

FY2012

Progress of Business Strategy

May 2013



SUMITOMO METAL MINING Co., Ltd.

Contents

I

**Trend in Business Performance and
Asset Components**

II

**Review of 2009 3-Yr Business Plan
and Strategy of 2012 3-Yr Business Plan**

III

External Environment

IV

Financial Highlights and Information Materials

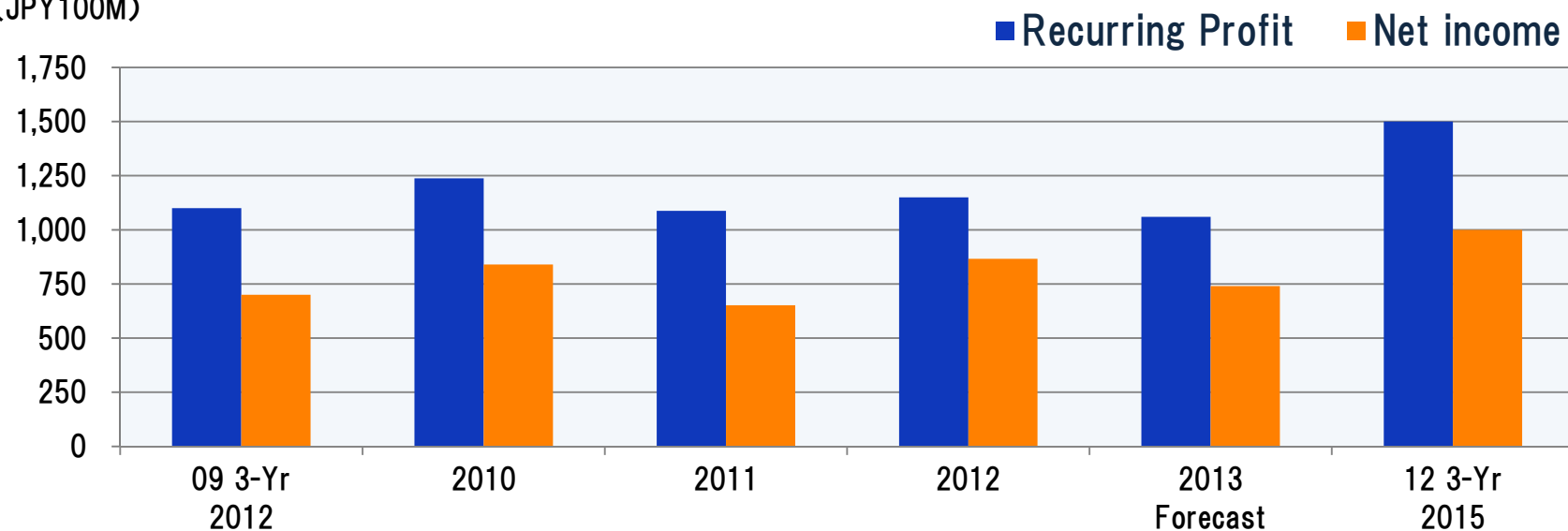
I . Trend in Business Performance and Asset Components



Taganito Project

1) Profit Trends

(JPY100M)

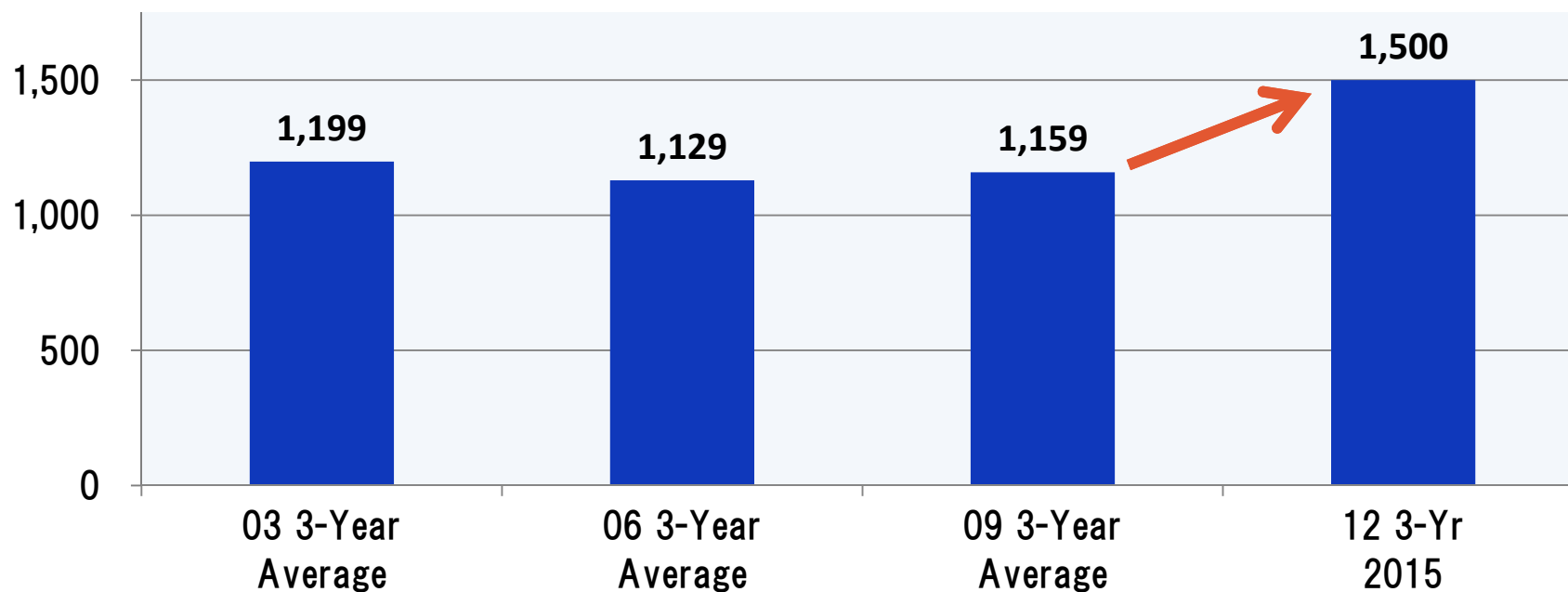


	09 3-Yr 2012	2010	2011	2012	2013 Forecast	12 3-Yr 2015
Recurring profit (JPY100M)	1,100	1,238	1,088	1,150	1,060	1,500
Net income (JPY100M)	700	841	653	866	740	1,000
Cu Price (\$/T)	6,000	8,140	8,485	7,855	7,000	7,500
Ni Price (\$/lb)	8.0	10.7	9.6	7.7	7.0	9.0
Au Price (\$/Toz)	1,000	1,294	1,646	1,654	1,450	1,550
Forex (¥/\$)	90.0	85.7	79.1	83.1	98.0	80.0

2) Recurring Profit Trend

(JPY100M)

Trends of Recurring profit in each 3-Year plan

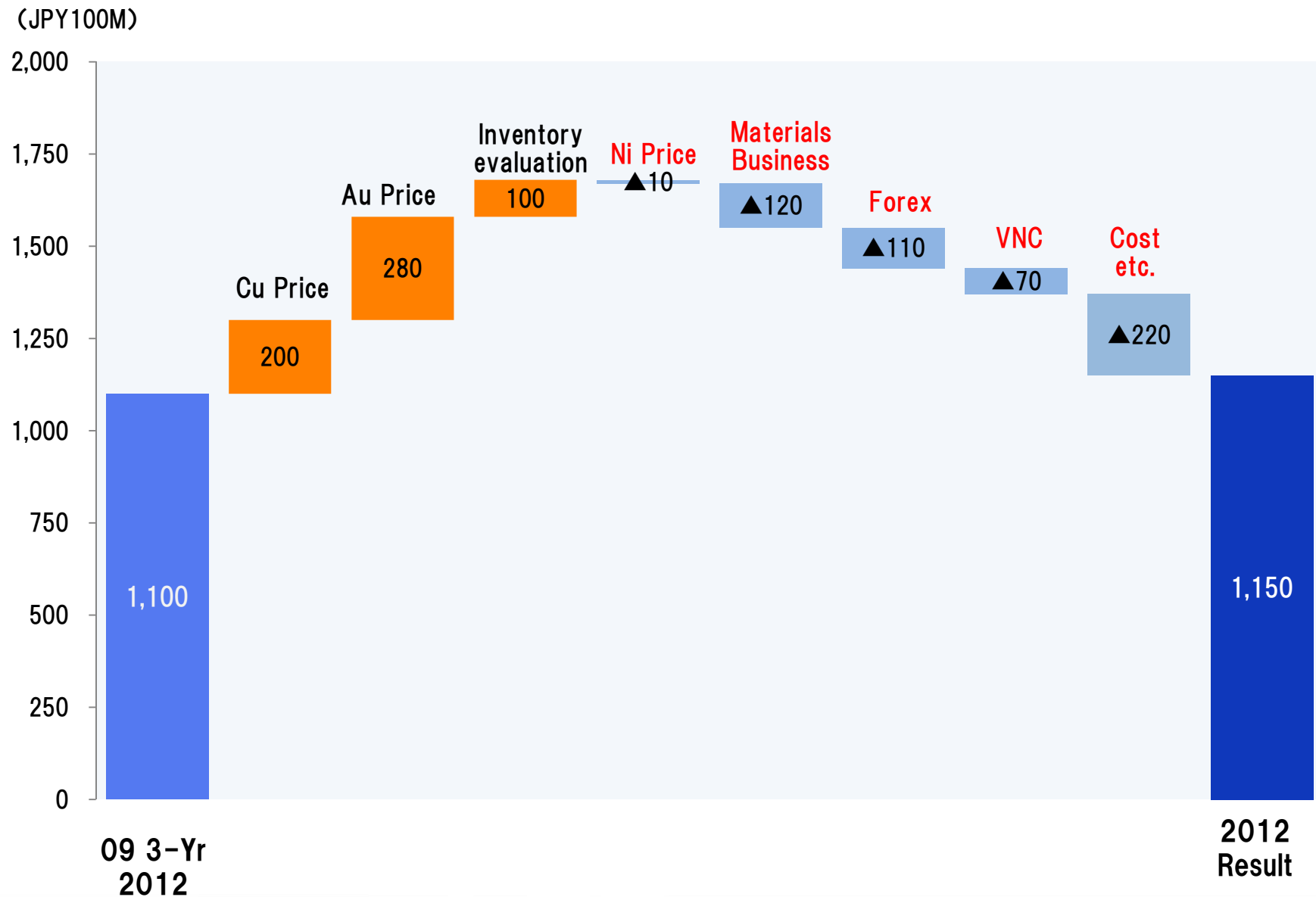


(JPY100M)

	03 3-Yr	06 3-Yr	09 3-Yr	12 3-Yr 2015
Total of Recurring profit in each 3-Year Plan	3,597	3,386	3,476	-
Yearly average of each 3-Year plan	1,199	1,129	1,159	1,500

