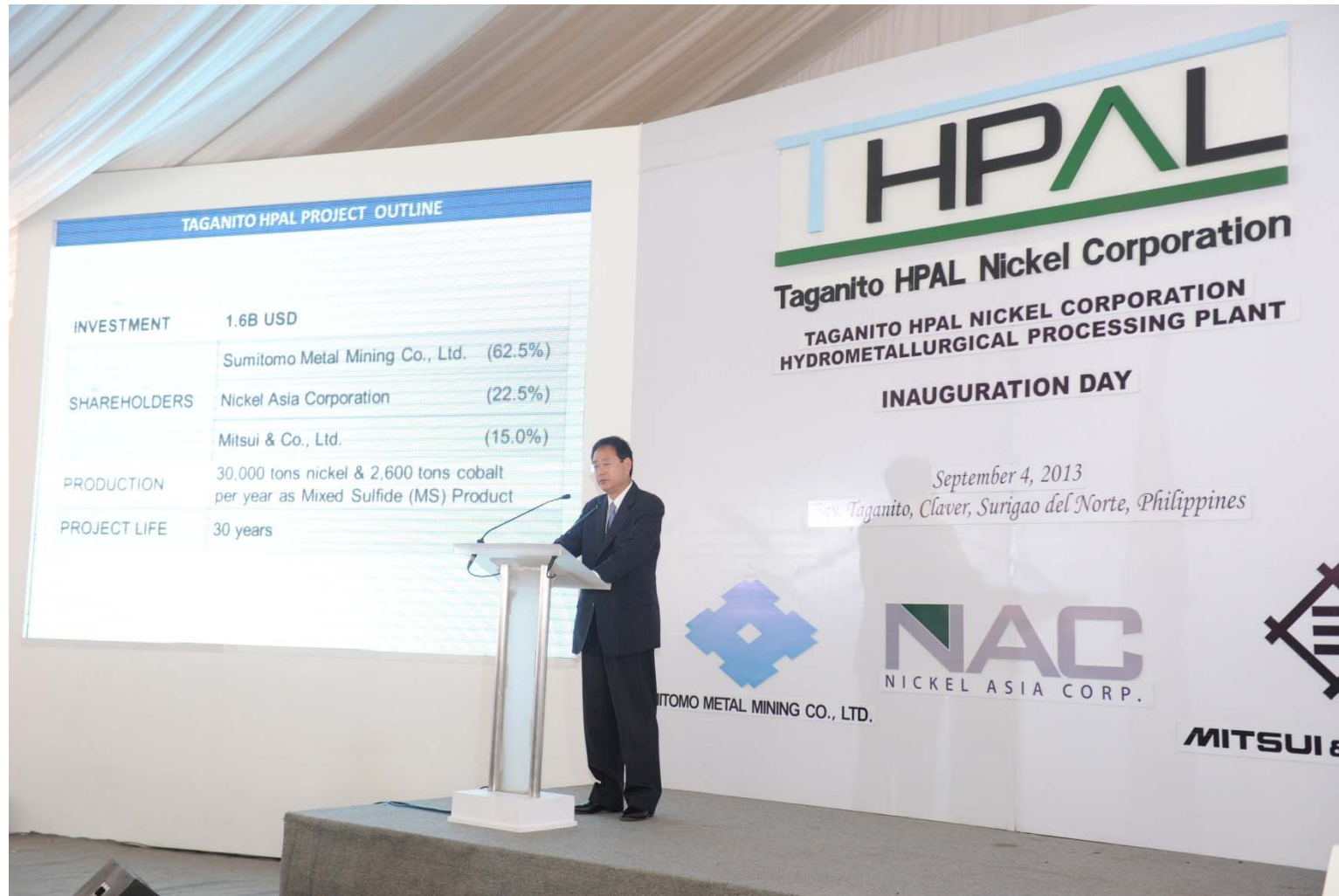
Planting plans for the period covered in the 12 3-Yr Business Plan

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

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

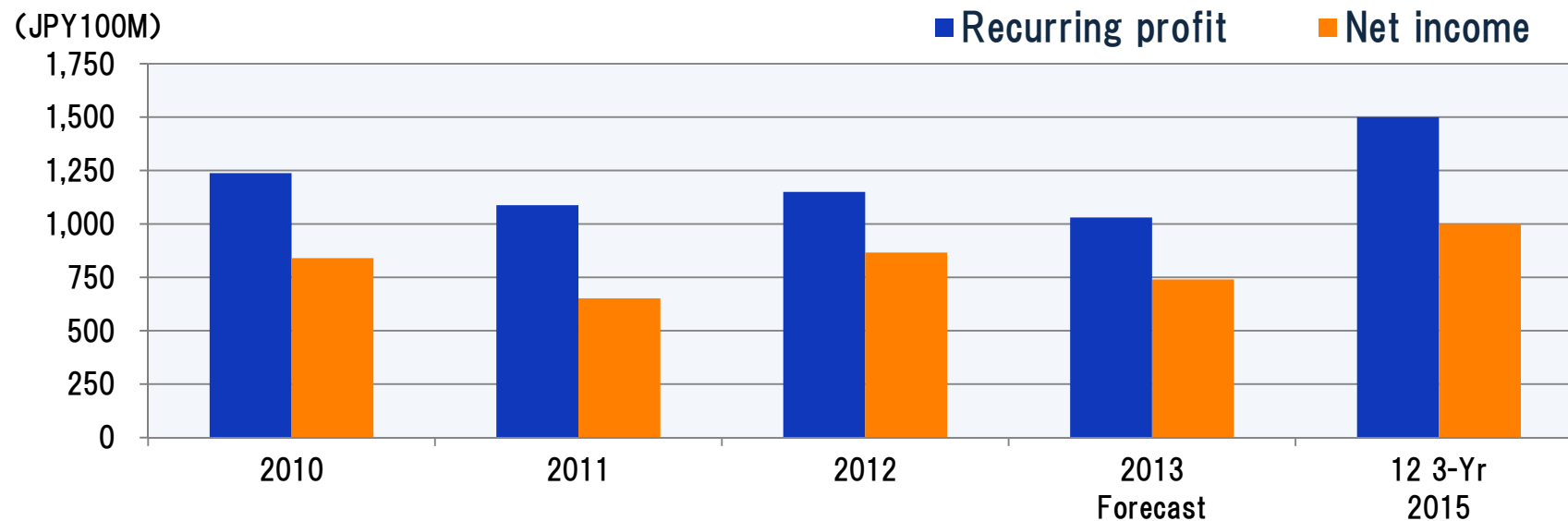
- Own Cu/Au exploration
- Copper mine development projects in North and South America
- Gold mine development projects

