The establishment of the center has led to		
expectations for ripple effects on various sectors, for		
example, manufacturing and sales of protective gear		
and goods for karate and worldwide dissemination of		
information on karate, in addition to ripple effects on		
the tourism sector.		
The 2009 Okinawa Traditional Karatedo World		
Championship, the first world championship karate		
meet in six years, will be held in August this year.		
People from 31 countries entered the previous		
championship, and even more countries are expected to		
enter this year.		

4. Toward finding solutions to global issues

From the 1990s through the first decade of the 2000s, in connection with the global economy, emerging economies, including Asia, achieved rapid economic growth; however, on the other hand, global greenhouse gas emissions have surged, drawing closer attention to global warming issues. In addition to this, the development of industries and enhancement of the purchasing power of consumers in emerging economies have initiated an increase in global demand for natural resources and foods, and global consumption of water.

Such global issues are difficult problems not easily resolved without unified commitments by every country, and they require international cooperation. In particular, countries with high-level technology, like Japan, are expected to make active commitments. Meanwhile, such commitments to resolve global issues will also give rise to worldwide business opportunities.

The following discusses global issues, such as global warming and concerns about shortages of resources, ⁹² foods and water, and introduces example cases where excellent technologies of Japanese-owned companies succeeded in solving these kinds of issues overseas.

(1) Global warming issues

(A) Movements involving global warming issues

2008 was the first year of the first commitment period (2008 to 2012) as prescribed in the Kyoto Protocol. The parties to the protocol are required to promote commitments to reduce greenhouse gases. Coping with the issue of global warming has become one of the most important tasks for companies as well.

On the other hand, in comparison with the rest of the world, Japan has top class energy-saving technology and high energy efficiency. Japan was the first nation in the world to establish a sustainable society where both environmental protection and economic growth can be attained. Thus, overseas business expansion by Japanese-owned companies based on their advantageous environment-related technologies will contribute to finding solutions to the issue of global warming.

⁹² For flow of international trade, etc. of energy (crude oil, coal and natural gases) and mineral resources, refer to Supplementary Note 2-5.

(B) Expansion of environment-related business market

(a) Environment-related business market arousing expectations for further development

The environment-related business market is expected to grow further in the medium- to long-term. Prime Minister Aso said in his speech entitled, "Toward New Growth," in April 2009, that strategic investment in the environment-related fields, regarding which Japan has the world's best technology, shall be linked to economic growth and the creation of jobs, so as to create a market for the low-carbon emissions revolution worth ¥50 trillion in 2020 and job opportunities for 1.4 million people.

In addition, the United Nations Environment Programme (UNEP) predicts that the scale of the global environment-related business market, which was approximately 1 trillion euros (approximately \$130 trillion) in 2005,⁹³ will expand to approximately 2.2 trillion euros (approximately \$290 trillion) in 2020 (Figure 2-2-4-1).⁹⁴



Figure 2-2-4-1 Estimate on scale of world's environment-related business market

IEA, in its *World Energy Outlook 2008*, estimates the scale of worldwide power generation for 2030, by category of energy resource. According to the estimate, solar photoelectric generation will be 88 times as much in 2030 as it was in 2006, wind power generation will be 11.5 times as much, and power generation using non-fossil energy will increase remarkably (Figure 2-2-4-2). Such results arouse expectations for the development of related markets.

Source: Innovative environmental growth markets from a company perspective (Roland Berger, 2007).

⁹³ This business market covers generation and storage of electricity, efficiency in energy use, efficiency in materials, sustainable transportation and traffic, management and recycling of waste, and sustainable water resources management.

⁹⁴ The United Nations Environment Programme (2008), *Green Jobs: Towards decent work in a sustainable, low-carbon world.*

	Power generation (TWh)		Scale of increase (times)	
	2006	2030	2030/2006	
Coal	7,756	14,596	1.9	
Oil	1,096	791	0.7	
Gas	3,807	6,716	1.8	
Nuclear energy	2,793	3,458	1.2	
Hydropower	3,035	4,809	1.6	
Biomass	239	863	3.6	
Wind power	130	1,490	11.5	
Geothermal power	59	177	3.0	
Solar photoelectric	4	352	88.0	
Wave power	1	14	14.0	
Total power generation	18,921	33,265	1.8	

Figure 2-2-4-2 Estimate of electric power generation, by energy source, based on IEA (Alternative Policy Scenario)

Source: World Energy Outlook 2008 (IEA, 2008)

(b) Increase in investment in environment-related business

In recent years, the amount of worldwide investment in environment-related business has been showing sharp growth. Newly invested funds for new types of energy increased by approximately 7 times all over the world in the period from 2004 to 2007. However, in 2008, the impact of the financial crisis slowed down investment in environment-related business (Figure 2-2-4-3).