3) Recurring Profit Analysis

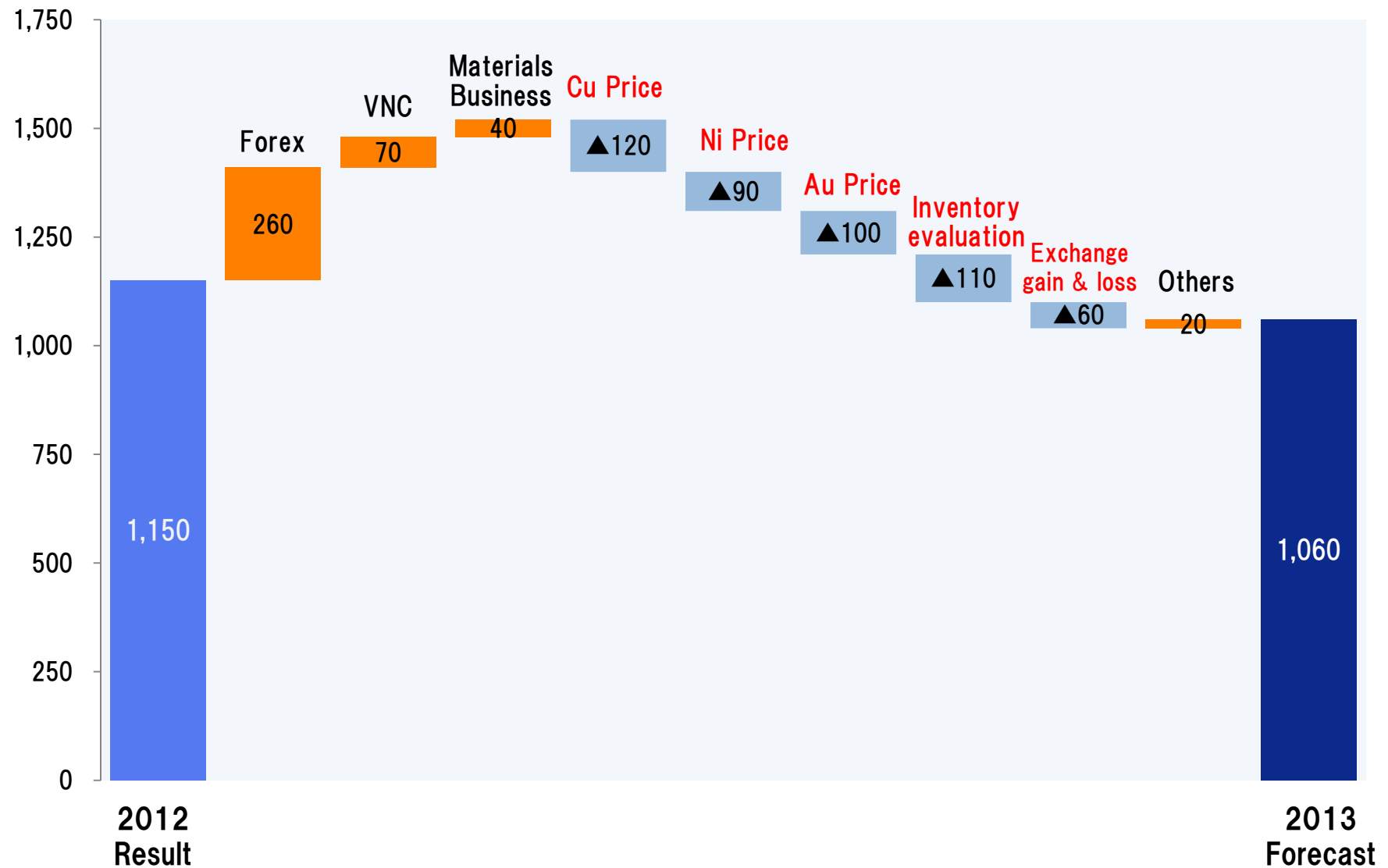
FY2012 Result vs. 09 3-Yr 2012



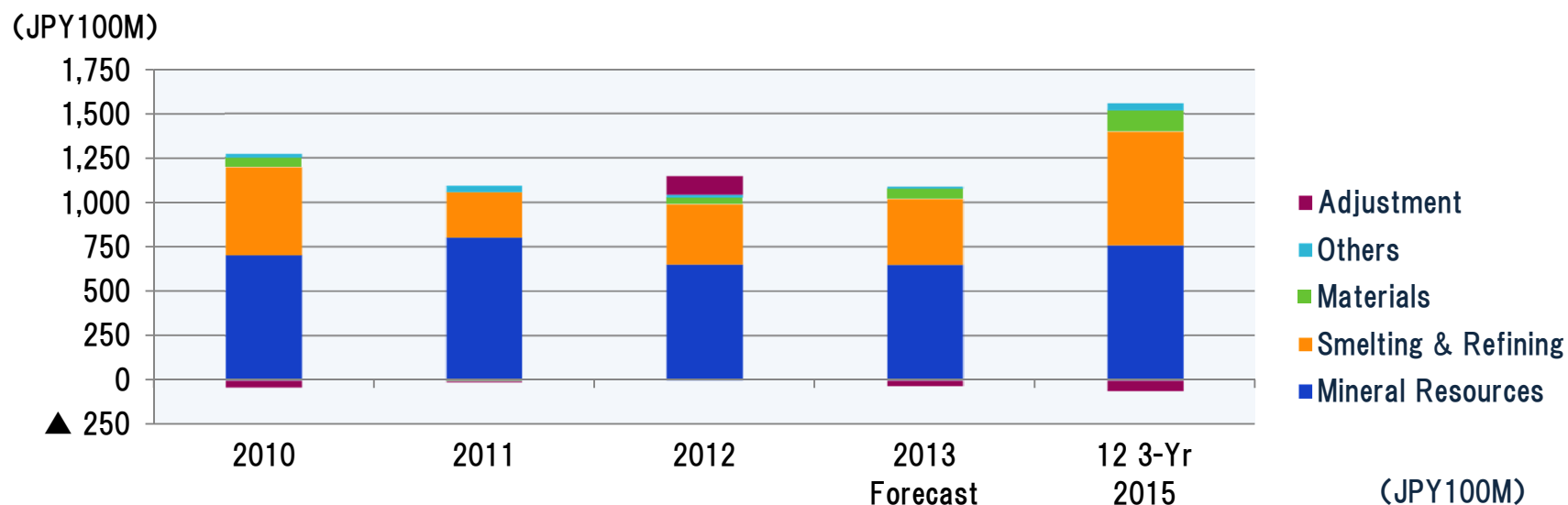
4) Recurring Profit Analysis

FY2013 Forecast vs. FY 2012 Result

(JPY100M)



5) Profit Trends by Segment

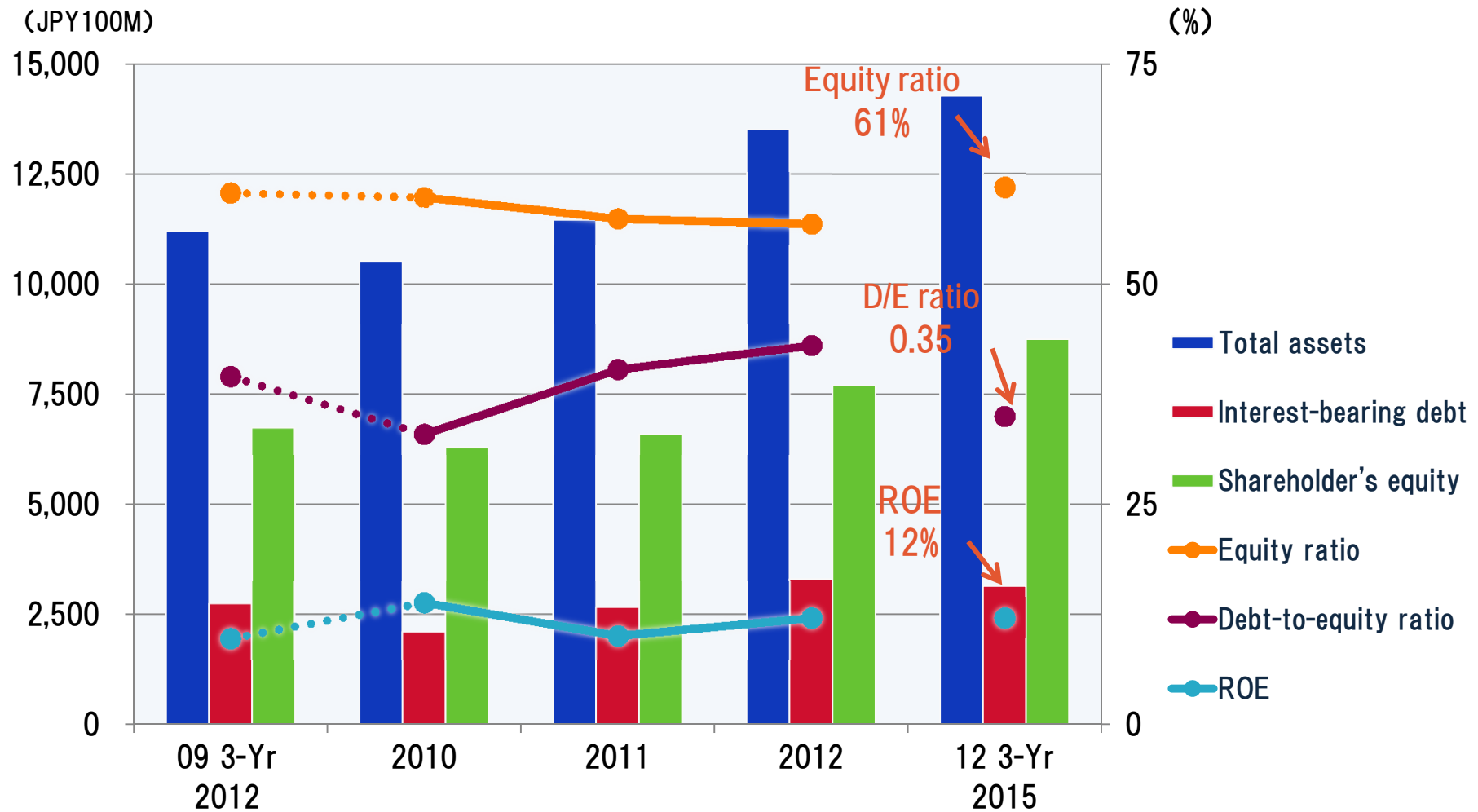


		2010	2011	2012	2013 Forecast	12 3-Yr 2015
✕ Segment profit	Mineral Resources	705	806	652	650	760
	Smelting & Refining	495	256	339	370	640
	Materials	54	14	38	60	120
	Others	23	19	16	10	40
Adjustment		▲39	▲7	105	▲30	▲60
Recurring Profit		1,238	1,088	1,150	1,060	1,500