II. Trends in Business Performance



Inauguration Ceremony, Taganito HPAL

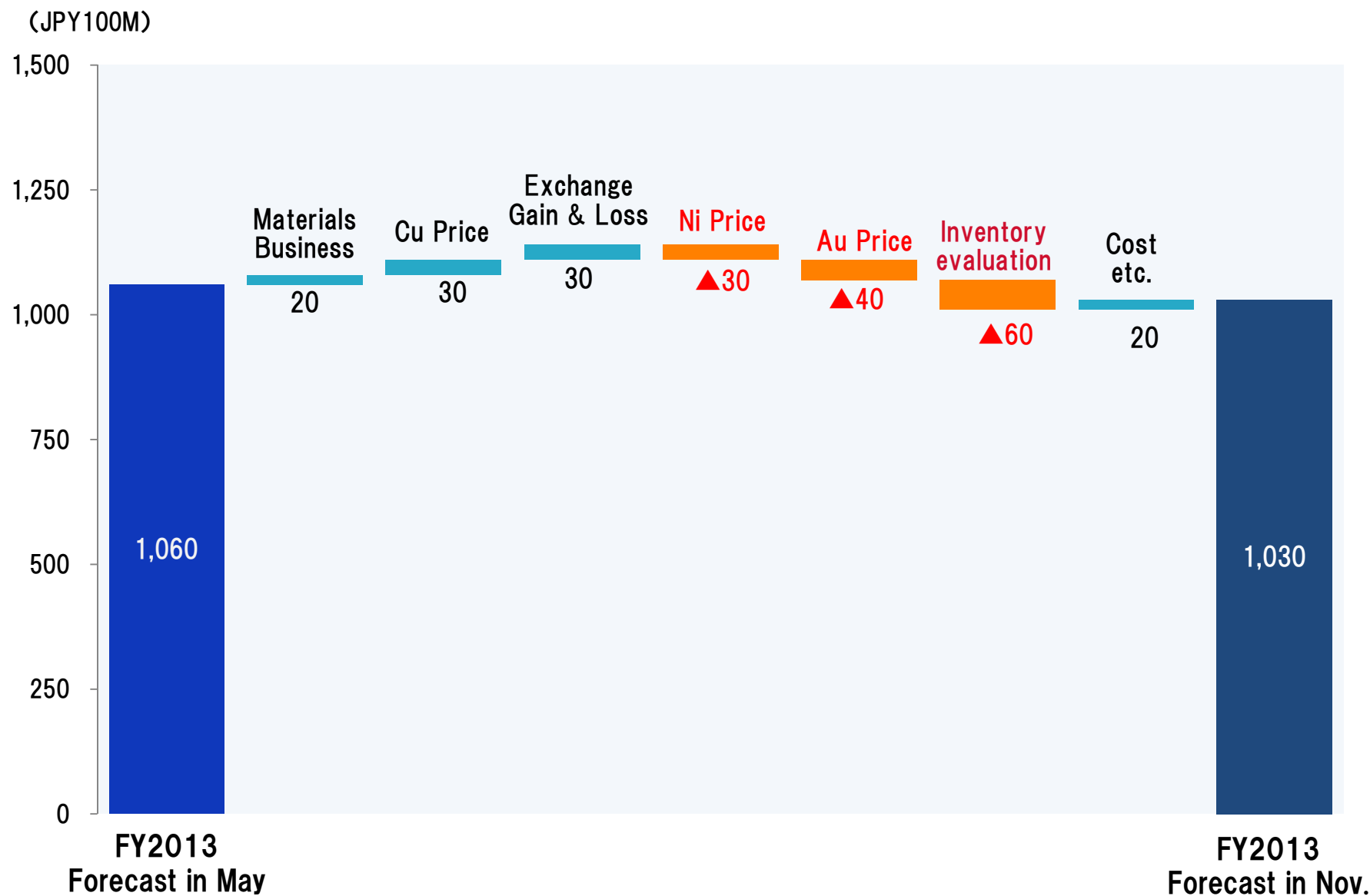
1) Profit Trends



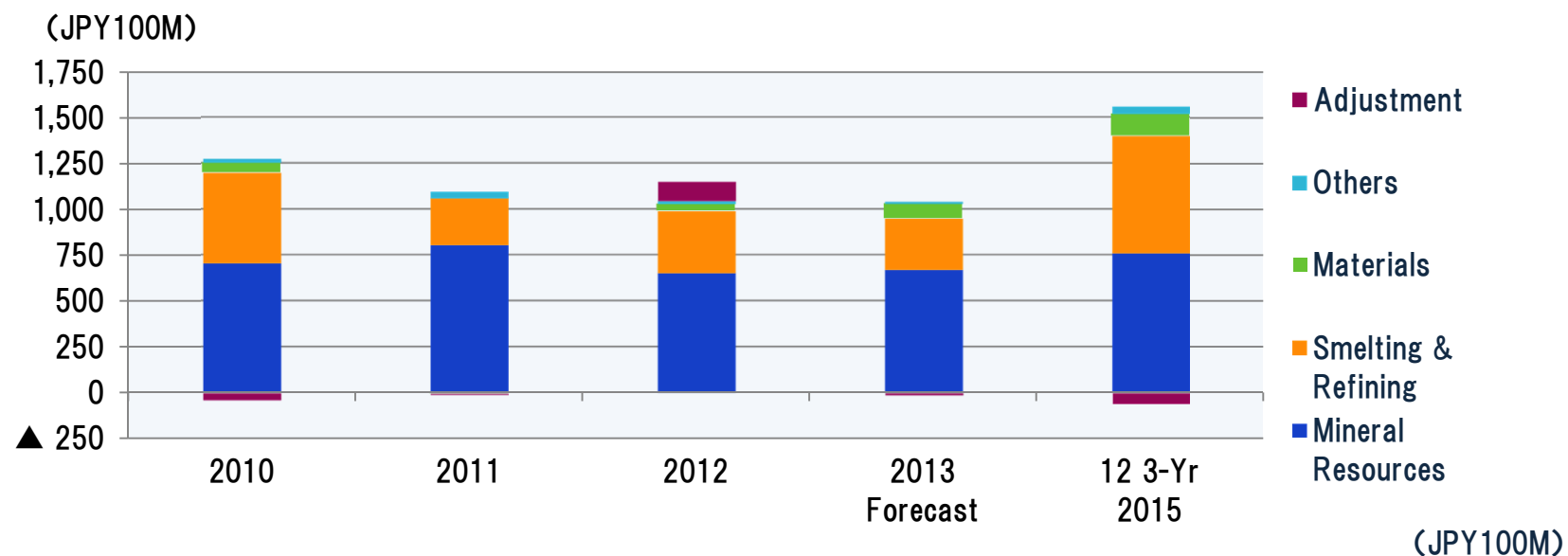
	09 3-Yr 2012	2010	2011	2012	2013 Forecast	12 3-Yr 2015
Recurring profit (JPY100M)	1,100	1,238	1,088	1,150	1,030	1,500
Net income (JPY100M)	700	841	653	866	740	1,000
Cu Price (\$/T)	6,000	8,140	8,485	7,855	7,056	7,500
Ni Price (\$/lb)	8.0	10.7	9.6	7.7	6.4	9.0
Au Price (\$/Toz)	1,000	1,294	1,646	1,654	1,335	1,550
Forex (¥/\$)	90.0	85.7	79.1	83.1	98.4	80.0

2) Recurring Profit Analysis

FY2013 Forecast in May vs in November



3) Profit Trends by Segment



		2010	2011	2012	2013 Forecast	12 3-Yr 2015
✕ Segment profit	Mineral Resources	705	806	652	670	760
	Smelting & Refining	495	256	339	280	640
	Materials	54	14	38	80	120
	Others	23	19	16	10	40
Adjustment		▲39	▲7	105	▲10	▲60
Recurring Profit		1,238	1,088	1,150	1,030	1,500

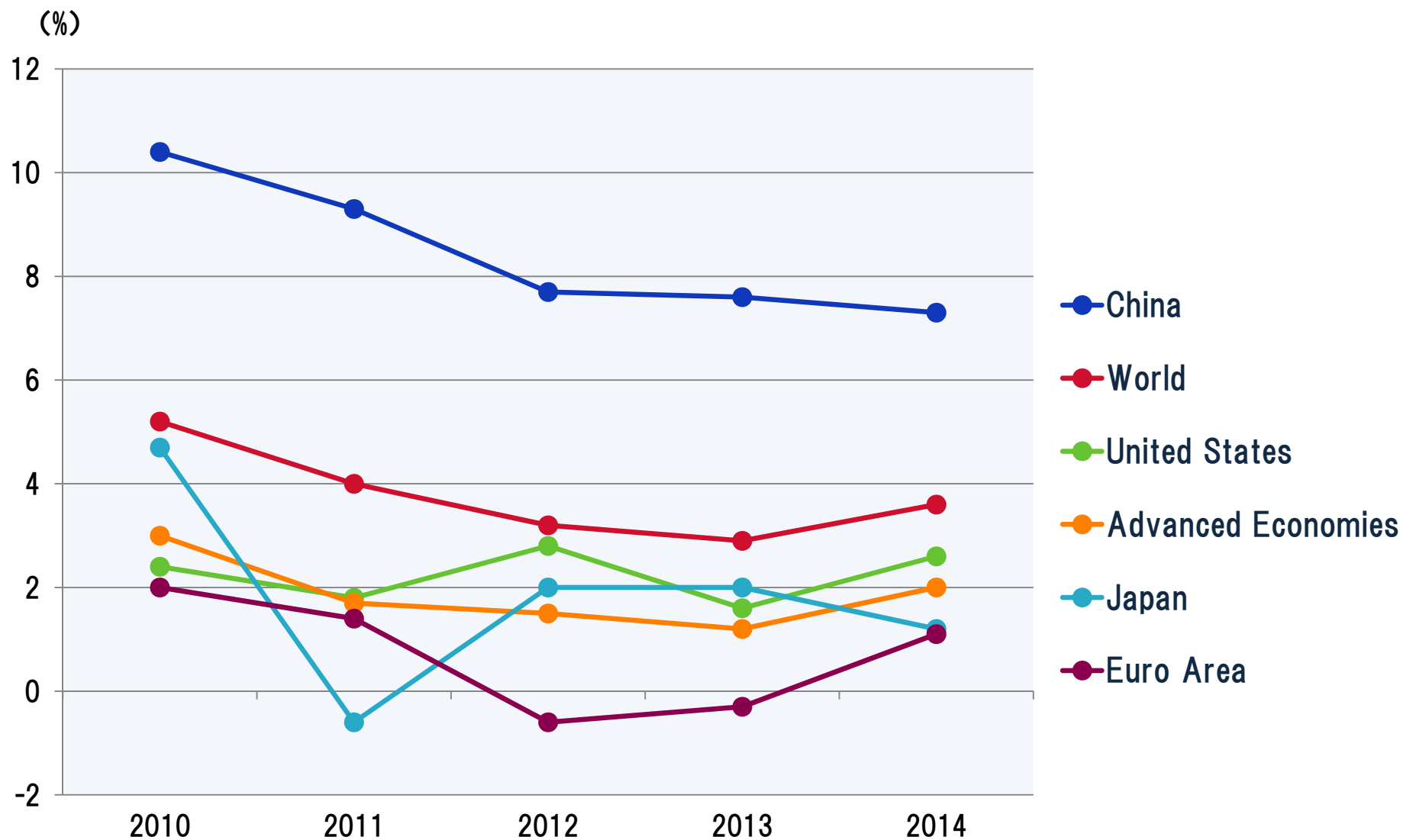
✕ FY2010-FY2011 : Contribution Margin (Earlier Bases)
/FY2012,2013Forecast, 12 3-Yr 2015 : New Segment Profit

III. External Environment



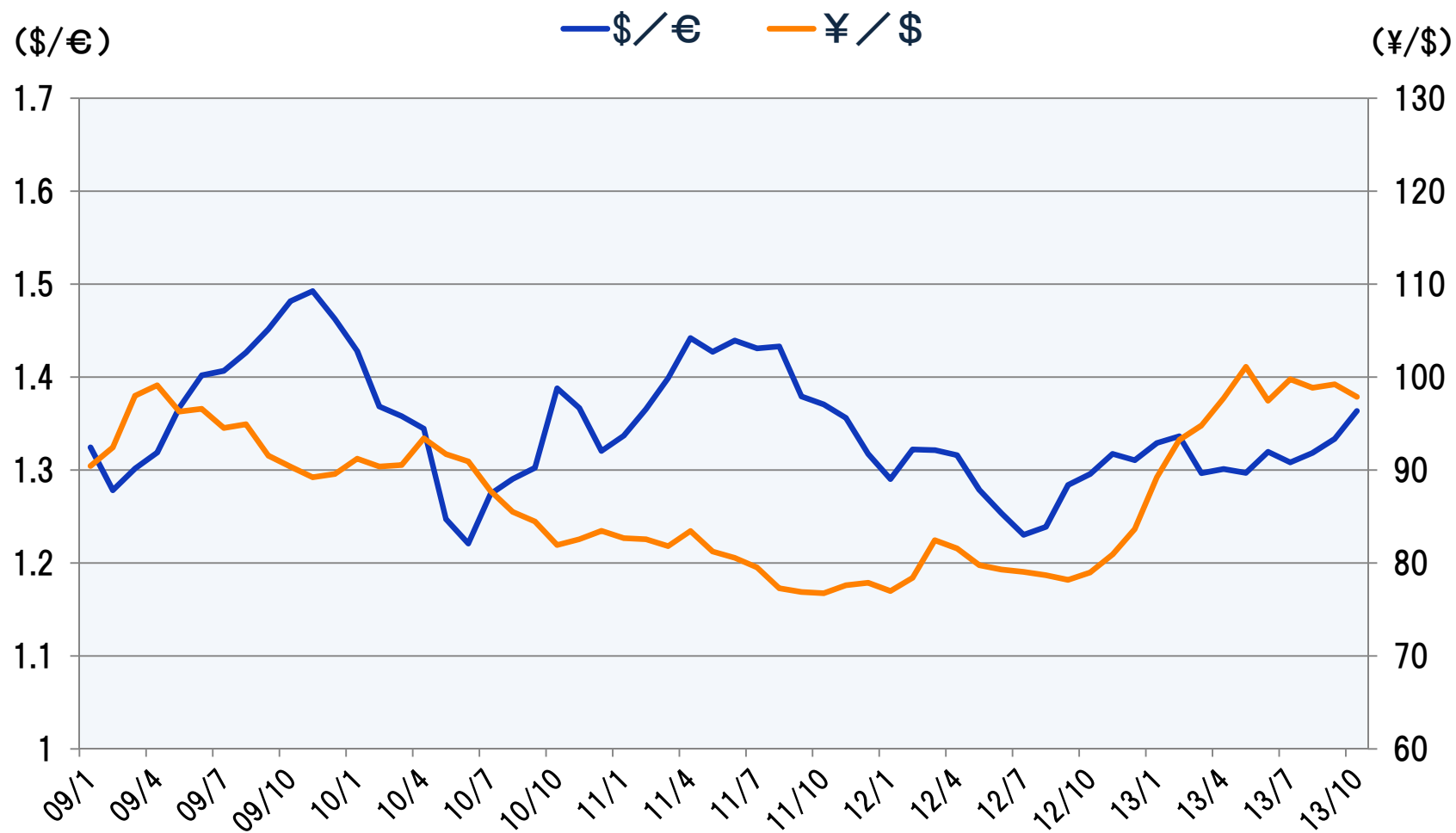
**Taganito HPAL Inauguration ceremony
(Presentation of commemorative stationery gifts to local children representatives)**

