Japan’s Mineral Industry

- By Metalworld Research Team

Mineral Resources Indispensable to Our Lives and Industry

We need various raw materials to conduct our daily lives and industrial activities and these raw materials are mineral resources. If supply of these mineral resources were to come to a halt, continuation of our normal daily lives and industrial activities would immediately become impossible.

However, Japan is a country lacking in mineral resources and depends on imports from overseas for the majority of these resources. Japan therefore implements various measures to ensure the stable supply of mineral resources from overseas.


The mineral resource industry of Japan is made up of three general sectors: the non-ferrous metal industry, the non-metal mining industry and the quarrying industry.

The non-ferrous mining industry consists of mines where minerals are excavated and the refineries where metals other than iron are produced from the minerals. However, Japan’s mines have been depleted and currently refineries depend on imports from overseas for the majority of the necessary minerals for raw materials. The main mines, which are still in operation domestically are Toyoha Mine in Hokkaido (lead, copper) and Hishikari Mine in Kagoshima (gold).

The nonmetal mining industry engages in mining of nonmetal minerals such as lime, silica sand, and clay. Lime is used as a raw material in cement and silica sand is used mainly as a raw material in glass. Clay is used for products we are familiar with in our everyday lives like cosmetics and ceramic ware.

Quarrying industry mines various kinds of rough stone used mainly as raw materials in building.

(A) The Purpose of Japan's Mineral Resource Policy is to secure a Stable Supply of Resources to Protect our Livelihood

To achieve this purpose, the following measures have been implemented:

(i) Promotion of Exploration and Development of New Mines

While minerals are an essential basic material in our lives, Japan depends on imports from overseas for most of its minerals. Mining minerals ultimately results in exhaustion of the mineral deposits. To secure long-term stable supplies of minerals, the continuous development of new mines is necessary. Therefore, the government gives various types of assistance for the conducting of exploration surveys.

- Development of mineral resource exploration technology (physical exploration, remote sensing etc.);
- Corporate exploration assistance and exploration investment and financing in Japan and abroad; Surveys on geological structures in Japan and abroad;
- Development of recycling-related technology for non-ferrous metals;
- Mine exploration reserve fund system (through the tax system);

(ii) Rare Metals Reserve:

Rare metals are used in cutting edge industries such as the electronics industry as a raw material to make magnetic materials and electronics parts. However, countries, which produce rare metals are limited and this factor makes the supply structure extremely fragile. So Japan is building national reserves of seven rare metals: nickel, chrome, tungsten, cobalt, molybdenum, manganese, and vanadium.

(iii) Securing Nonmetal Resources:

Limestone, nonmetal quarrying are resources which Japan can self-supply in only a very limited capacity. With economic stagnation and rising awareness of the environment, development of new mines is becoming very difficult. In such a restricted environment, the government has taken the following measures to secure a stable supply:

- Specific disaster prevention reserve fund (through taxes)
- Rock resource surveys

Sources of mineral imports by mine configuration

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<tr>
<th></th>
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<tbody>
<tr>
<td>Copper</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Independently Developed Minerals</td>
<td>54.4</td>
<td>198.8</td>
<td>557</td>
<td>551.9</td>
</tr>
<tr>
<td>Financed Minerals</td>
<td>312</td>
<td>342.2</td>
<td>446.9</td>
<td>395.8</td>
</tr>
<tr>
<td>Other Minerals</td>
<td>564</td>
<td>534.2</td>
<td>344</td>
<td>337.3</td>
</tr>
<tr>
<td>Total</td>
<td>930.4</td>
<td>1073.2</td>
<td>1347.9</td>
<td>1285</td>
</tr>
<tr>
<td>Lead</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Independently Developed Minerals</td>
<td>8.3</td>
<td>13.3</td>
<td>12.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Financed Minerals</td>
<td>0.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Other Minerals</td>
<td>169.2</td>
<td>105.8</td>
<td>116</td>
<td>112.2</td>
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<tr>
<td>Total</td>
<td>187.1</td>
<td>110.1</td>
<td>128.3</td>
<td>127.4</td>
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<tr>
<td>Zinc</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independently Developed Minerals</td>
<td>22.2</td>
<td>52.4</td>
<td>90.2</td>
<td>94.3</td>
</tr>
<tr>
<td>Financed Minerals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other Minerals</td>
<td>564.1</td>
<td>492.4</td>
<td>440.8</td>
<td>480.5</td>
</tr>
<tr>
<td>Total</td>
<td>586.3</td>
<td>544.8</td>
<td>531</td>
<td>574.8</td>
</tr>
</tbody>
</table>