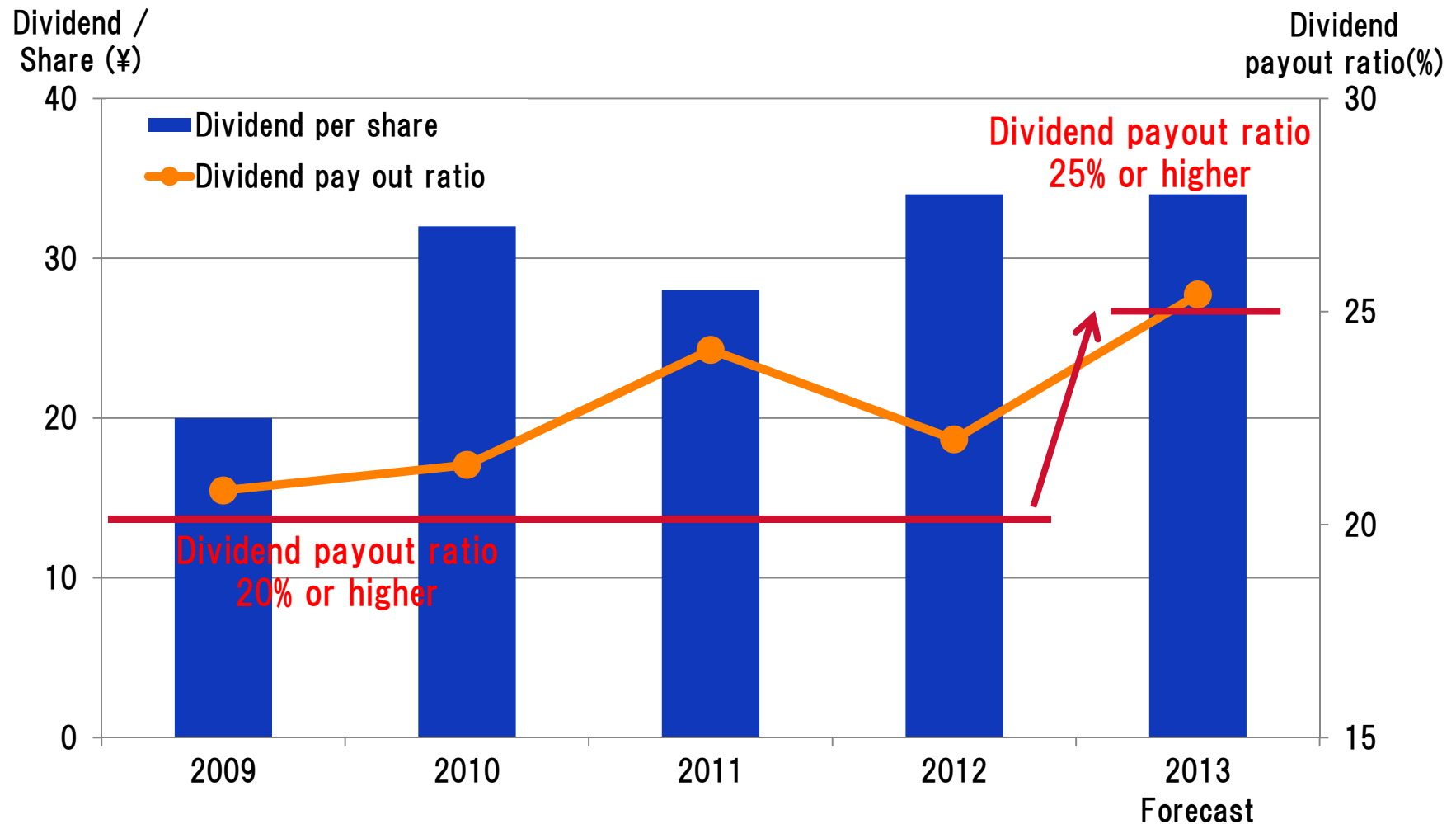
✕ FY2010-FY2012 : Contribution Margin (Earlier Bases) / FY2013 Forecast, 12 3-Yr 2015 : New Segment Profit
For details, please refer P 41

6) Financial Strategies

Maintenance of a Sound Financial Structure



7) Trend of Dividend



- Dividend payout ratio raised from 20% or higher
⇒ 25% or higher from FY2013

II . Review of 2009 3-Yr Business Plan and Strategy of 2012 3-Yr Business Plan



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%
SMM	31.5%
Sumitomo Corp.	13.5%

Total
Investment
for Phase 1

\$ 3.9B

Schedule and Current Status

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

Factors Behind Increase in Investment Amount

- Total investment for Phase 1: increase from \$2.9B to \$3.9B
- Main factors for increase
 - Changes in economic environment, such as exchange rate and price of construction materials changes
 - Increasing labor costs
 - Work cost increases due to design content changes, etc.

1) Mineral Resources

② Expansion of Existing Mines Morenci -Cu



Morenci Mine (USA) Expansion Project

**Equity
Interest
Ratio**

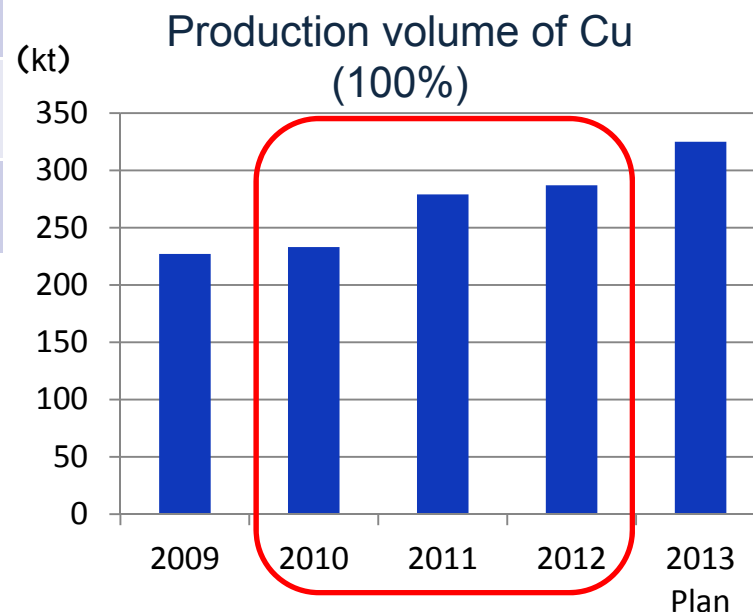
FCX 85%
SMM 12%
Sumitomo Corp. 3%

**Total Amount
of Investment**

\$1.7B

Upgrade Plan

	Current	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
- 2014 3Q - Launch full-scale operation

1) Mineral Resources

② Expansion of Existing Mines Cerro Verde-Cu

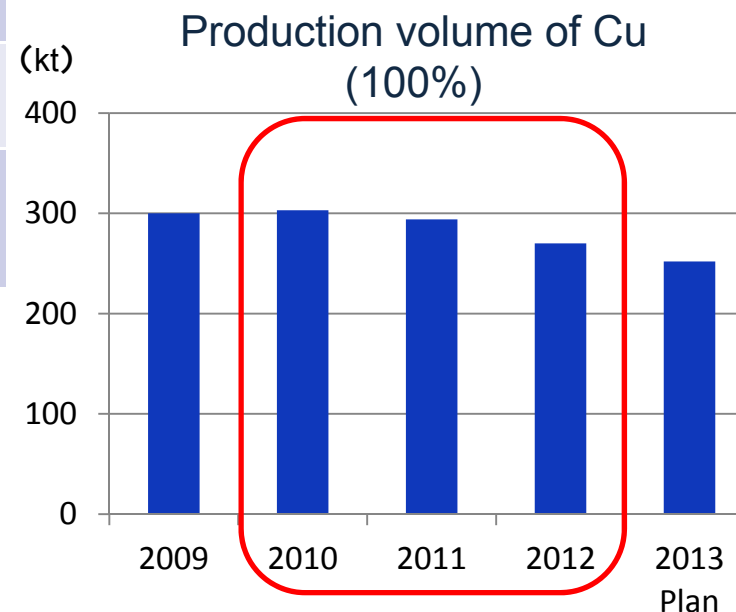


Cerro Verde Mine (Peru) Expansion Project

Equity Interest Ratio	FCX	53.56%	Total Amount of Investment \$4.4B
	SMM	16.80%	
	Sumitomo Corp.	4.20%	
	Other	25.44%	

Upgrade Plan

	Current	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 2Q - Scheduled to complete final planning (including financing)
- 2013 - Start construction
- End of 2015 - Full production

1) Mineral Resources

③ Maintenance and Expansion of Existing Au Mine Volume



Hishikari Mine

Production volume and Gold content

Production volume during 09 3-Yr plan: 7.5t/year

FY2013 production plan: 7.0t

Gold content as of December 31, 2012: 169t

Maintaining gold content by carrying on the policy of “Explore as much as we mine”

Development plan for lower ore body

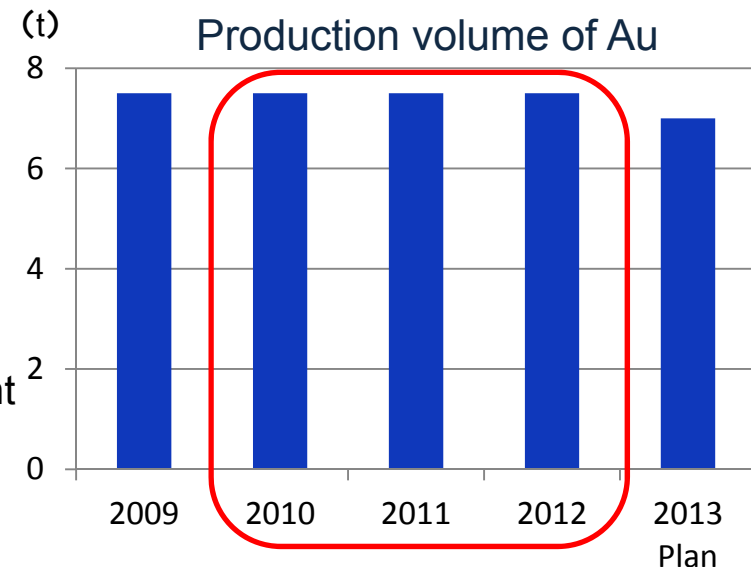
Confirmed quality mineral vein in the lower part of ore body being mined

- 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
- End of 2012 - Posted 23t of expected gold volume for lower part of ore body as gold content

(Note)

Hishikari mine: Content gold in Minalable ore (JIS) : 169t

Expect gold content in lower ore body (Not included in Minalable ore) : 7t



1) Mineral Resources

③ Maintenance and Expansion of Existing Au Mine Volume



Pogo Gold Mine

2009 - Additionally acquired mining interest
(51% → 85%)

2010 - Production Volume 12t

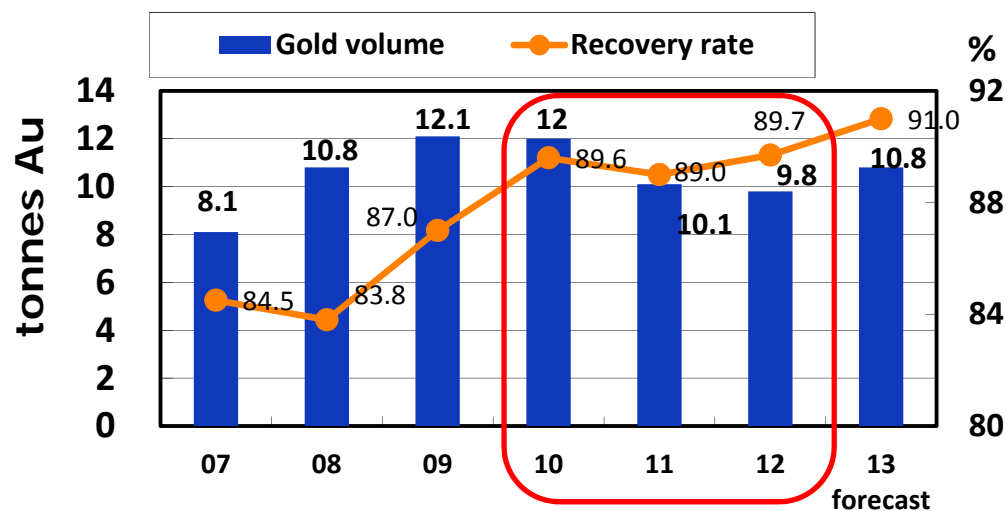
2013 - Production Plan: 10.8t

Gold content as of December 31, 2012: 143t

*The mined quantity fell in 2012 due to the intrusion of water into the mine

Operation is expected to return to normal in 2013

*Actively continue the exploration of surrounding area



(Note) Pogo Gold Mine: Content Gold in Reserve + Resource (NI43-101(Canada))
(Gold content in reserve : 69t, in resource : 74t)

1) Mineral Resources

④ Promotion of Exploration by SMM /Stone Boy - Au / Solomon - Ni

Stone Boy Project

- Exploration in each areas such as Naosi area
- Conducted environmental surveys and Pre/FS
- 12 3-Yr Business Plan period: Continue exploration