1) General Conditions – Global GDP Growth

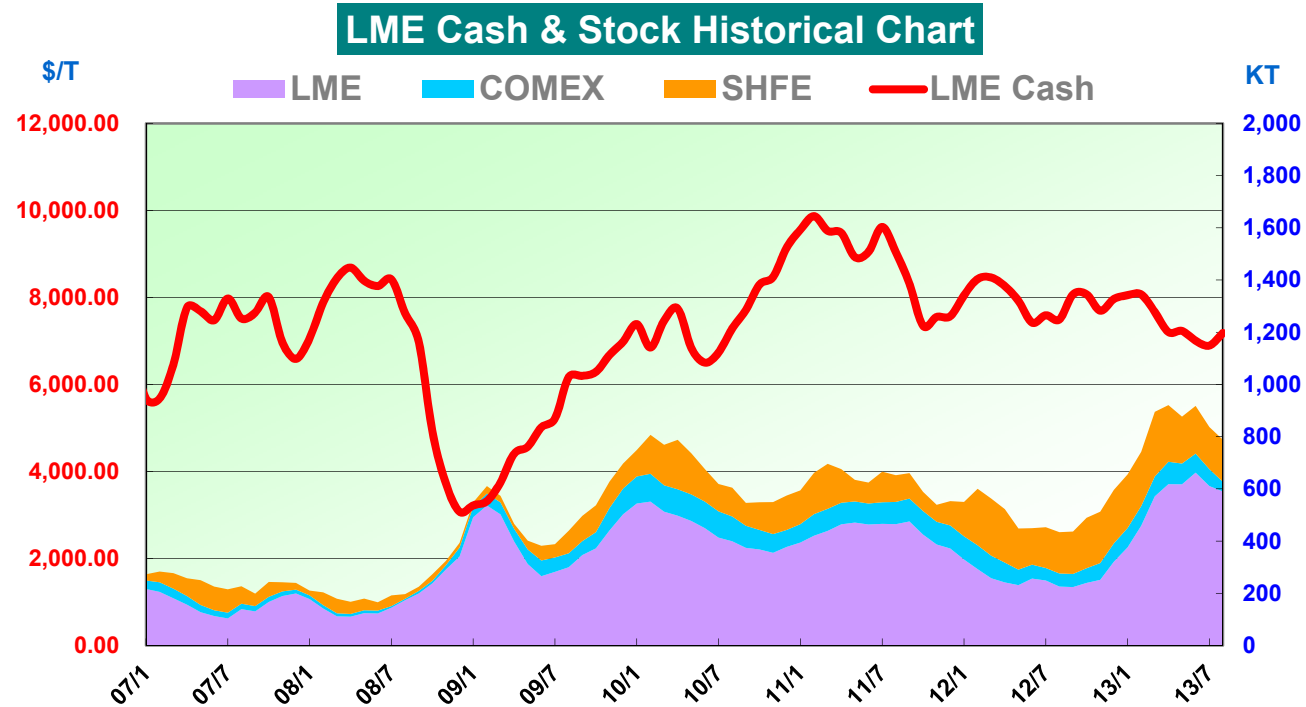


(IMF October 2013)

2) Forex Trends



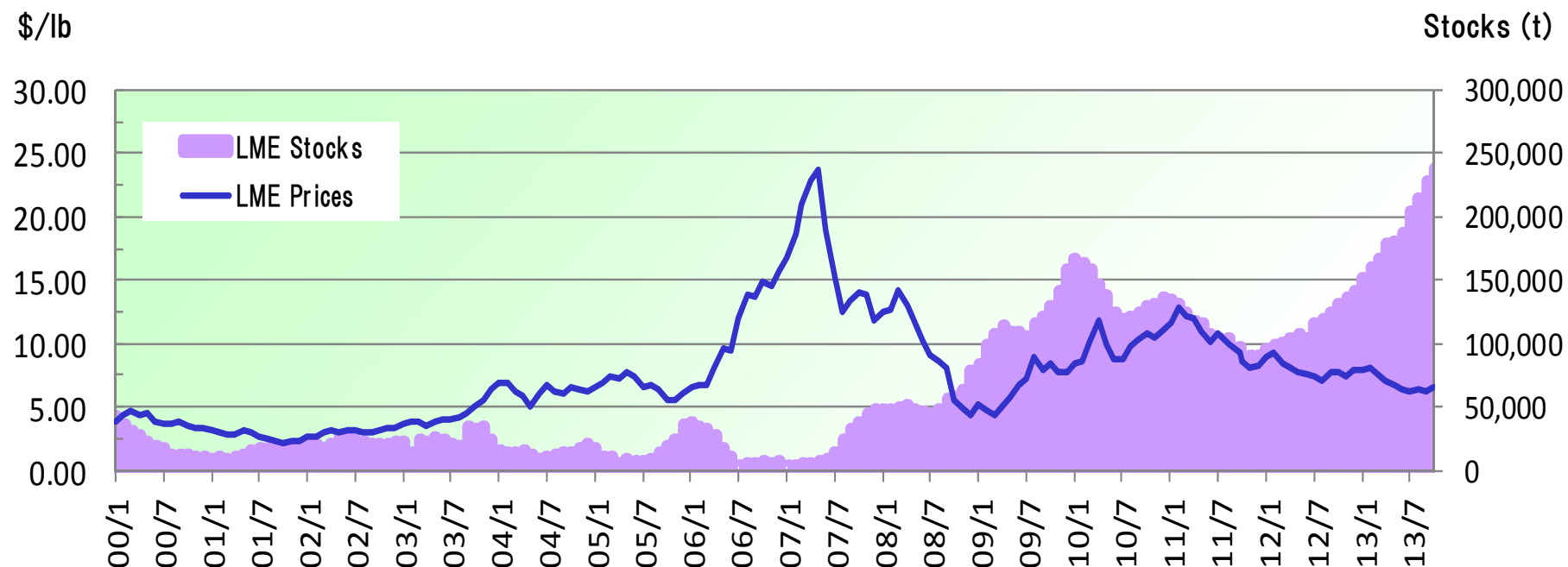
3) Cu – Price / Supply & Demand Balance



[ICSG Estimation 2013/10]

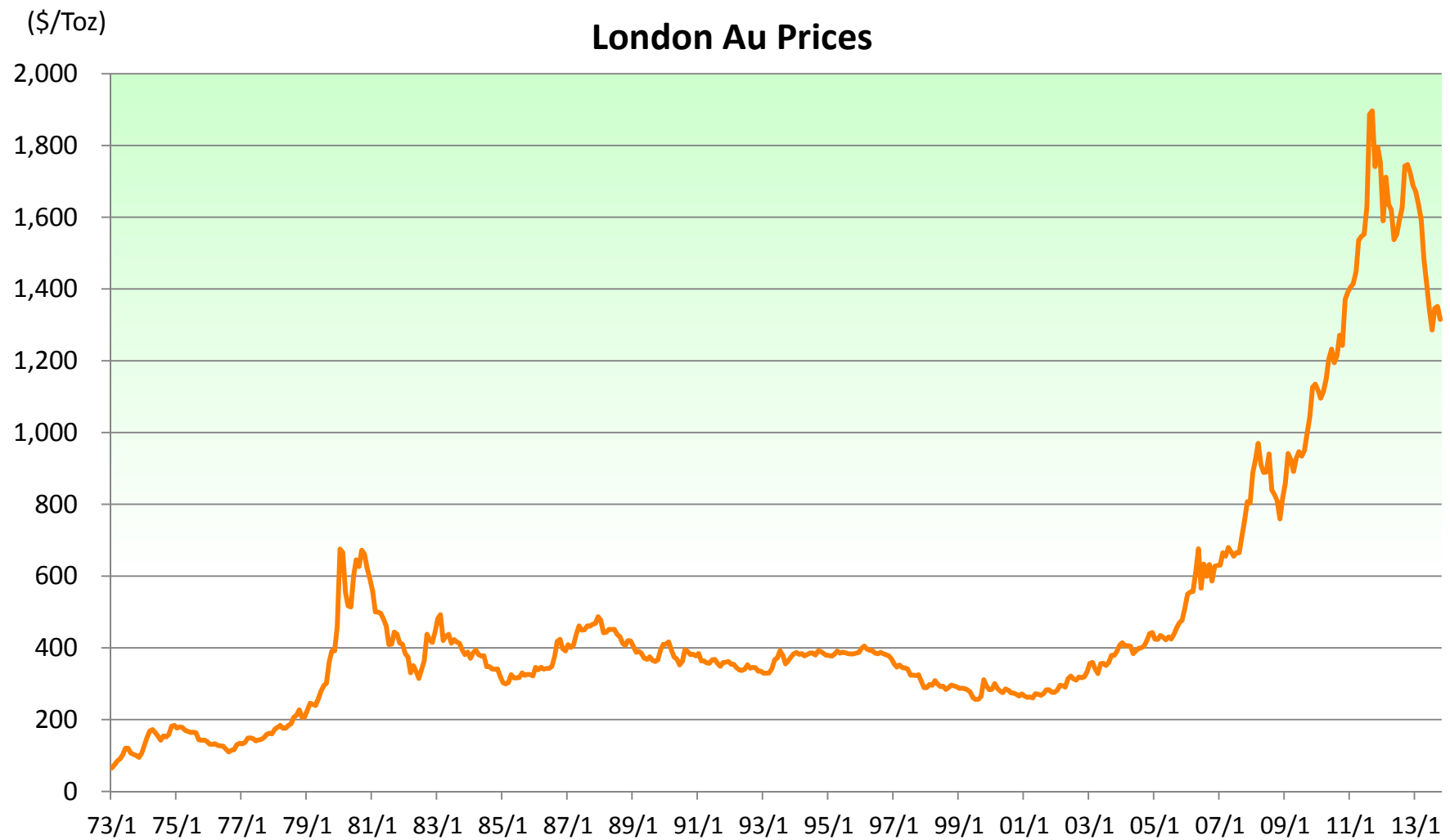
	2012	2013	2014
Production	20,129	20,912	22,061
Usage	20,550	20,525	21,429
Balance	▲421	387	632

4) Ni – Price / Supply & Demand Balance



	INSG Estimation 2013/Oct.(kt)			SMM Estimation 2013/Oct. (kt)		
	2012	2013	2014	2012	2013	2014
Production	1,760	1,910	1,970	1,748	1,848	1,923
Usage	1,660	1,770	1,850	1,675	1,780	1,856
Balance	100	140	120	73	68	67

5) Au- Price



IV . Promotion of the 12 3–Yr Plan Strategy



Sierra Gorda Project

1) Mineral Resources

① Participation in Mine Development Project Sierra Gorda Project - Cu



Sierra Gorda Project (Chile)

Equity Interest Ratio	KGHM	55%	Total Investment for Phase 1	\$ 3.9B
	SMM	31.5%		
	Sumitomo			
	Corp.	13.5%		

Schedule

- * 2011 - Decided to participate in the project
- * 2013 - Promote Phase 1 construction work (110 kt annual production capacity)
- * 2014 - Start production; Phase 1 ramp-up

Current Progress

- Residential facilities, office, auxiliary facilities (drinking water supply facilities, wastewater treatment facilities, fuel filling station, etc.), heavy equipment repair plant, etc. are completed
- Pre-Stripping is in progress
- Ore transport line, crushing process, concentration process are under construction
- Crew of over 9,000 is engaged in construction

1) Mineral Resources

② Increasing Production at Existing Mines Morenci - Cu



Morenci Mine (USA) Expansion Project

**Equity
Interest
Ratio**

FCX 85%
SMM 12%
Sumitomo Corp. 3%

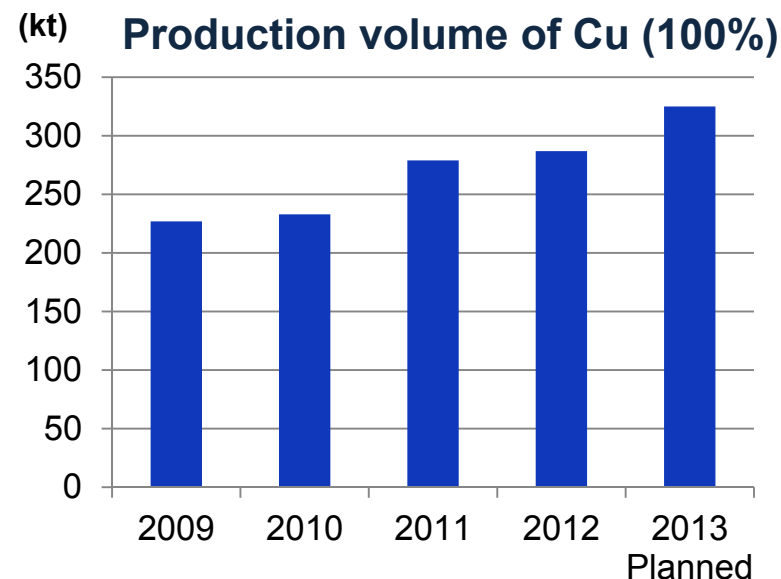
**Total
investment**
\$1.9B

Upgrade Plan

	Current status		2014
Mining output	635 kt/day	→	815 kt/day
Concentration capacity	50 kt/day		115 kt/day
Production volume of copper	280 kt/year		400 kt/year