(Source: Data from the Ministry of International Trade and Industry; Metalworld 2006-08-15)
To secure stable and efficient supply of mineral resources, promote exploration and development of mines and encourage recycling as mid-to long-term measures and step up rare metal conservation projects as a preemptive measures to counter a short-term supply obstacle.

(A) The Current State of Japan’s Nonferrous Metal Resources

(i) Characteristics of Nonferrous Metal Resources:

Japan consumes a large amount of nonferrous metal. (Copper: 99.9%, zinc: 92.0%). Nonferrous metal is indispensable to our lives and industry as basic materials for automobiles, home electronic appliances, information-related appliances and power grids. Rare metal, especially, will be an essential material for information technology and environmental technology to support the core of Japan’s economy.

- Ratio of Japan’s consumption to the world consumption (2001)
  - Copper: 7.8%
  - Zinc: 7.3%

- Japan’s dependence on import (2001)
  - Copper: 99.9%
  - Zinc: 92.0%

- Reserve ratio of major elements in earth crust
  - Steel: 5.0%
  - Copper: 0.0055%
  - Tungsten: 0.000015%

- Number of years possible for nonferrous metal mining (2001)
  - Copper: 47.8 years
  - Zinc: 49.2 years

(B) Composition of the Nonferrous Metal Industry:

The nonferrous metal industry is recently comprised of "the electric material business" and "the environment-related business" in addition to "the metal business."

(i) The metal business:

The business section of mining minerals at domestic and overseas mines and refining mined minerals into bare metal, such as copper, at domestic refineries.

(Major domestic mines)

- Toyoha Mine (Hokkaido/lead, zinc)
- Hishigari Mine (Kagoshima Prefecture/gold)

(Major refineries)

- Saganoseki Refinery (Oita Prefecture/copper)
- Onahama Refinery (Fukushima Prefecture/copper)
- Chigirijima Refinery (Hirishima Prefecture/lead)
- Takehara Refinery (Hirishima Prefecture/lead)
- Iijima Refinery (Akita Prefecture/zinc)
- Annaka Refinery (Gunma Prefecture/zinc)

(ii) The electric material business:

A business section of processing bare metal, such as gold, platinum and nickel, for electric-related products, including information technology-related products.

(iii) Section for environment-related business:

Section for environment-related business including recycling utilizing refining technology and facilities developed to date (for example, in the recycling of lead automobile batteries or electrical household appliances) and cleaning contaminated soil.

(C) Recent Business Condition of the Nonferrous Metal Industry:

FY2002 sales of eight major nonferrous companies amounted to 2,517.3 billion yen, down 1.7% on the previous year. Although demand for automotive-related products remained firm and there was a recovery in demand for mobile phones and computer-related products, earnings decreased as a result of depressed prices of non-ferrous metals, such as copper and zinc. Due to a reduction in costs, current profits rose to 69.8 billion yen, up 598% on the previous year. The outlook for the entire FY2003 is for a continued austere business environment for all companies.

(Major refineries)

- Saganoseki Refinery (Oita Prefecture/copper)
- Onahama Refinery (Fukushima Prefecture/copper)
- Chigirijima Refinery (Hirishima Prefecture/lead)
- Takehara Refinery (Hirishima Prefecture/lead)
- Iijima Refinery (Akita Prefecture/zinc)
- Annaka Refinery (Gunma Prefecture/zinc)

(D) Characteristics of the Nonferrous Metal Industry:

1. Risk of Mine Exploration Activities

- As mineral deposits lie more upcountry and deeper and the quality of world-class mineral deposits deteriorates, exploration requires a large amount of funds and advanced technology.