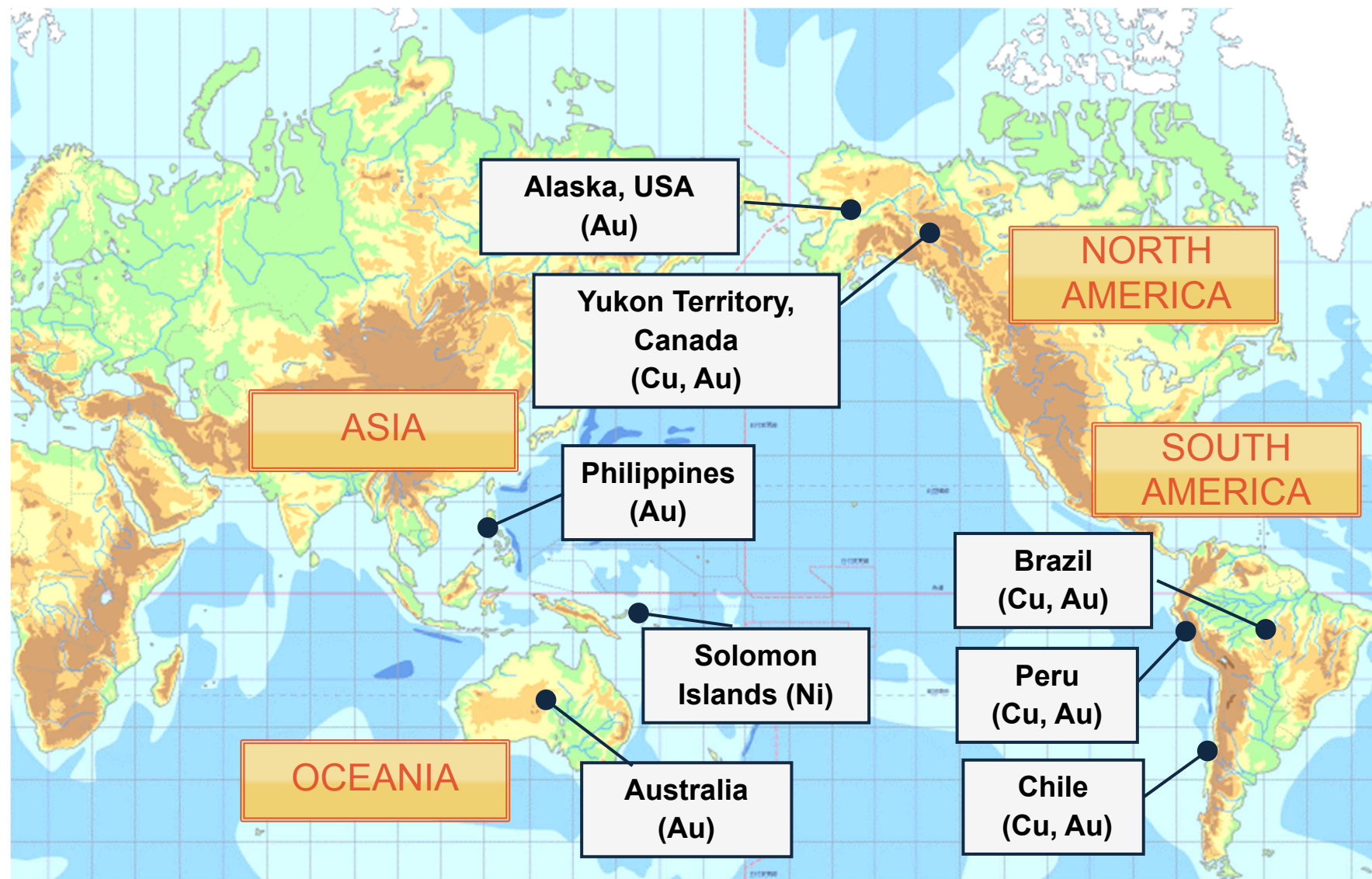
Solomon Project

- Conduct environmental research and Pre/FS in Choiseul Section and Isabel Section
- Applied for mining rights and prepared for development
- 12 3-Yr Business Plan period: Continue development preparations

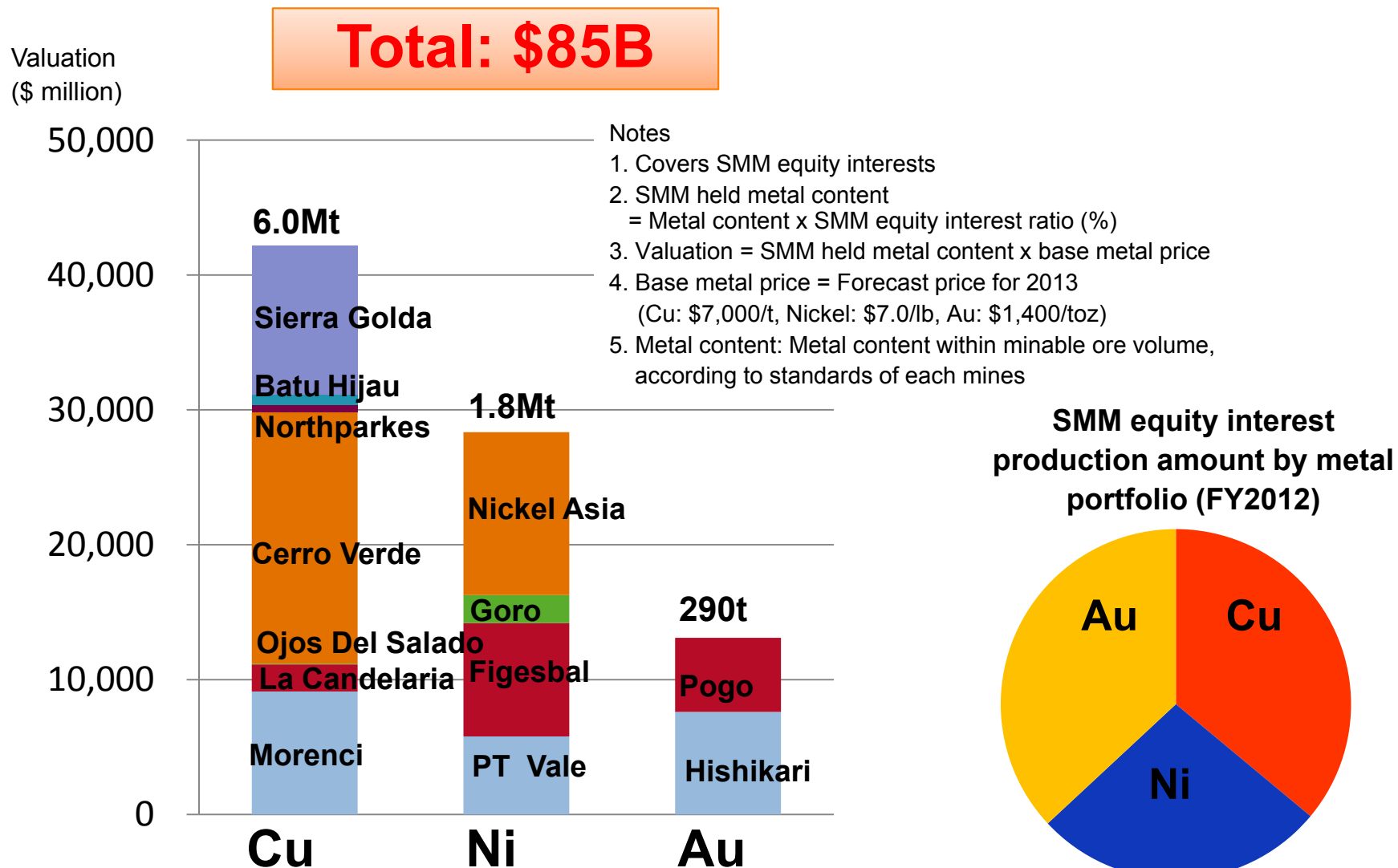


1) Mineral Resources

④ Promotion of Exploration by SMM - Worldwide Exploration



1) Mineral Resources ⑤ Mining Interest – Metal content in ores



2) Smelting & Refining ① Coral Bay Nickel -Ni



Coral Bay Nickel (Philippines)

Equity
Interest
Ratio

SMM	54%
NAC	10%
MITSUI & CO., LTD.	18%
Sojitz	18%

Schedule

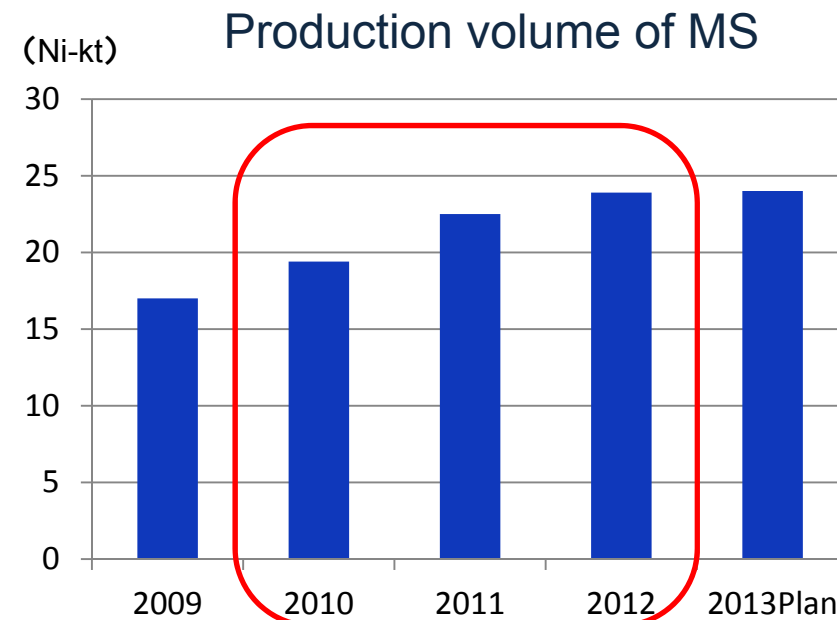
2006 - Started second production line construction work

2009 - Started operation of two production lines

Production volume

FY2012 - Full-scale production (24kt)

Full-scale production will continue



2) Smelting & Refining ② Taganito Project-Ni



Taganito Project (Philippines)

Equity
Interest
Ratio

SMM 62.5%
NAC 22.5%
MITSUI & CO., LTD. 15%

Total Amount
of Investment

\$1.6B

Schedule

March, 2010 - Started construction

October, 2011 - An assault incident by NPA

December, 2011 - Construction was resumed

Summer 2013 - Scheduled to complete
construction work

FY2013 3Q - Start pilot operation

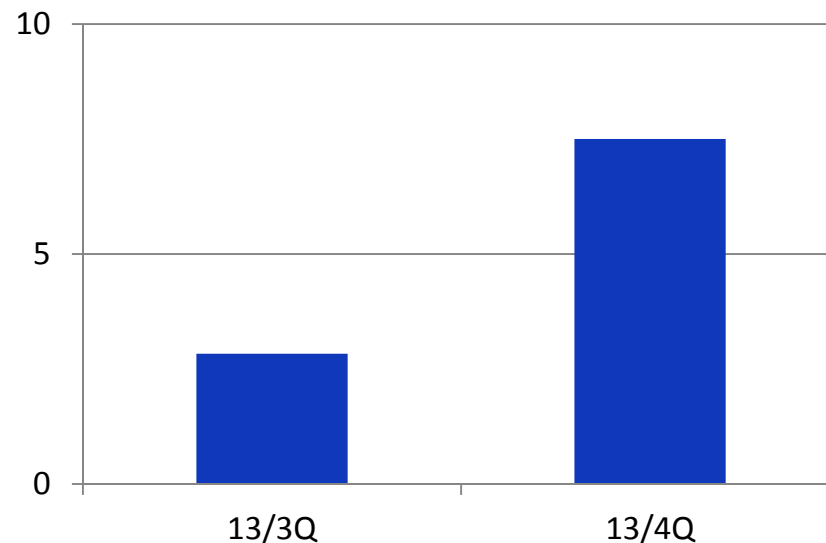
FY2013 4Q - Switch to full-scale production

Production volume

2013 - 11kt (Plan)