Schedule

- * January 2013 - Decided on participation in project for increasing production
- * 2014 2Q - Complete construction; 3Q - Launch full-scale operation



1) Mineral Resources

② Increasing Production at Existing Mines Cerro Verde - Cu



Cerro Verde Mine (Peru) Expansion Project

Equity Interest Ratio

FCX	53.56%
SMM	16.80%
Sumitomo Corp.	4.20%
Other	25.44%

Total investment

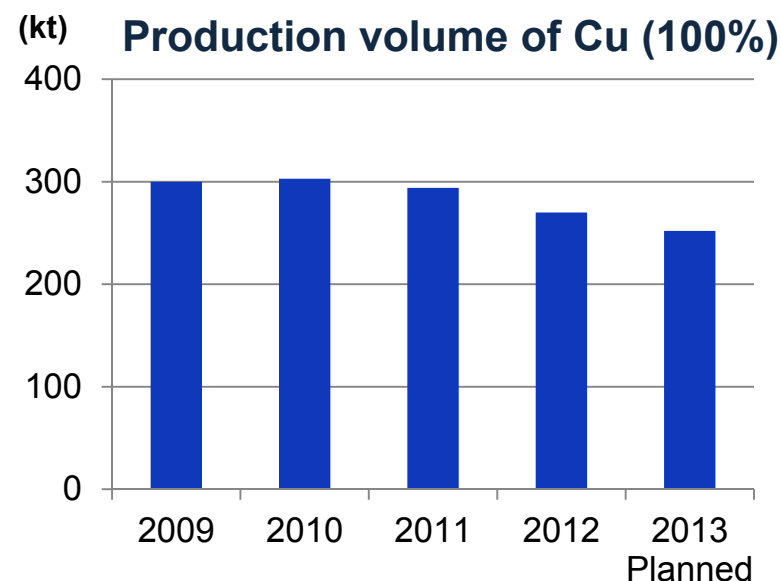
\$4.6B

Upgrade Plan

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

Schedule

- * 2013 - Scheduled to complete final planning (including financing)
- * 2013 - Start construction
- * 2016 - Full production



1) Mineral Resources

③ Maintenance and Expansion of Existing Au Mine Volume



Hishikari Mine

Production volume and gold content

FY2013 Production plan: 7.0 t

Gold content as of December 31, 2012: 169 t

Continue maintaining reserves

Development plan for lower ore body

Confirmed quality mineral vein in the lower part of ore body being mined

*** Installed hot spring drawdown equipment at 80ML below sea level**

Total investment amount:

Approx. ¥3.2 billion

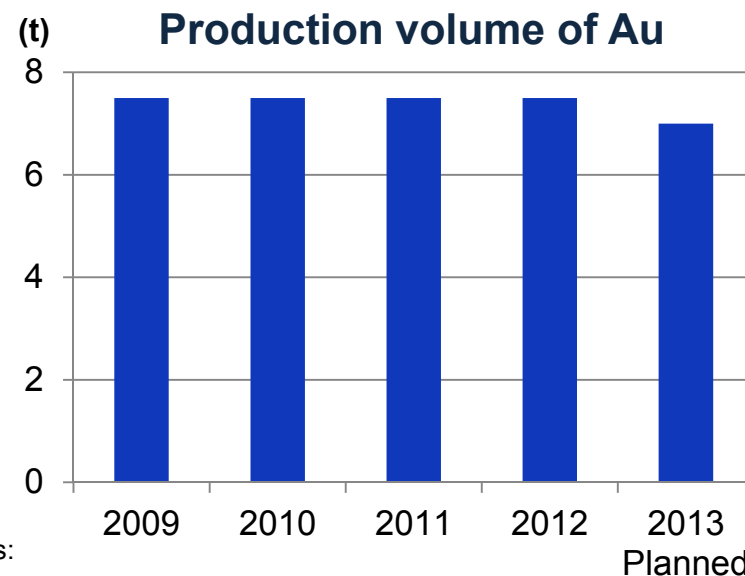
*** November, 2012 - Start construction**

*** 2018 - Scheduled to start mining**

(Note)

Gold content of Hishikari mine: Content of gold in minable ore according to JIS standards:
169 t

Gold content in lower ore body not included in minable ore: 7 t expected



1) Mineral Resources

③ Maintenance and Expansion of Existing Au Mine Volume



Pogo Gold Mine

2009 - Acquisition of additional mining interest (51% → 85%)

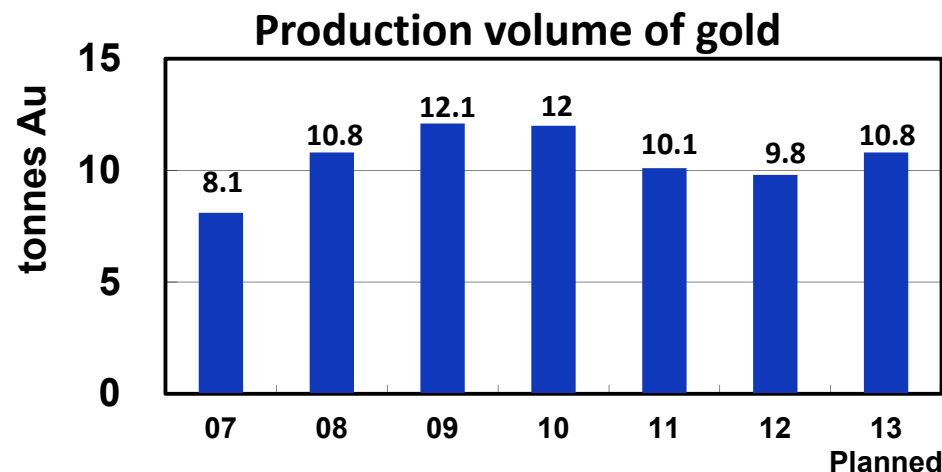
2010 - Production volume: 12 t

2013 - Production plan: 10.8 t

Gold content as of December 31, 2012: 143 t

* Mined quantity declined in 2012 due to mine flooding
Normal operation in 2013

* Actively continue exploration of the surrounding area



East Deep Section Development Plan

* 2014 - Scheduled to start mining

(Note) Gold content of Pogo Gold Mine : Gold contained in reserves plus resources under Canadian standards
(Gold content in reserves: 69 t, in resources: 74 t)

1) Mineral Resources

④ Promotion of Exploration by SMM

Stone Boy - Au/ Solomon - Ni

Stone Boy Project

- Conduct gold exploration in Alaska
Continue exploration

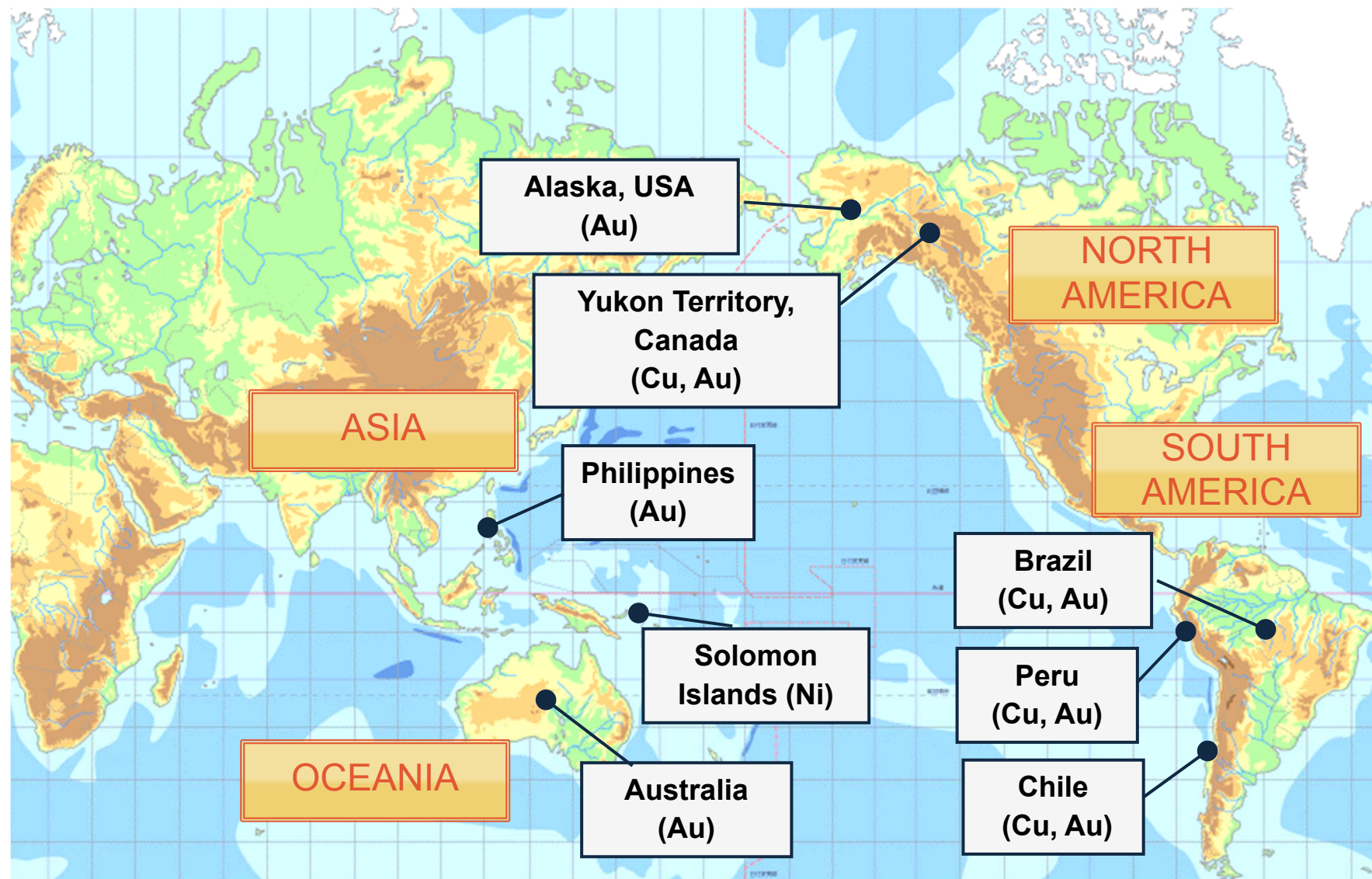
Solomon Project

- Conduct exploration, environmental research, and Pre/FS in Isabel Area
 - 2010 - Successfully bid **for 3 mining blocks in Isabel** Area in international bidding
 - 2011 - Government of Solomon unilaterally revoked successful bids and conferred mining blocks to Axiom KB Limited
 - In same year, SMM sued government and Axiom KB Limited
- October 2013 - High court Litigation began



1) Mineral Resources

④ Promotion of Exploration by SMM - Worldwide Exploration



2) Smelting & Refining

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

Taganito Project (Mindanao , Philippines)

**Steady progress of the 2nd construction
of world's most advanced
HPAL plant based on CBNC results**

- ◆ Investment ratio: SMM 62.5%, NAC 22.5%,
MITSUI & CO., LTD. 15%
- ◆ Scheduled period for operation: 30 years
- ◆ Investment amount: US\$1.6 billion (up to the start of commercial production)

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

CBNC (Coral Bay Nickel Corp., Palawan, Philippines)

HPAL technology (High Pressure Acid Leach)
allows Ni-Co recovery from low-grade Ni oxide ores
world-first for SMM on commercial scale
2005 Phase I : Start of production Current Capa: 24ktpa
MS Ni intermediate produced at CBNC
E-Ni produced from MS at Ni refinery in Japan