Figure 2-2-4-3 Changes in amount of new investment in new energy

Source: *Global Trends in Sustainable Energy Investment 2008* (United Nations Environment Programme, UNEP), *Global Trends in Clean Energy Investment, January 2009* (New Energy Finance).

(C) Commitment of Japanese-owned companies to finding solutions to environmental issues

Currently, companies in countries all over the world are using their management resources, while focusing on environment and energy technologies. Japanese-owned companies also have actively strived to expand business by taking advantage of their environmental technology. Efficiency in energy use achieved by Japanese-owned companies is among the world's best. Moreover, its consumption of primary energy compared to GDP is remarkably lower than that of other developing



Figure 2-2-4-4 Each country's primary energy consumption compared to GDP

(Japan's advantage in contribution in finding solutions for global warming issues)

Japan has set the goal of becoming a world leader in the low carbon revolution, by means as elevating the ratio of the quantity of introduced renewable energy to final energy consumption from around 10% in 2005 to 20% in 2020, the world's highest level, and encouraging the dissemination of eco cars (electric cars, hybrid electric cars, etc.) at the fastest speed in the world.⁹⁵ Encouraging the dissemination of technology with a view to realize a low carbon society would contribute to solving global warming issues in Japan and the whole world. It is expected that Japanese technology will be further developed in many other parts of the world.

(a) Eco-car

With regard to hybrid electric cars,⁹⁶ Japanese automobile manufacturers, such as Toyota and Honda, occupy an overwhelming world share; in 2008, Japanese manufacturers captured more than 90% of the world share (Figure 2-2-4-5).

Source: Energy Balances of OECD Countries, Energy Balances of Non-OECD Countries (IEA, 2008).

⁹⁵ The website of the Prime Minister of Japan and His Cabinet, *Toward New Growth*

⁹⁶ The data refers to the number of hybrid electric cars sold, out of the thirty top-ranked car sales categorized by type of automobile and published by the Japan Automobile Dealers Association.

Figure 2-2-4-5 Number of hybrid electric cars sold by each manufacturer (2008; total of seven companies)



Source: Based on survey of Nomura Research Institute, Ltd. and MarkLines Co., Ltd. (Data: JATO Dynamics Ltd., etc.)

Meanwhile, in Japan, the ratio of hybrid electric cars to the number of passenger automobiles sold has been on an upward trend. The enhancement of customers' awareness of the environment may be considered as the main factor that has pushed up the ratio of fuel-efficient hybrid electric cars, even after the financial crisis. A further increase of hybrid electric cars is expected to work as an incentive for the realization of a low carbon society.

(b) Solar batteries

Japan produced the most solar batteries in the world in the period from 1999 to 2007. However, in 2008, a surge in China's production quantity pushed down Japan's world share to second place (Figure 2-2-4-6).



Figure 2-2-4-6 (2007 and 2008) Share of production quantity of solar batteries, by country

According to *Patent Application Technological Trend Research Report* of fiscal year 2008, Japan occupies an overwhelming proportion of patent applications related to solar batteries, which were filed

in Japan, the United States, Europe, China and South Korea, inferring that Japan has the world's leading technology related to field of solar batteries (Figure 2-2-4-7).

Figure 2-2-4-7 Countries' shares in total patent applications filed in the period from 2000 to 2006 (applications filed in Japan, U.S., Europe, China and South Korea)



Source: Patent Application Technological Trend Research Report 2008 (Ministry of Economy, Trade and Industry, Japan).

In February 2009, the Ministry of Economy, Trade and Industry announced the "The New Purchase System for Solar Power-Generated Electricity," which was subject to further detailed discussion. The Ministry of Economy, Trade and Industry convened the "Study Group on PV System Industry Strategy" in March 2009. The study group discussed the visions of future photoelectric generation sectors from the standpoint of industrial strategy, in addition to the standpoint of energy policy, so as to sustain and enhance the competitiveness of such sectors. The report prepared by the study group sets a goal of increasing Japan's world share of production quantity of solar battery cells to about one-third in 2020.

(c) Energy-efficient technology

Japan has technologies to efficiently utilize energy. Therefore, many Japanese-owned companies demonstrate the highest energy efficiency in the world.

For the purpose of reducing greenhouse gases, which is a global issue, it is important to disseminate excellent energy-saving technologies overseas. Japan is required to play an important role for such purpose, as it has the necessary technology.