FY2014 - Begin 30kt operation

(Ni-kt) Production Plan of MS



2) Smelting & Refining

③ Promotion of 65 kt Electrolytic Nickel Production Operation - Ni



Increase production at Niihama Nickel Refinery

Production
Capacity

41kt / year
→65kt / year

Total Amount
of Investment

¥14B

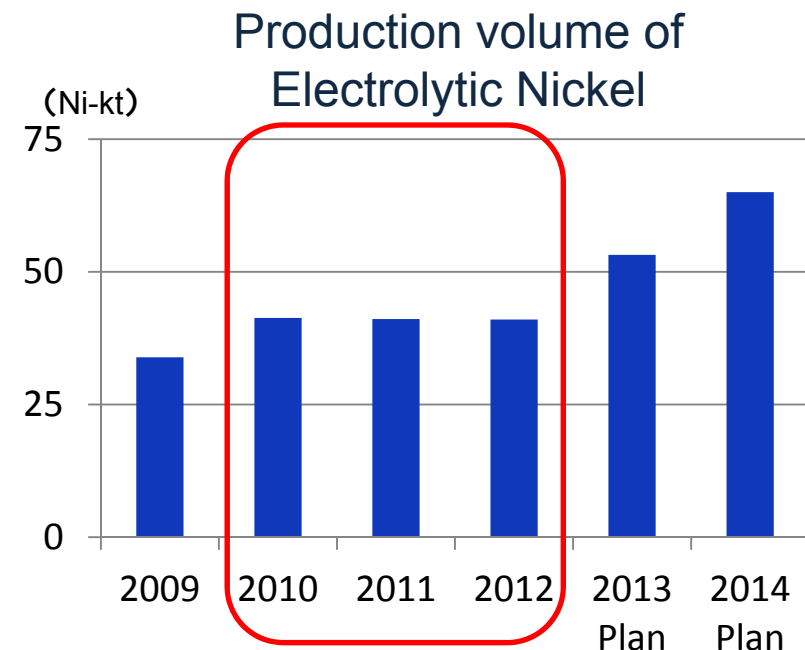
Schedule

- FY2009 - Completed 41kt production structure
- FY2010 - Determined to invest for 65kt production operation
- End of March 2013 - Refining facility completed
- October, 2013 – Receipt of raw materials from Taganito

Production volume

FY2013 - 53kt (Plan)

FY2014 - Begin 65kt operation



2) Smelting & Refining

④ Goro Project –Ni

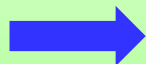
Goro Project (New Caledonia)

May, 2012 Water leak during sulfuric acid process



October, 2012

Agreed not to undertake the expenses for facility repair and improvement (additional investment) at this stage



**Investment in SUMIC decreased from 21% to 14.5%
(no longer an affiliated company
accounted for using equity method since 2012 3Q)**



2012 4Q - Complete maintenance and repairs, and begin operations

2013 1Q - Produce total of 5.1kt of nickel hydroxide and nickel oxide
(equivalent to 35% of capacity)

Aim for simultaneous operation of 2 of 3 production lines

2) Smelting & Refining

⑤ Cu - Enhance competitiveness of Toyo Smelter



Toyo Smelter & Refinery (Japan)

FY2012 Production Volume of Electrolytic copper 436kt

FY2013 Production Plan 423kt

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

Stable high-load operation at our new flash furnace

Progressively increased volume of recycled raw materials

Measures to enhance competitiveness

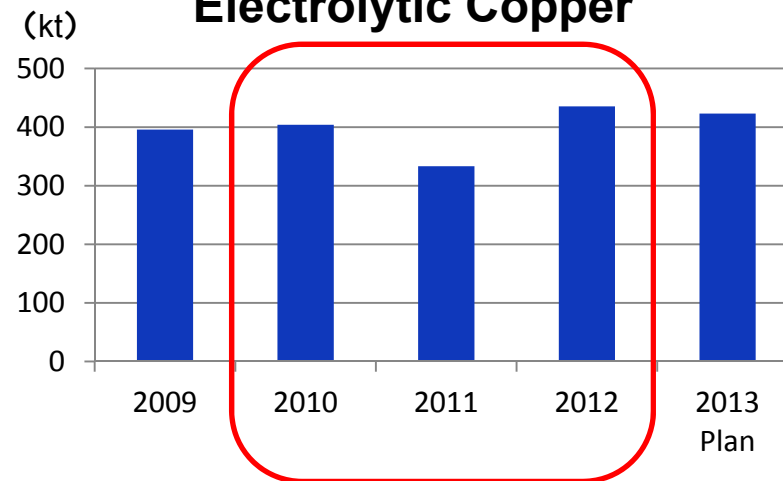
Develop and improve an advanced concentrate burner

Support expanded pickup and process of secondary raw materials

Promote further cost reduction measures

Improve operational environment

Production Volume of Electrolytic Copper



3) Materials

Progress of Selection and Concentration

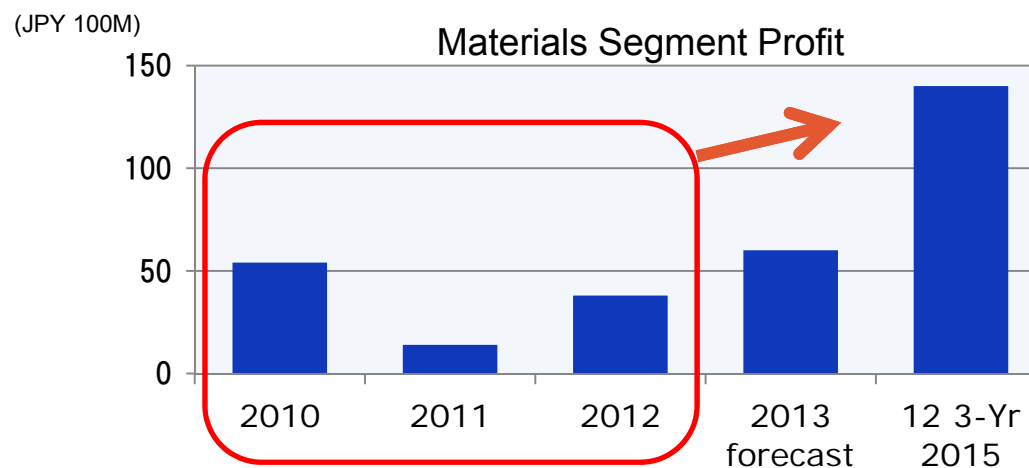
Materials Business 09 3-Yr Business Plan Measures

Implementation of various measures toward the shift of our business structure

- Withdraw from the bonding wire business.
- Terminate subtractive COF production / sales and shift to semi-additive COF production.
- Withdraw from lead frame production in Thailand.
- Promote an alliance in the lead frame business.



Concentrate management resources for the production of materials used in the environmental and energy fields.



※For 2010-2012 show contribution margin based on the earlier bases, and for 2013 forecast and 12 3-Yr 2015 show new segment profit

3) Materials Progress of Selection and Concentration

② Battery Materials & Sapphire Substrates

Battery Materials

Strategy and Measures

Maintain and strengthen positive relationships with good customers
Strengthen precursor production capacity in preparation for construction of new supply chain

Respond to TOYOTA xEV's expansion strategy

- Maintain our top market share of 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 higher 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

Sapphire Substrates

Strategy and Measures

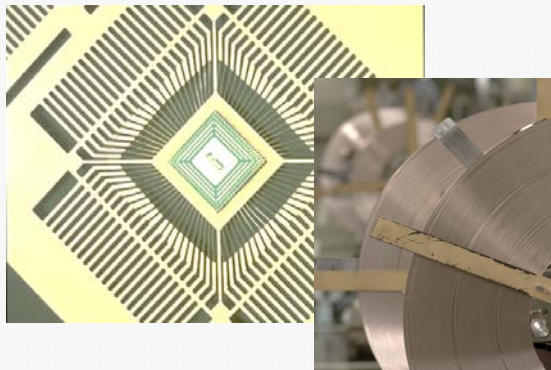
Build Mass production line
at Okuchi Electronics Co., Ltd.

- 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 application and acquire new customers

3) Materials Progress of Selection and Concentration

③ Integration of Lead Frame Business

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:
Over ¥1 billion/year

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)

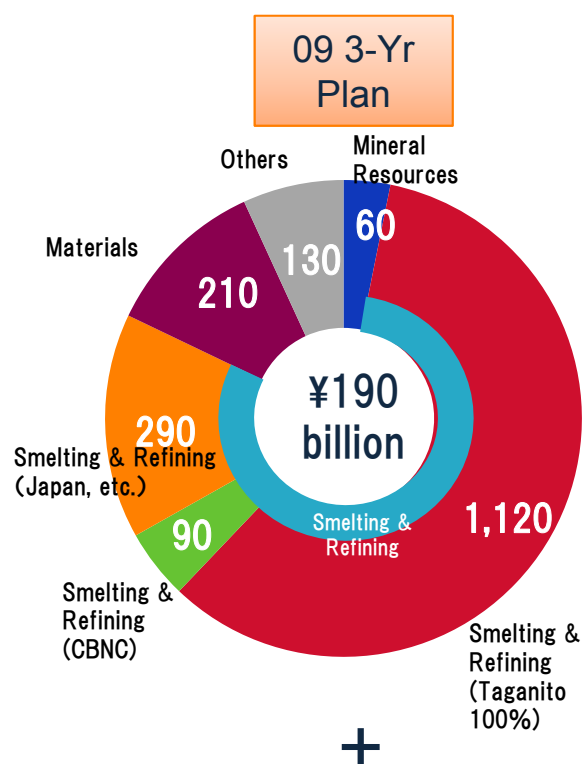
Recover chrome contained in HPAL raw material ore at Taganito

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

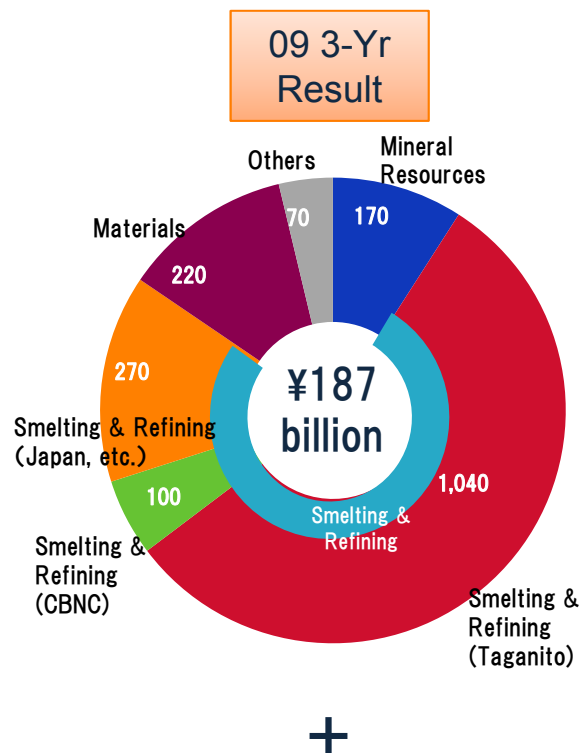
Current chrome production and usage status

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

5) Investments in Large Projects



Acquisition of overseas interest



Overseas interest	JPY 100M
Sierra Gorda	410
Goro	40
NAC	15
Total	465



Acquisition of overseas interest

6) Promotion of Research & Development

Technology Development Measures for 09 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
- Construction scheduled to be completed in 2014

Materials business

- October, 2010 - Established Battery Research Laboratory
- October, 2012 - Established Materials Research & Development Center
(under Technology Division)