2) Smelting & Refining

① Establish a 100 kt Capacity for Ni – Taganito Project

Progress of the Taganito Nickel Project

* Project completion to start of pilot operation

Schedule

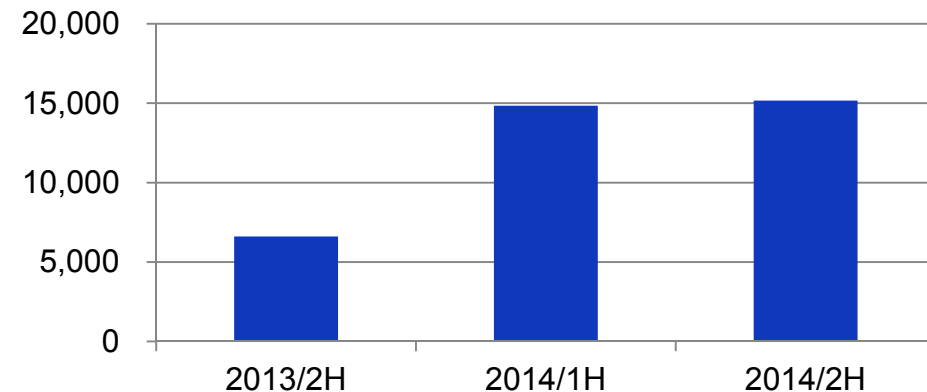
2013 June Construction work Completion
Sep Inauguration Ceremony
9/3 Pre-Inauguration Party
(Manila)
9/4 Inauguration Ceremony,
THPAL Plant
(More than 200 participants)
October 21 First Ship leaves to Japan
3Q Start of the pilot operation
4Q Shift to the full production system

2014 30Kt of yearly output

2014
Production volume: 30 kt/year



Production plan of MS (Ni-t)



2) Smelting & Refining

② Promotion of 65 kt Electrolytic Nickel Production Operation - Ni



Increase production at Niihama Nickel Refinery

**Production
Capacity**

**41 kt/year
→ 65 kt/year**

**Total
investment**

¥14 B

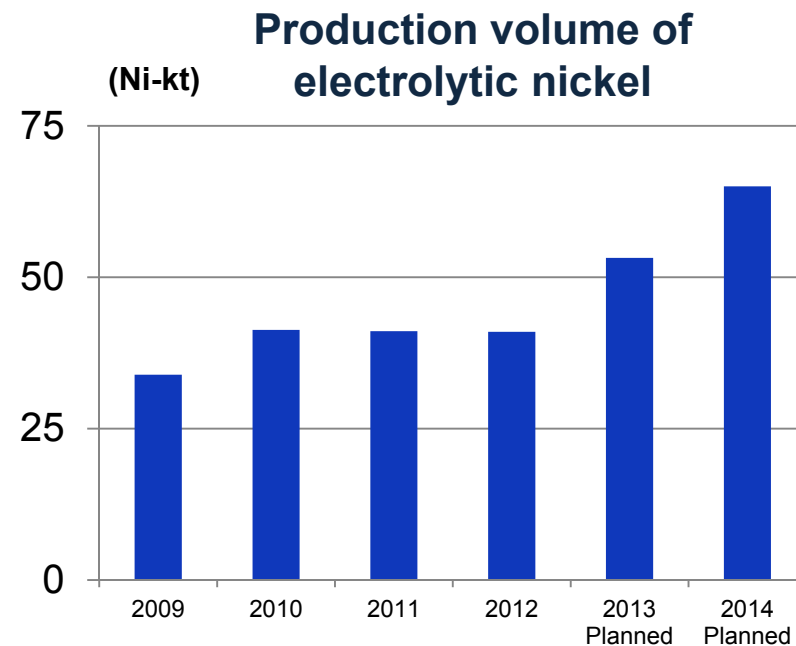
Schedule

- * FY2009 - Completed 41 kt production structure
- * FY2010 - Decided to invest in 65 kt production operation
- * End of March 2013 - Refining facility completed
- * November onward - Receipt of raw materials from Taganito

Production Volume

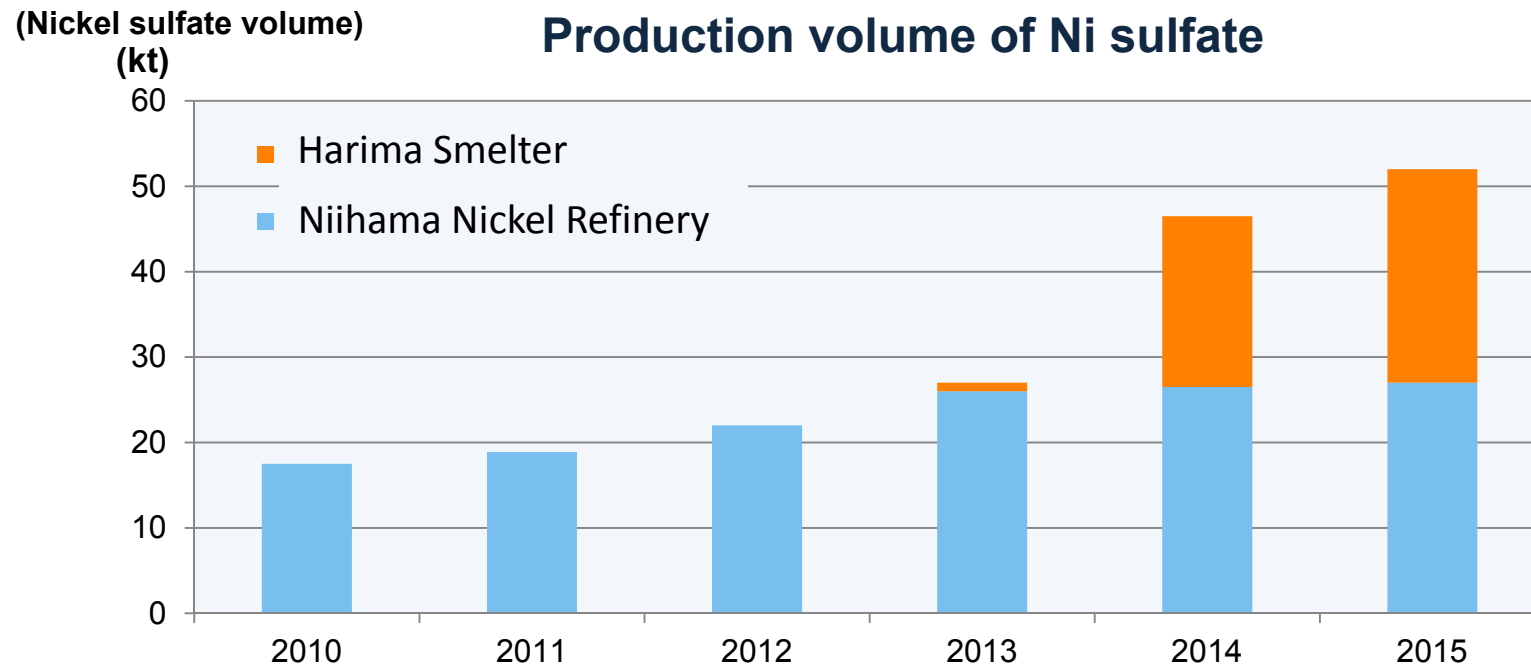
FY2013 – 53 kt (Planned)

FY2014 - Begin 65 kt operation



2) Smelting & Refining

③ Ni Sulfate Business Expansion



Expand production capacity for the growing battery materials sector

Schedule

- Plant construction nearly complete
- Carry out pilot operation; aim for production launch in 2013/4Q

4) Expanded Recycling of Valuable Metals

Scandium (Sc)

Recover small quantities of scandium contained in HPAL raw material at CBNC

- 2013 - Build pilot plant
- 2014 - Start trial production (10kg/month)
- 2015 - Build production line

Current scandium production and usage status

- Global production of approx. 10t/year
- Supplied by the United States, Ukraine, Russia, China, etc.
- Modest volume of production and high price result in limited demand

Additive to aluminum (increases strength)
Additive to solid electrolyte for fuel cells



Provide stable supply in order to increase new demand

Chrome (Cr)

Recover chrome (as chromite) contained in HPAL raw material ore at Taganito

- 2013 - Build pilot plant at CBNC
- Based on pilot test results, build chrome recovery plant at Taganito

Current chrome production and usage status

- Main suppliers are South Africa, Kazakhstan, and India
- Additive for special steels such as stainless steel

Hematite

Recover hematite contained in HPAL residue at Taganito as steel-making materials

- 2013 - Build pilot plant at THPAL
- Examining for the possibility of practical use

Pomalaa Pre F/S

Overview

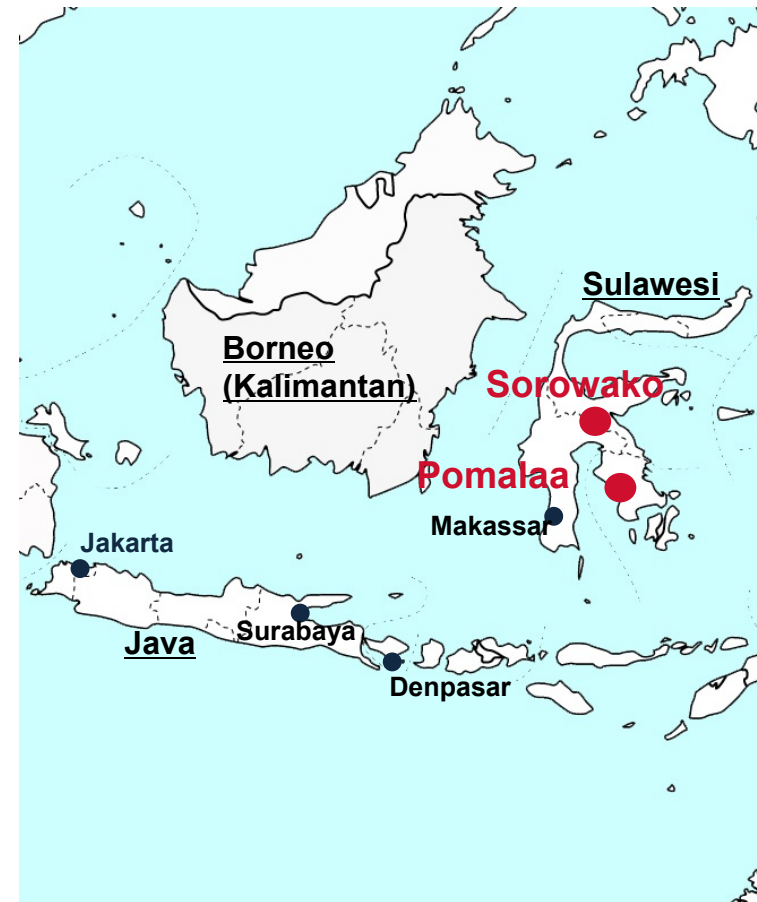
- P.T. Vale Indonesia owns mining rights
- Pre F/S is underway

Background

- June 2012 - Began Pre F/S
- January 2013 - Began environmental impact analysis survey (mandated)

Current Progress

- Pre F/S is completed; will conduct evaluation
- Apply for logging permit
- PTVI will conduct COW negotiations



2) Smelting & Refining

⑥ Movements Surrounding Indonesian Mining Law

Background to Indonesian Mining Law

Background

- January 2009
New Mining Law promulgated
Prohibits export of unprocessed ores from 2014
- February 2012
Announcement of implementation of export prohibition ahead of schedule, from May 2012
→ Following this, export permits were reopened, with export tax imposed
- Currently, as of October 2013
Under consideration within Indonesian government

Outlook

- Indonesian Ni ore supply: About 20% of world supply (2012, INSG)
- SMM: If implemented on schedule, will have impact on ferronickel raw materials at Hyuga Smelting Co., Ltd.