2. Risk of Mine Exploration

- The scale of new mine exploration tends to become larger as economy of scale is pursued.
1. Risk of Mine Exploration Activities
   o As mineral deposits lie more upcountry and deeper and the quality of world-class mineral deposits deteriorates, exploration requires a large amount of funds and advanced technology.

2. Risk of Mine Exploration
   o The scale of new mine exploration tends to become larger as economy of scale is pursued.
   o A large amount of funds are required for environmental measures, compared with conventional practice.

3. Tendency of Centralization
   o The world market of the nonferrous metal industry is becoming centralized, as world-class nonferrous metal-related corporations are enhancing profitability and expanding resource supply share by corporate mergers and acquisitions.

4. Difficulty in Substitution and Possibility of Recycling
   o Nonferrous metal resources are basic materials used in a wide range of industries, including the information technology field, depending on their characteristics, and many of them are difficult to substitute.

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<tr>
<th>Shifts of metal mines</th>
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<tr>
<td></td>
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<tr>
<td><strong>Year</strong></td>
</tr>
<tr>
<td>Number of Mines</td>
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<tr>
<td>(Small to Medium Size)</td>
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<td>26 (24)</td>
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[3] Overview of the Nonferrous Metal Industry:
Production levels of nonferrous mining industries, including limestone and other stone quarrying, have stagnated due largely to the recent economic downturn and a reduction in public works.

Ex. Trends in limestone mining

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<tr>
<td></td>
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<tr>
<td><strong>Year</strong></td>
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<tr>
<td>Number of mines</td>
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<tr>
<td>298</td>
</tr>
<tr>
<td>Output (million tons)</td>
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<td>160</td>
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[4] The Metal Mining Agency of Japan:

(A) Overview of the organization:
   • Date of establishment: May 20, 1963
   • Law the establishment based on: The Metal Mining Agency law (Law 78 in 1963)
   • Number of managerial positions: Chairman of the board of directors-1, directors-5 (of these, part-time-1), secretary-1, personnel-189 (as of April 2003)

(B) Overview of operations:

(i) Metal resource development project:
   In order to secure stable mineral resource supply, promote mine exploration for mid-to long-term expansion of supply sources through overseas resource information collection, satellite image analysis, geological features and structure, exploration technology development and loans for exploration.

(ii) Metal mineral stockpile project:
   By stockpiling rare metal of which deposits are concentrated in politically unstable countries, prepare a system to endure a short-term supply obstacle.

(iii) Mine pollution-related project:
   From a viewpoint of protection of people’s health and preservation of environment for life, prevent mine pollution resulting from the metal mining industry.

(C) Overview of Individual Policy (Budgets for FY 2001):

(i) Aid for Exploration and Development of Domestic Mines:
   In order to promote domestic mine exploration activities, conduct surveys of geological features and structure in wide areas and surveys of detailed geological features and structure. Furthermore, extend aid to projects, including loans for exploration by corporations, exploration of ore deposits and utilization of byproducts.

(ii) Technology Cooperation:
   In addition to securing a stable supply of mineral resources for Japan, engage in technological cooperation with developing countries in resource development research including geological surveys, boring surveys and physical exploration to promote economic development in those countries.

(iii) Technology Development:
   Engage in R&D for advanced exploration technology for remote, deep mine mineral excavation, R&D for recovery technology for valuable metals utilizing nonferrous metal refining facilities, and R&D for slag recycling technology.

(iv) Rare Metal Stockpile:
   To secure rare metal in a stable and efficient way, conduct national stockpile of seven kinds of rare metal (nickel, chrome, cobalt, manganese, vanadium, tungsten, molybdenum). Aim at stockpiling worth 42 days by the government of domestic consumption amount and a total stockpiling worth 60 days by the government and the private sector by the end of 2005.

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