Acceleration of development of new products

Under the 12 3-Yr Business Plan, technology development will be further advanced



7) Progress in Large-Scale Projects

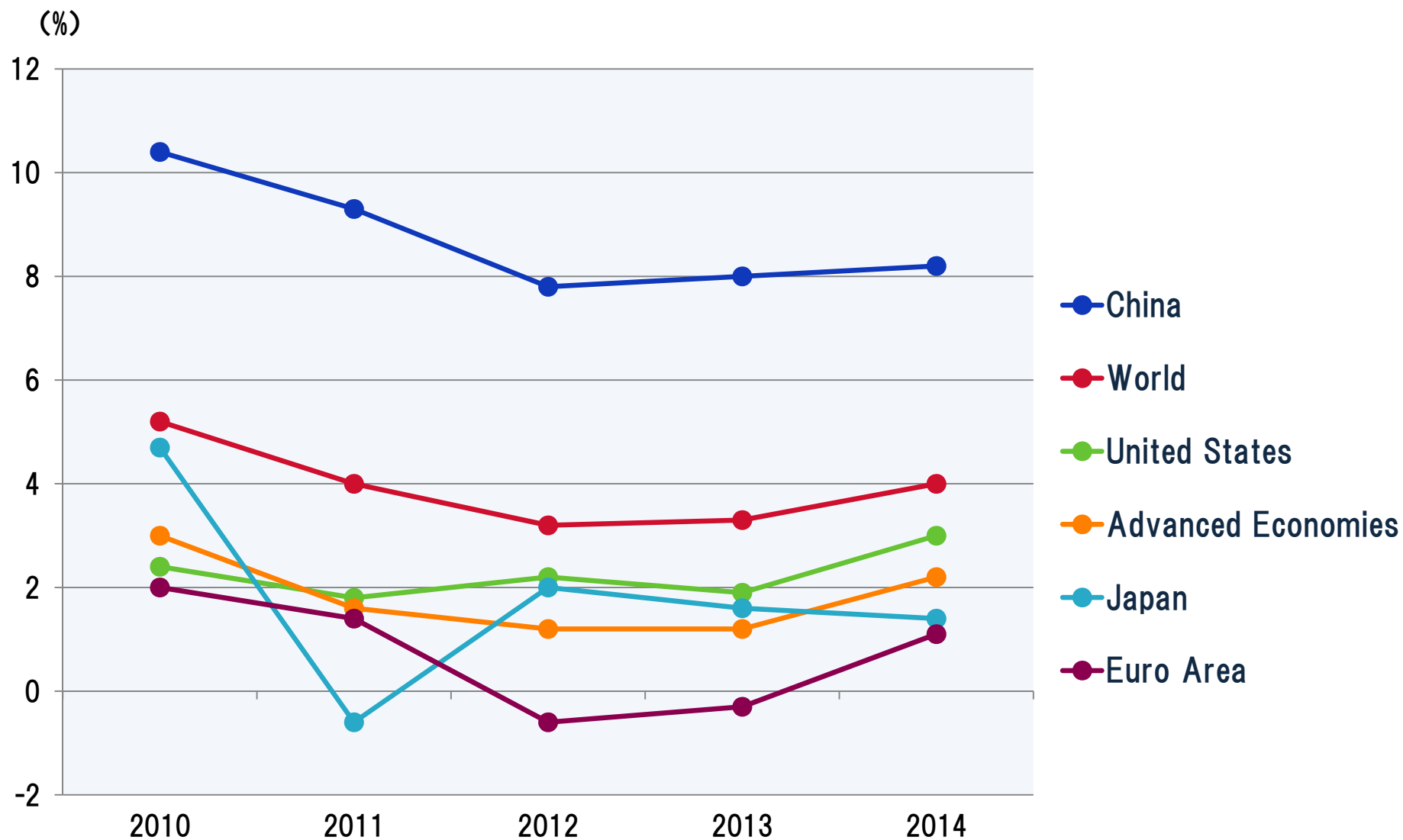
	- 2006 3-Yr Plan		2009 3-Yr Plan			2012 3-Yr Plan			2015 3-Yr Plan
(fiscal year)	~2008	2009	2010	2011	2012	2013	2014	2015	
Taganito Project	2007 ○ F/S contract conclusion	○ Project determined				○ 30kt operation			○ 2016 36kt operation
E-Ni 65 kt			○ Project determined			○ Launch			
Sierra Gorda Project				○ Project participation determined			○ 1st Stage start		○ 2017 2nd Stage start
Morenci Expansion					○ Project participation determined		○ Expanded operation start		
Cerro Verde	2004 ○ Participation determined	○ 2007 Phase 1 production start					○ Participation for Expansion project determined		○ 2016 Expanded operation start
Coral Bay Nickel	2005 ○ Phase 1 operation	○ Phase 2 operation							
Pogo Gold Mine	2006 ○ Start production	○ Additional mining interest acquired							
Goro Project	2005 ○ Project participation determined				○ Investment diluted from 11% to 7.6%	○ Normal operation			
Toyo Smelter 450 kt	○ Establish capacity								

III. External Environment



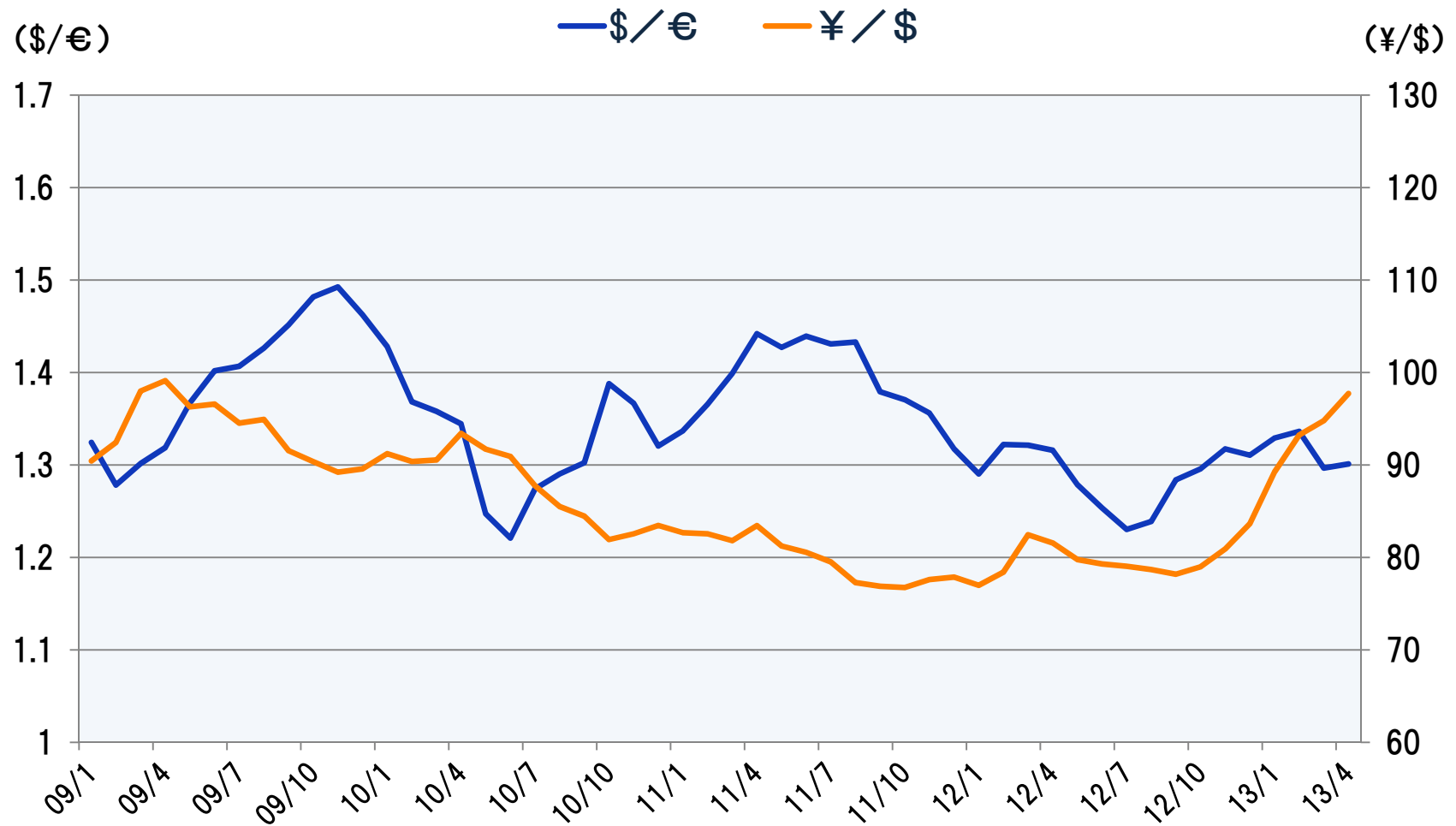
Niihama Nickel Refinery (Japan)

1) General Conditions – Global GDP Growth

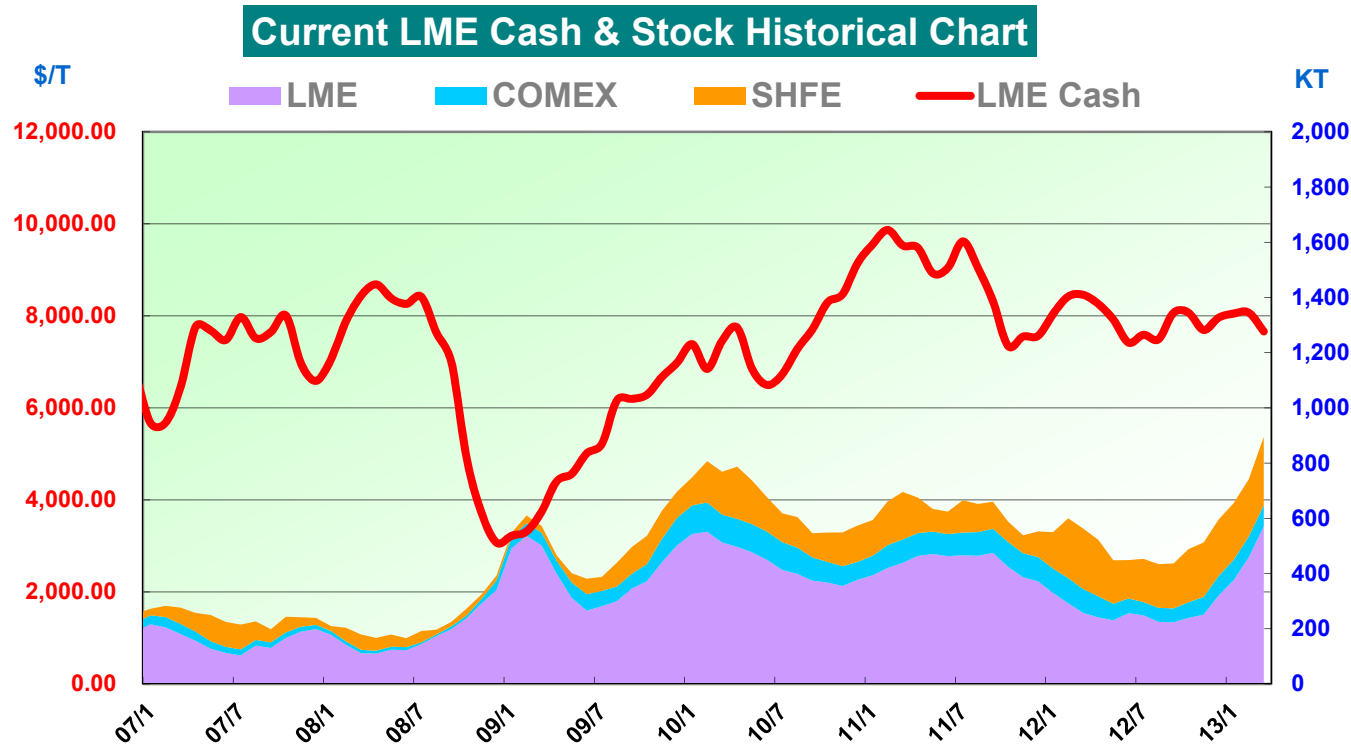


(IMF Apr. 2013 Forecast)