2) Smelting & Refining

⑦ Cu – Enhance Competitiveness of Toyo Smelter



Toyo Smelter & Refinery (Ehime, Japan)

FY2012 Electrolytic copper production volume: 436 kt

FY2013 Production outlook: 405 kt

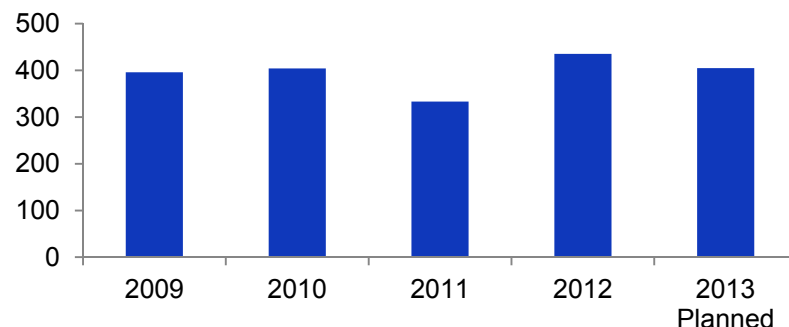
Mandatory shutdown (periodic shutdown) scheduled for October – November for 20 days

Stable high-load operation at the new flash furnace

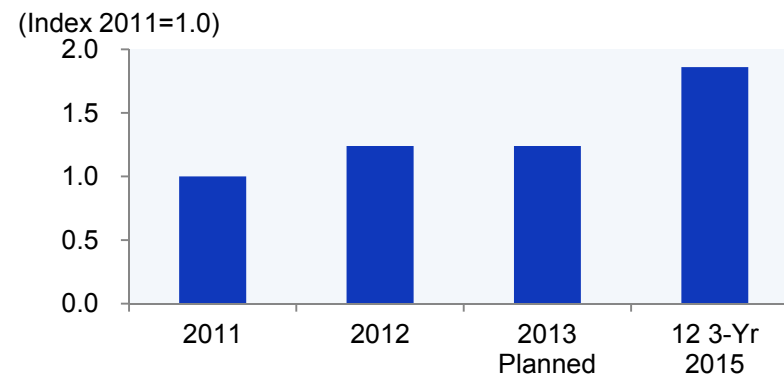
Progressively increased volume of recycled raw materials

Promote further cost reduction measures

Production volume of electrolytic copper (kt)



Volume of scrap copper collected

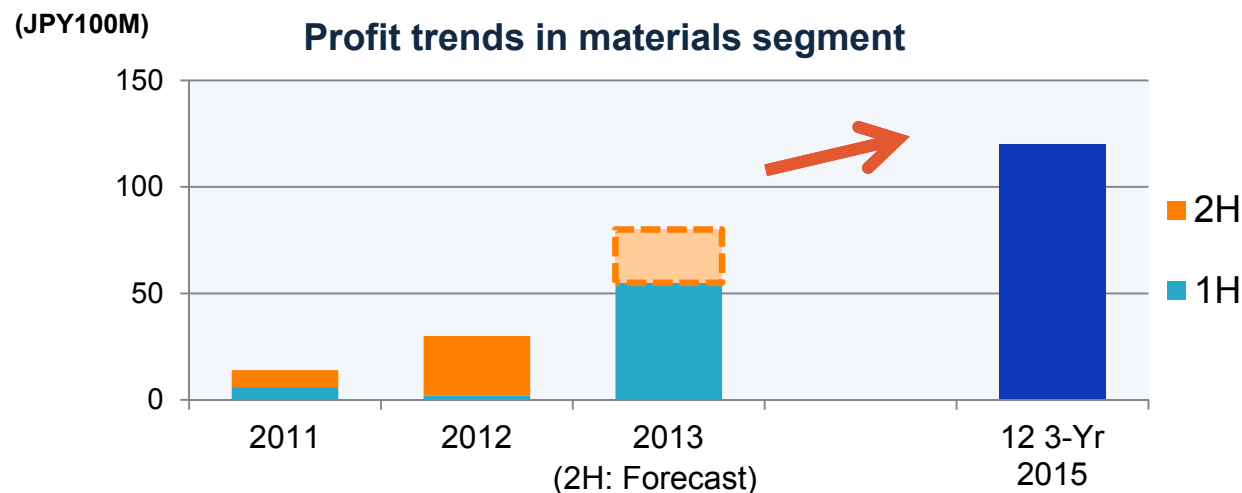


3) Materials

① Pursue Selection and Consolidation, Complete Business Structure Changes

Goals of the 2012 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



* 2011: Contribution Margin (Earlier bases); 2012, 2013, 12 3-Yr Business Plan 2015: New segment profit

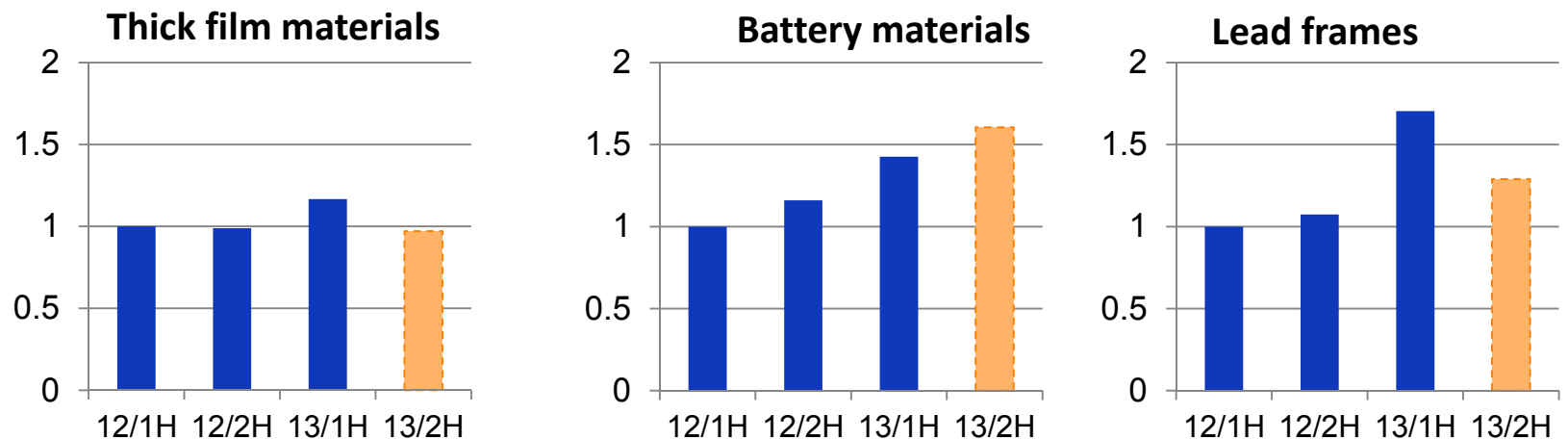
3) Materials

② Promotion of Growth Strategies

Growth Strategies in the Materials Business

- Improve technological and product development capabilities through cooperation with favored customers
- Further speed up technological development
- Stabilization of profit/loss

Steady Recovery of Business Results



Addition of certain profits

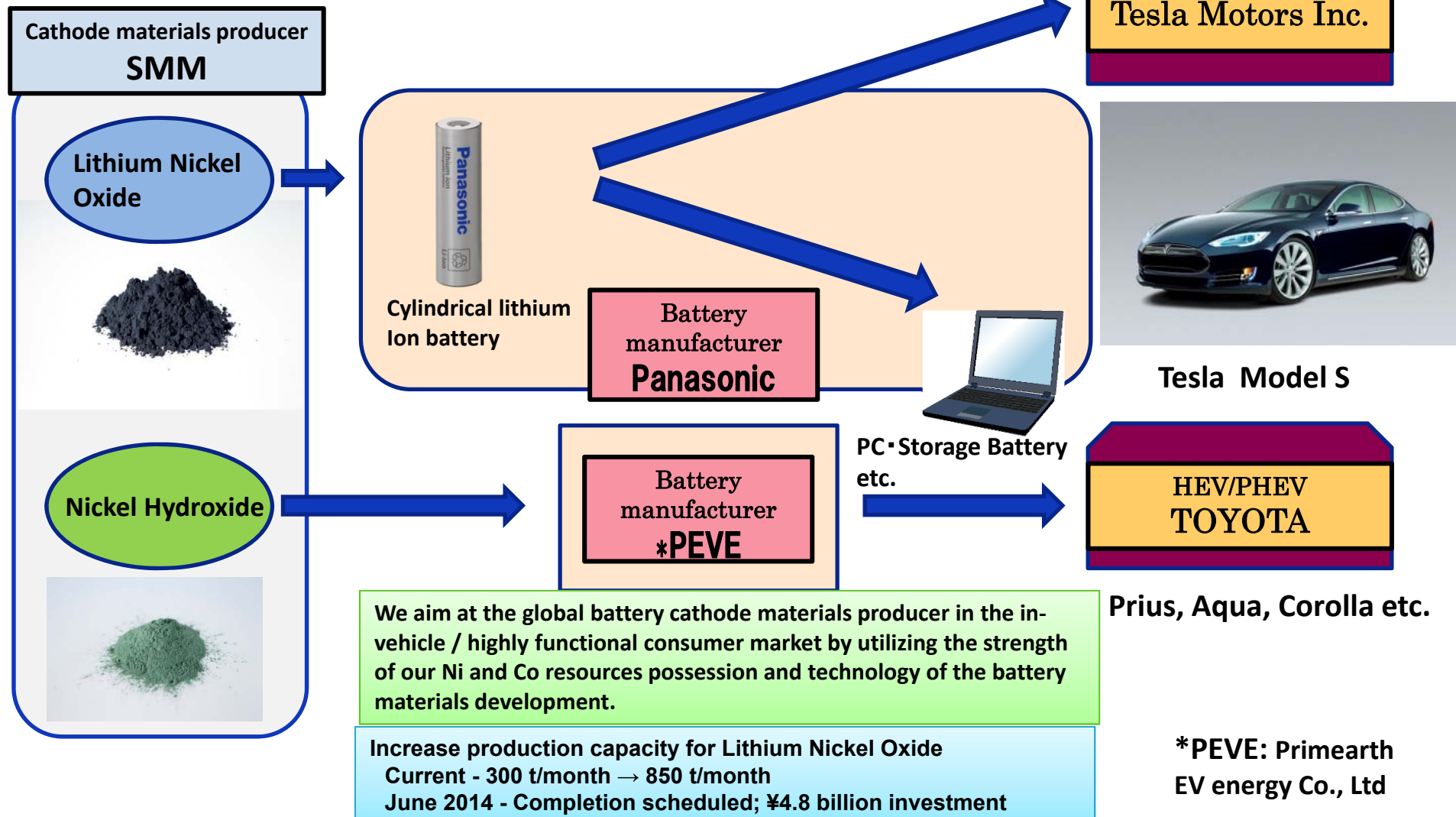
3) Materials Progress of Selection and Concentration

(2) Battery Materials



Core Business
Growth Strategy

Battery Materials – Supply Chain



3) Materials ④ Crystal Materials

LN (Lithium niobate) /LT (Lithium tantalate)

Strategy and Measures

Used in mobile phone & smartphone SAW filters

- Produce at Sumiko Kunitomi Denshi Co., Ltd.
→ Increase production volume
in line with smartphone demand growth
- Further strengthen relationships with major customers
- Strengthen development in response to increasing speed and smaller size of communications equipment



Sapphire Substrates

Strategy and Measures

Launch mass production line at Okuchi Electronics Co., Ltd.

- Strategize 400φ, 2-bar extraction technologies
- Improve yield and productivity
- Achieve 400φ, 3-bar extraction technologies
- Improve cost competitiveness through manufacturing process improvements
- Develop new applications and acquire new customers



3) Materials ⑤ Thick Film Materials

Nickel Paste for MLCC

- Used in MLCCs (Multi-Layer Ceramic Capacitors)
- Increased use of MLCCs accompanying increase in smartphone and tablet demand
 - Increase in demand for SMM paste
- Strengthen relationships with major favored customers

Resistor Paste

- Used in chip resistors vital in electronic circuits
- Demand increasing in line with increase in mobile communications device demand
- High global share
- Supplied from Ome and SEP (Shanghai) to locations of many customers in China and Taiwan



3) Materials ⑥ Integrate Lead Frame Business

Launch of Integrated Business

July 1, 2013 - Launch

- Lead frames

SH Materials Co., Ltd.

Investment ratio: SMM 51%, Hitachi Metals, Ltd. 49%

Annual net sales: Approx. ¥35.0 billion

Major facilities: Yonezawa, Miyako, Kawanishi (Niigata),
Niihama, Okuchi, China (Suzhou, Chengdu),
Malaysia, Taiwan, Singapore

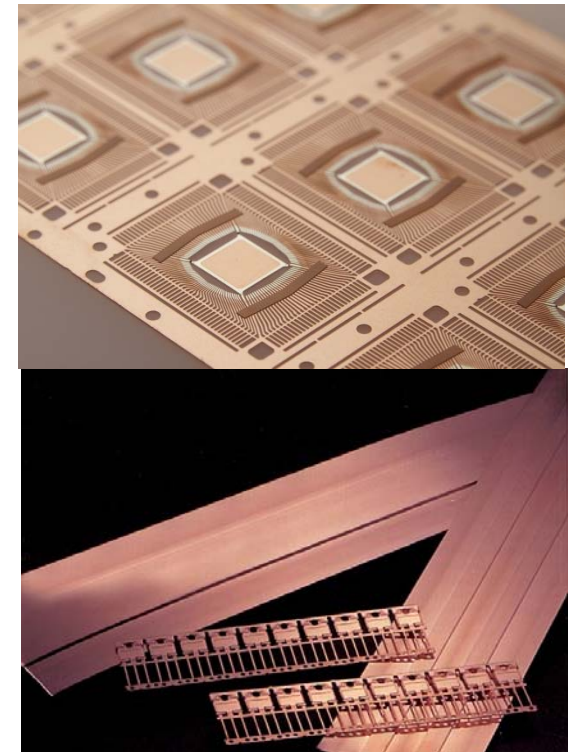
- Brass and copper

SH Copper Products Co., Ltd. (SHCP)

Investment ratio: SMM 50%, Hitachi Metals, Ltd. 50%

Annual net sales: Approx. ¥50.0 billion

Major facilities: Tsuchiura



Vertical Integration

Improve competitiveness in materials development and procurement through capital investment in copper products business

Structural Reforms

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

Total Effect: Over ¥1 billion/year

4) Promotion of Research & Development

Technology Development Measures for 12 3-Yr Business Plan

Mineral Resources and Smelting & Refining Business

- **November, 2012 - Decided on construction of new Resource & Hydrometallurgy Process Center**

Develop world's most advanced processes and facility technologies in the area of mineral resources and smelting & refining

- At present, construction is nearly complete; bring in equipment in preparation for start of operation in April

Materials Business

- **Battery Research Laboratory (established October 2010)**

Support start of lithium nickel oxide production increase project

Develop cathode materials for next-generation batteries

- **Materials Research & Development Center (established October 2012)**

Development of products in environmental and energy area

Respond to decreasing size of final products and increasing speed of communications



5) Progress in Cost-Cutting

Cost-Reduction Measures in 2012 3-Yr Business Plan

Reduce costs by ¥10 billion/year

Period of activity: October 2012 - fully achieve in FY2015

Target amount: Reduction of ¥10 billion/year

Base: FY2012

- **Improve productivity**
- **Switch to low-cost materials**
- **Carefully select fixed costs**

Progress in FY2013

Target amount: ¥5 billion

Proceeding smoothly

Continuing cost reduction initiatives in all departments

V. Financial Highlights

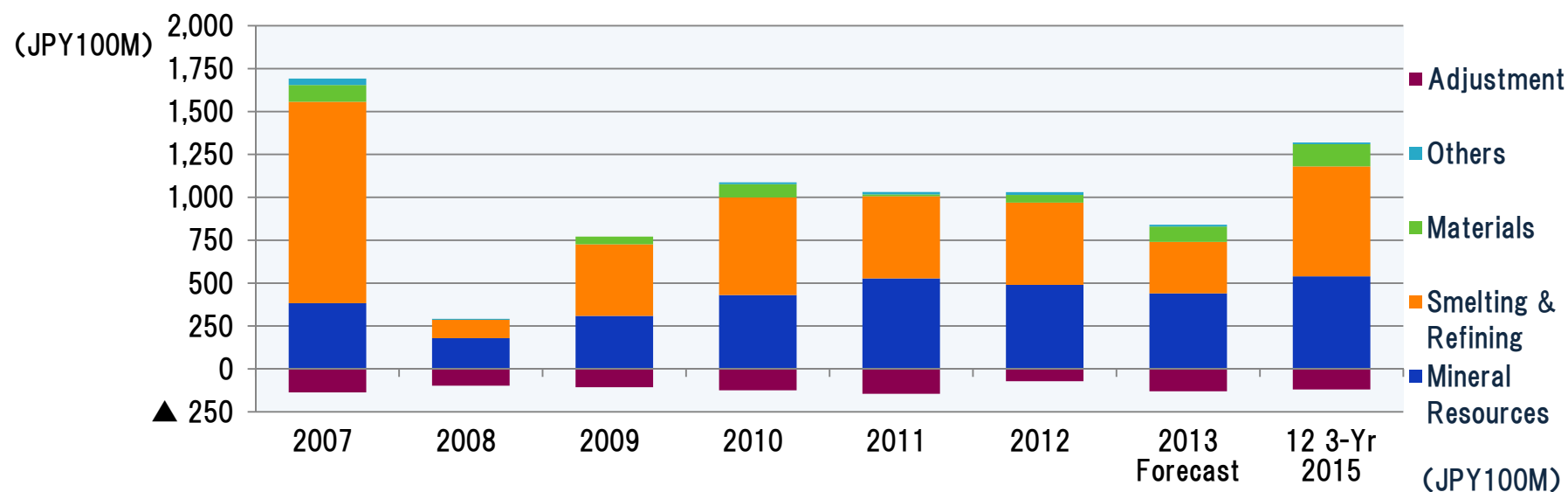


Sierra Gorda Project

1) Performance Trends

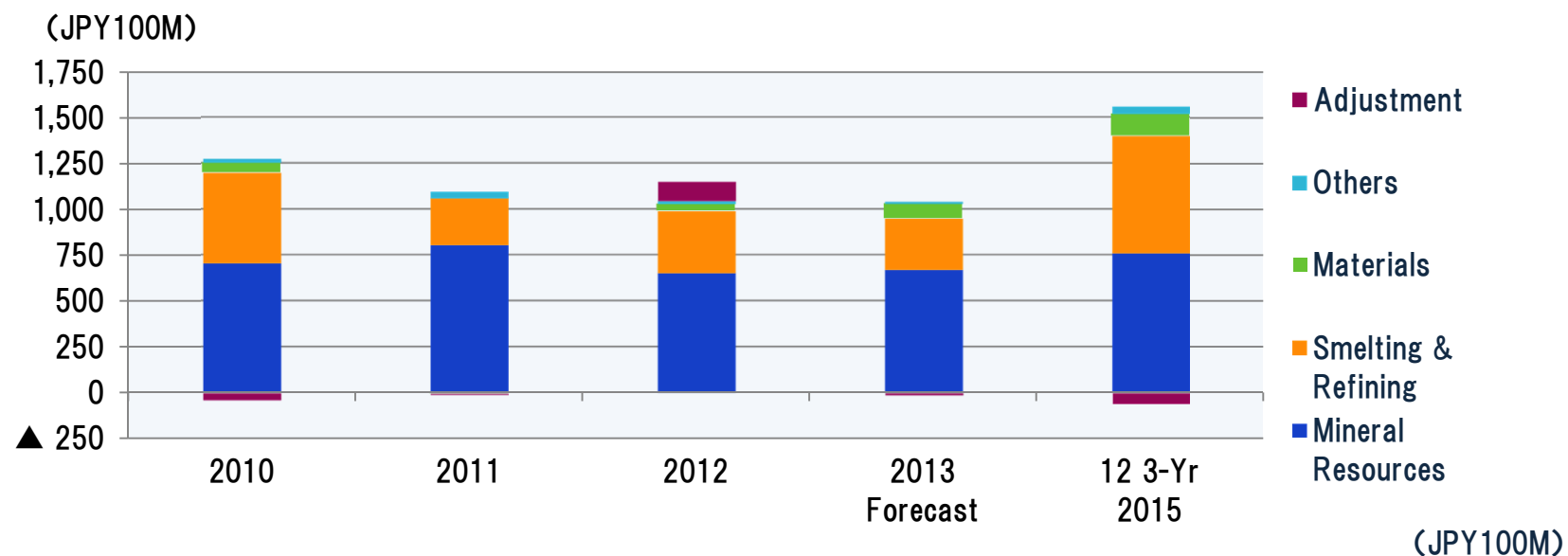
	2007	2008	2009	2010	2011	2012	2013 Forecast	12 3-Yr 2015
Net Sales	11,324	7,938	7,258	8,641	8,479	8,085	8,120	9,100
Operating Income	1,555	107	663	962	886	958	710	1,200
Recurring Profit	2,179	328	879	1,238	1,088	1,150	1,030	1,500
Equity Method profit	740	315	261	348	232	171	280	360
Net Income	1,379	221	540	841	653	866	740	1,000
ROA(%)	13.6	2.2	5.8	8.3	5.9	6.9	-	7
ROE(%)	25.4	4.0	9.9	13.8	10.1	12.1	-	12
Dividend Per Share(¥)	30.0	13.0	20.0	32.0	28.0	34.0	34.0	N/A
Copper (\$/t)	7,584	5,864	6,101	8,140	8,485	7,855	7,056	7,500
Nickel (\$/lb)	15.5	7.5	7.7	10.7	9.6	7.7	6.4	9.0
Gold (\$/Toz)	766	867	1,023	1,294	1,646	1,654	1,335	1,550
Zinc (\$/T)	2,986	1,560	1,934	2,187	2,101	1,950	1,850	1,800
Exchange(¥/\$)	114.4	100.7	92.9	85.7	79.1	83.1	98.4	80.0

2) Operating Income by Segment



	2007	2008	2009	2010	2011	2012	2013 Forecast	12 3-Yr 2015
Mineral Resources	384	181	309	432	528	490	440	540
Smelting & Refining	1,174	107	417	569	480	479	300	640
Materials	98	▲87	45	78	8	45	90	130
Others	37	6	▲1	10	16	16	10	10
Adjustment	▲138	▲100	▲107	▲127	▲146	▲72	▲130	▲120
Total	1,555	107	663	962	886	958	710	1,200