2) Forex Trends



3) Cu – Price / Supply & Demand Balance

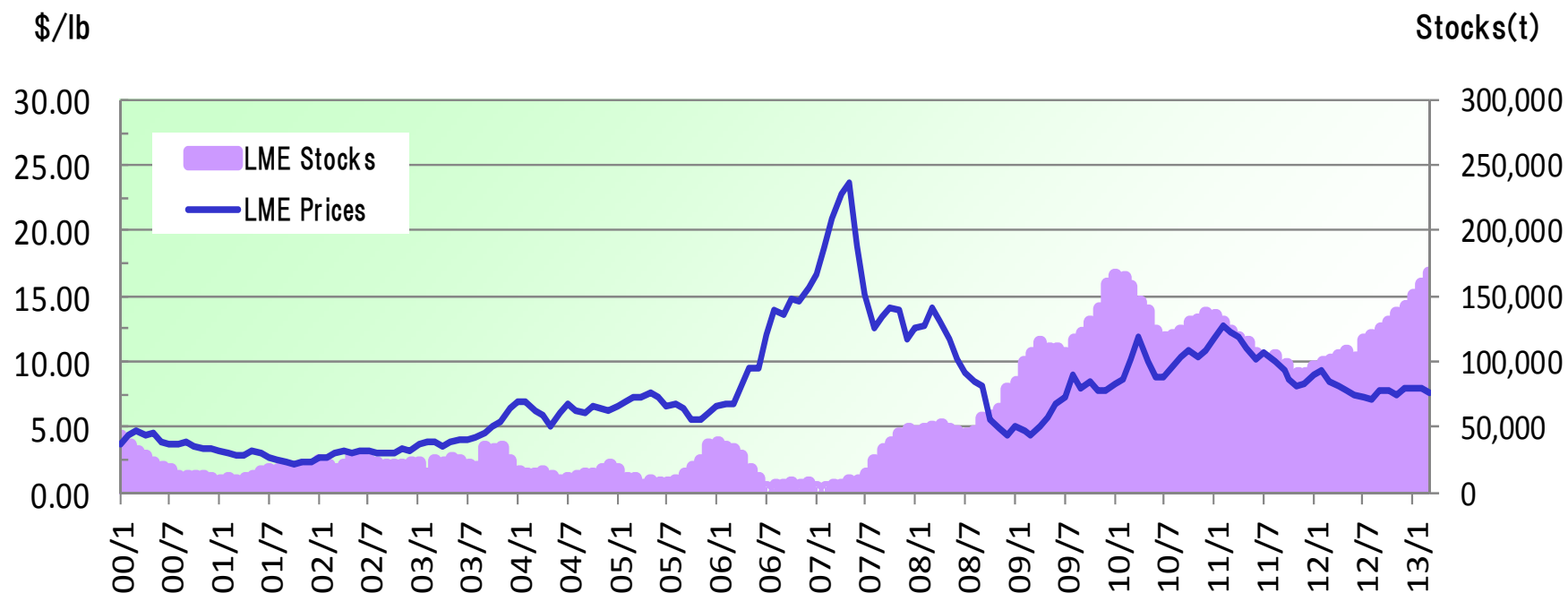


[ICSG Estimation April 2013]

(kt)

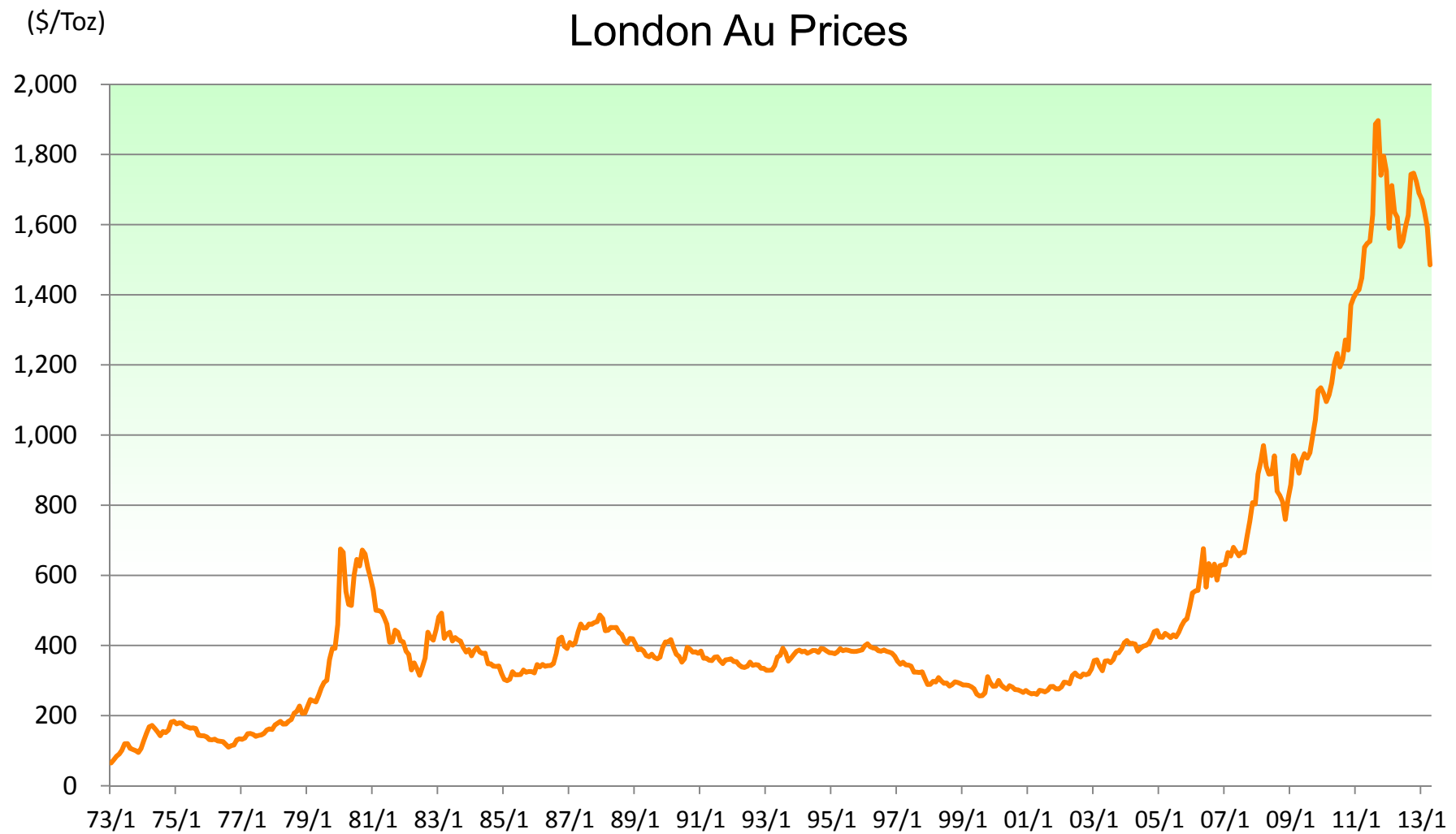
	2012	2013	2014
Production	20,116	20,983	22,046
Usage	20,509	20,566	21,366
Balance	▲393	417	681

4) Ni – Price / Supply & Demand Balance



	INSG Estimation Apr.2013 (kt)			SMM Estimation Apr. 2013 (kt)		
	2011	2012	2013	2011	2012	2013
Production	1,613	1,755	1,860	1,609	1,728	1,825
Usage	1,582	1,647	1,773	1,582	1,679	1,755
Balance	31	108	87	27	49	70

5) Au - Price



IV. Financial Highlights and Information Materials



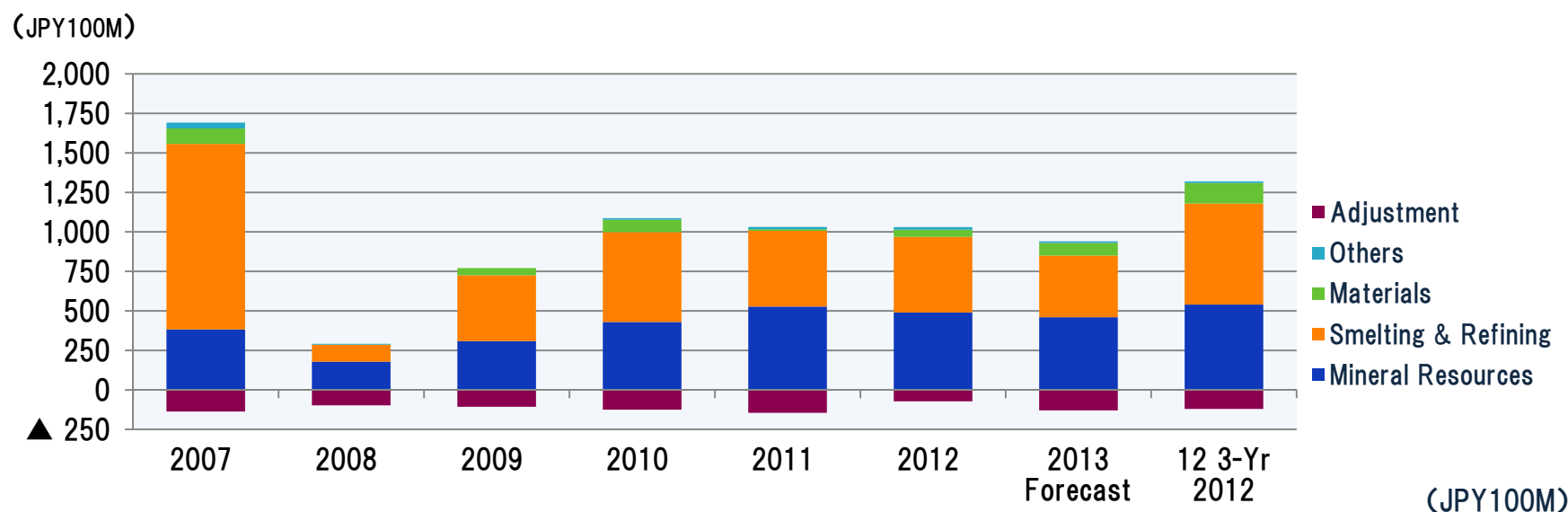
New Employee Education (Japan)

1) Performance Trends

(JPY100M)

	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	8,720	9,100
Operating Income	1,555	107	663	962	886	958	810	1,200
Recurring Profit	2,179	328	879	1,238	1,088	1,150	1,060	1,500
Equity Method profit	740	315	261	348	232	171	250	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	7,000	7,500
Nickel (\$/lb)	15.5	7.5	7.7	10.7	9.6	7.69	7.0	9.0
Gold (\$/Toz)	766	867	1,023	1,294	1,646	1,654	1,450	1,550
Zinc (\$/T)	2,986	1,560	1,934	2,187	2,101	1,950	1,900	1,800
Exchange(¥/\$)	114.4	100.7	92.9	85.7	79.1	83.1	98.0	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	460	540
Smelting & Refining	1,174	107	417	569	480	479	390	640
Materials	98	▲87	45	78	8	45	80	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	810	1,200

3) Segment Profit (method for calculating is changed)

(JPY100M)

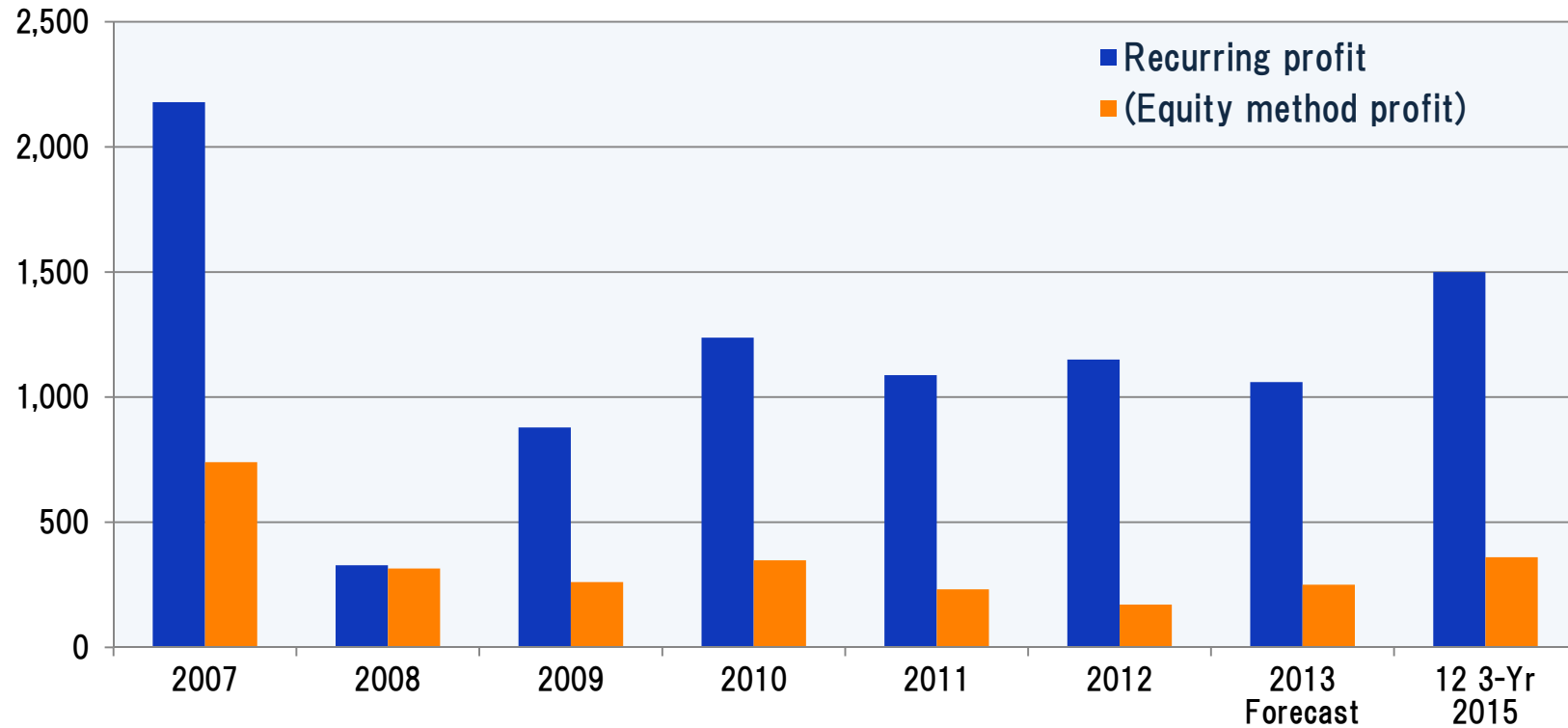
		2010 (Earlier Bases)	2011 (Earlier Bases)	2012 (Earlier Bases)	2013 Forecast (Earlier Bases)	2013 Forecast (New Segment Profit)	12 3-Yr 2015 (Earlier Bases)	12 3-Yr 2015 (New Segment Profit)
Segment profit	Mineral Resources	705	806	652	640	650	760	760
	Smelting & Refining	495	256	339	300	370	570	640
	Materials	54	14	38	80	60	140	120
	Others	23	19	16	10	10	40	40
Adjustment		▲39	▲7	105	30	▲30	▲10	▲60
Recurring Profit		1,238	1,088	1,150	1,060	1,060	1,500	1,500

Commencing with FY2013, the method for calculating segment profits recorded in the results brief is to be changed as follows

- “Capital costs” will no longer be allocated to segment profits.
- Internal loan interest, will be borne respectively by each segment.
- The method for allocating Head Office expenses and Technology Division expenses will be changed.

4) Recurring Profit / Equity Method Profit

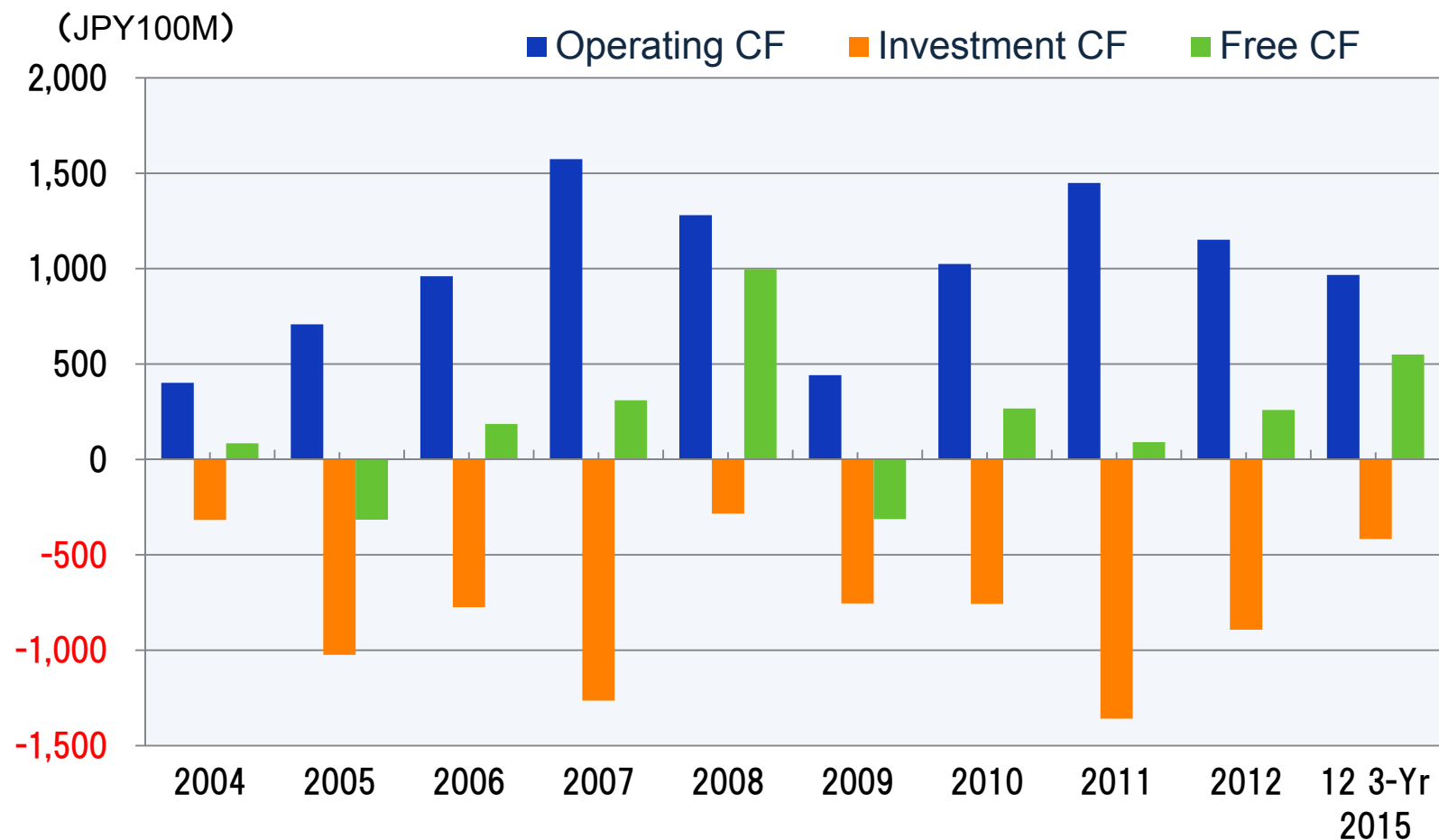
(JPY100M)



(JPY100M)

	2007	2008	2009	2010	2011	2012	2013 Forecast	12 3-Yr 2015
Recurring profit	2,179	328	879	1,238	1,088	1,150	1,060	1,500
(Equity method profit)	740	315	261	348	232	171	250	360

5) Cash Flow Trends



6) Sensitivity

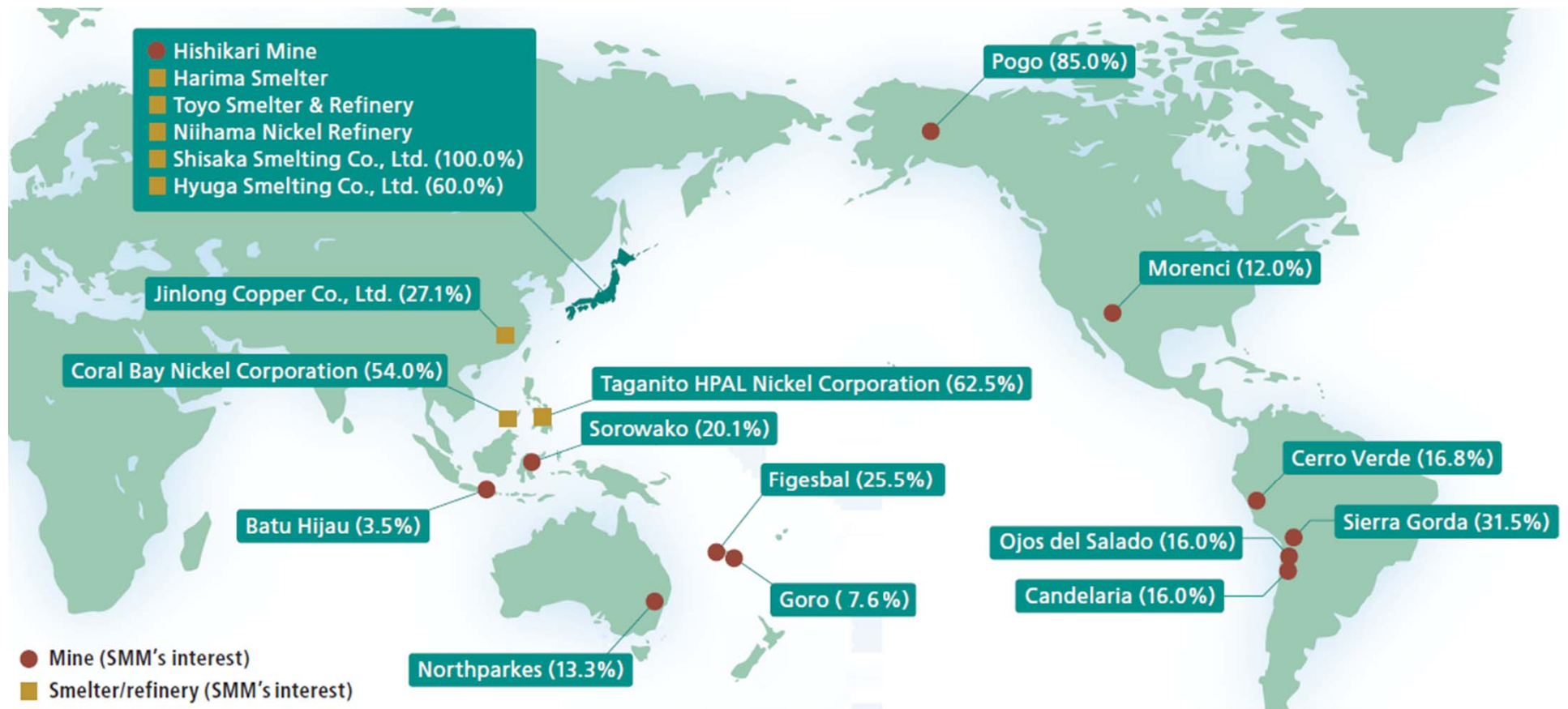
(JPY100M)

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.

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