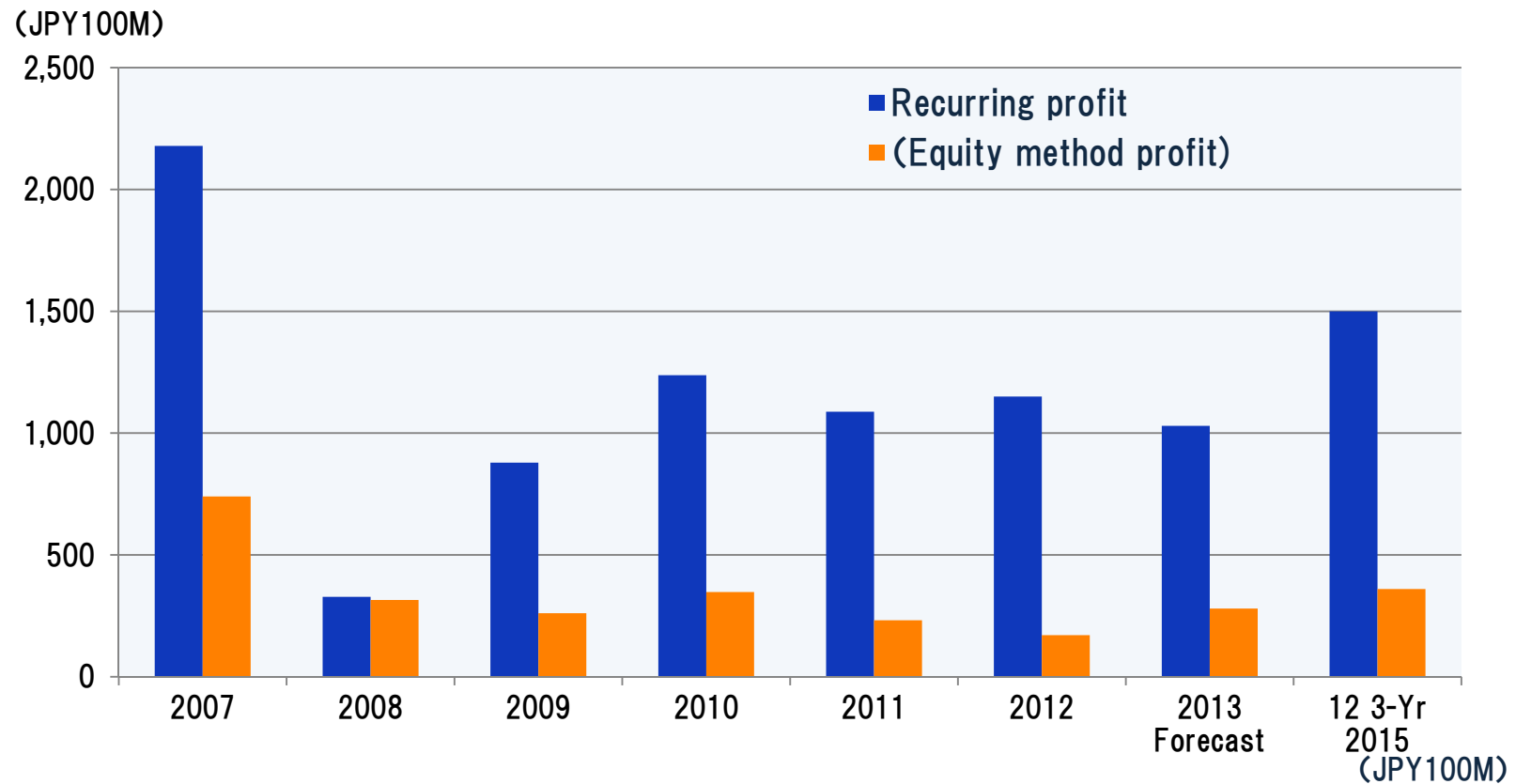
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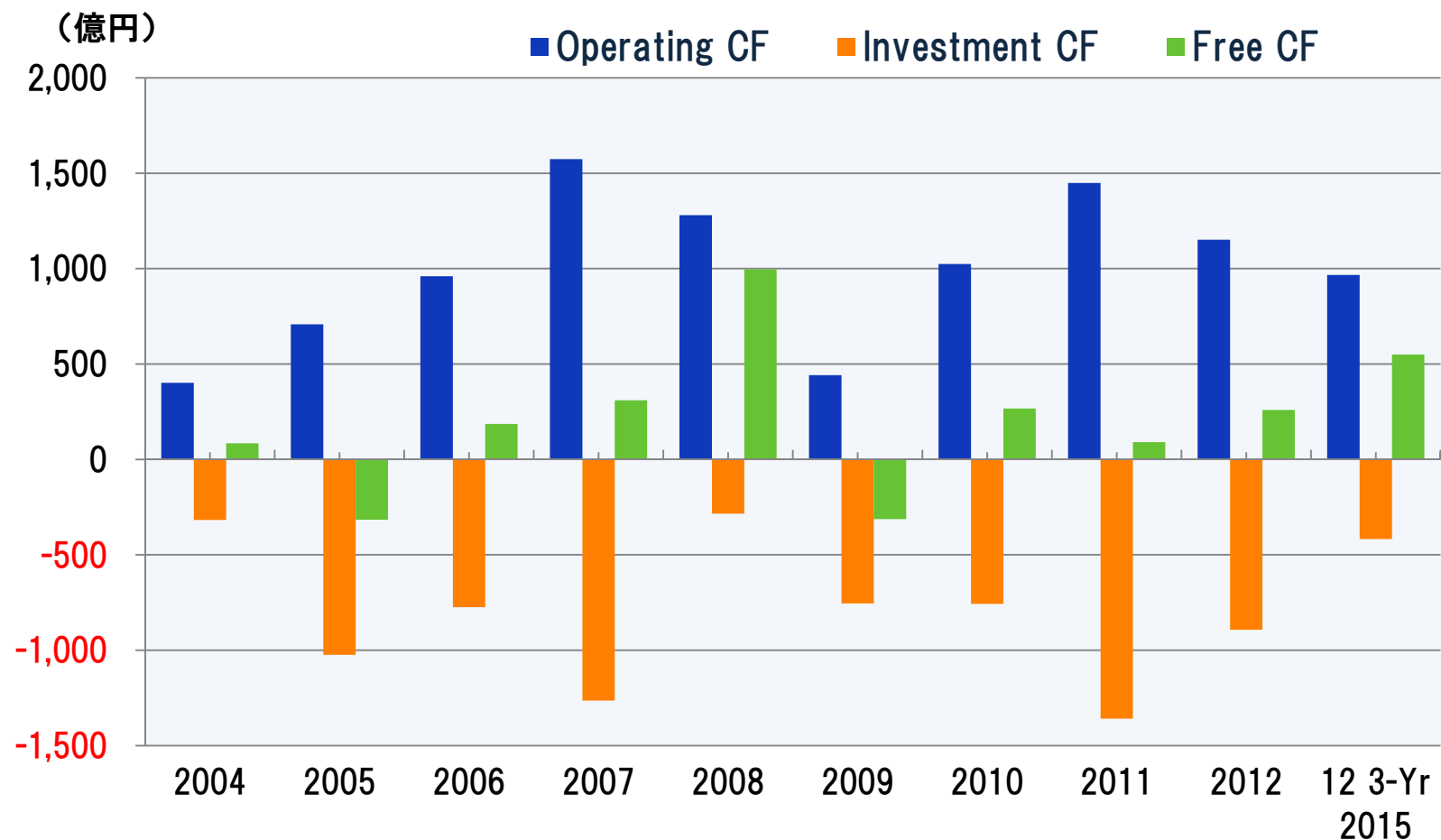
✕ FY2010-FY2011 : Contribution Margin (Earlier Bases)
/FY2012, 2013 Forecast, 12 3-Yr 2015 : New Segment Profit

4) Recurring Profit / Equity Method Profit



	2007	2008	2009	2010	2011	2012	2013 予想	12中計 2015
Recurring profit	2,179	328	879	1,238	1,088	1,150	1,030	1,500
(Equity method profit)	740	315	261	348	232	171	280	360

5) Cash Flow Trends



6) Sensitivity

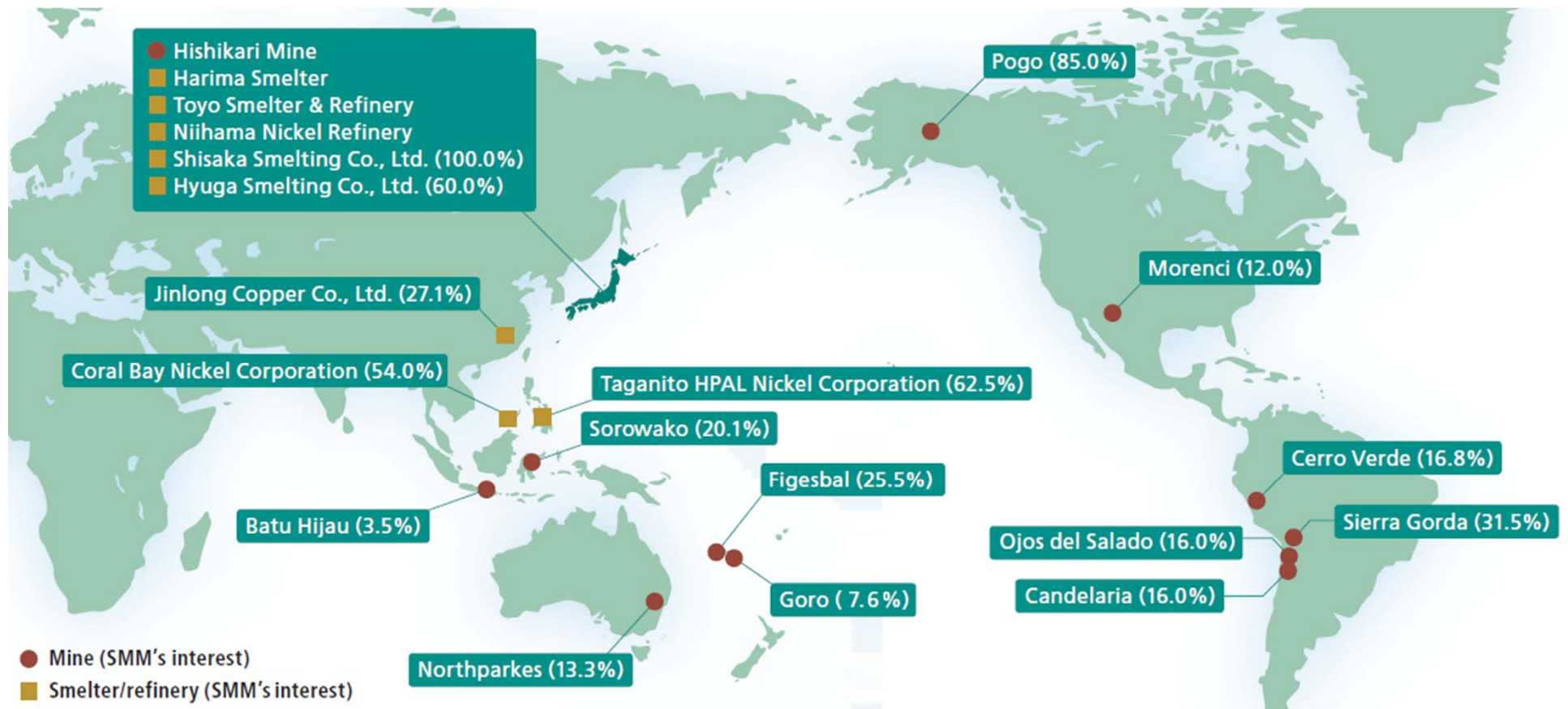
(JPY100M)

Element	Degree of variation	Operating income/ Recurring profit
Cu	$\pm 100\$/t$	7/13
Ni	$\pm 10 \text{ ¢ } /lb$	11/13
Au	$\pm 10\$/TOZ$	5/5
JPY/USD	$\pm \text{¥}1/\$$	13/15

(Remark)

USD/JPY translation include RC-related and Conversion rate of overseas consolidated / equity-method affiliate companies' profit.

7) SMM's Mines and Smelters / Refineries



8) Glossary

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; an 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.

8) Glossary

4) Metal content in ores

[Au]

(Canadian standard)

Reserve (ore)

Economically minable part of Measured or Indicated Mineral Resources demonstrated by at least preliminary feasibility study.

Resource (ore)

Quantity and of such a grade or quality that it has reasonable prospects for economic extraction.

(Japan Standard (JIS))

"Prospective Mineable Resource" ("Kasai Kouryo")

Total weight of the crude ore to be mined within the deposit, which contains the mineable portion of the "Geological Resource" and the waste rocks to be added in the mining process.

"Geological Resource" ("Maizo Kouryo")

Total weight of the mineralized material in the crust within the deposit.

[Cu / Ni]

"Reserve" or equivalent of the standards in each countries.

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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