<<Example Case>> A company contributing to the global environment through furnishing energy-saving technology

Shodensha Co., Ltd. carries out business in Japan and overseas, as a company rendering a comprehensive service called ESCO (Energy Service Company), which covers energy savings recommendations, and the provision, maintenance and management of facilities, etc. The company has contributed to saving energy at facilities that spend a lot of energy, such as plants, hotels, hospitals, office buildings and commercial facilities. For example, the company achieved a reduction in energy consumption of the entire facility of Sheraton Laguna Guam Resort by approximately 22%. The company's service has been adopted in about 3,000 projects in Japan and overseas. Active overseas business expansion by this energy-saving service sector may enhance contributions to solving global

environment issues.⁹⁷

<<Example Case>> Company engaged in seed development and distribution, which is also committed to environmental purification

Sakata Seed Corporation, a producer and distributor of seeds, seedlings, bulbs and equipment for agriculture and gardening, has been engaged in the international business of highly productive seeds that are resistant to disease, heat and cold. According to experimental results, "sun patience," a flowering plant developed by the company, was proved to be highly capable of purifying the environment, and of absorbing about 5–8 times as much nitrogen dioxide (NO₂) as existing gardening plants, about 3–4 times as much formaldehyde and about 4–6 times as much carbon dioxide. Furthermore, the plant also has a cooling feature, produced by its water sprinkling effect. The company categorizes the plant as an environment purification plant, and has distributed 9.25 million seedlings throughout the world as of fiscal 2008 (0.4 million seedlings in Japan).⁹⁸

<u>Column 21: Can Japanese weeds save the world? Improvement of lippia nodiflora</u> (IWADARESOU)

Japan is approximately 3,000 kilometers long, which is equivalent to one-third of the distance from the equator to the North Pole, and abounds in greenery and various plants. There are about 5,300 species of wild plants, including *pteridophyte* and *spermatophyte*, of which about 1,800 species (34%) are believed to be indigenous to Japan. These wild plants (weeds) deserve to be considered as Japan's wonderful assets, as they have succeeded in survival, while undergoing evolution to adapt themselves to Japan's diversified natural environment.

Green Produce, Inc., an environment venture business in Koyama City, Tochigi Prefecture, has commercialized *lippia nodiflora*, "a wild plant of dreams," discovered and improved by Mr. Hitoshi Kuramochi of Utsunomiya University, and has been carrying out experimental planting in such areas as the Middle East and Africa. *Lippia nodiflora* is a weed that originated in Yonagunijima Island of Okinawa Prefecture. Its roots grow to a maximum depth of about 1.5 meters, and it prevents soil erosion. Thanks to its highly prolific nature, countries such as Algeria have begun to import the plant as a greening plant for deserts.

However, as *lippia nodiflora* is a plant originally from Okinawa, a southern region, it is not suitable for growing in deserts, such as the yellow sand areas of China, where the temperature reaches minus 30° Celsius in winter. Mr. Kuramochi, who had worked for a large company as a herbicide researcher, discovered *lippia nodiflora*, a naturally growing weed, in Yonagunijima (Okinawa Prefecture), when he visited the island on a business trip. He recognized its highly prolific nature and ability to control soil erosion, and continued efforts to improve the species, until he achieved success in developing a species resistant to temperatures below minus 20° Celsius. Southwest University in Chongqing, China, and Utsunomiya University have launched a joint research project. The outcome generated from such research is expected to spread as a means for greening deserts all over the world and for preventing global warming, through private sector business, not a tax-based grant-in-aid.

⁹⁷ The Shodensha Co., Ltd website.

⁹⁸ The website of Sakata Seed Corporation



(2) Natural resource issues

(A) Movements related to natural resource issues

In the period from around 2000 to the summer of 2008, the trading prices of natural resources soared throughout the world. The prices turned downward thereafter, however, they have remained at a higher level than that of 2000 (Figure 2-2-4-8).⁹⁹

There are various factors that possibly caused the global soaring of natural resource prices, such as (i) the surge in demand of emerging economies, including those in Asia, and (ii) the flow of a huge amount of speculative funds and investment funds from international money markets and international capital markets into commodity markets. It is likely that the sharp price surges in recent years was caused, in particular, by the material impact of (ii) the flow of speculative funds and investment funds.

Thereafter, after the occurrence of the global financial crisis, the rapid downturn in the global economy has considerably pushed down the natural resource price since the autumn of 2008. However, looking at the slowdown in the efforts to develop the world's natural resources, an increase in demand for energy resources and mineral resources primarily in emerging economies may tighten global supply and demand in the medium- to long-term.

⁹⁹ Resource prices for the period from April 2000 to April 2009 showed an overall uptrend, i.e. crude oil increased by 1.9 times, iron ore by 4.9 times, coal by 2.7 times and copper by 2.6 times.



Figure 2-2-4-8 Change in international natural resources prices (April 2000-April 2009)

The medium- to long-term global oil demand is expected to see growth of approximately 25% from 2007 to 2030. It is estimated that OECD countries will see a decline of 5.6% in oil demand, while emerging economies, which will continue to enjoy comparatively high economic growth rates, will be the driving force for demand growth (India: increase of 145%; China: increase of 121%) (Figure 2-2-4-9).



Figure 2-2-4-9 Estimate of oil supply and demand, by region

Note: Based on the presumption that the average annual global population growth rate will be 1.0% (2006 - 2030), and that the average annual global real economic growth rate will be 3.3% (2006 - 2030).

(B) Japanese-owned companies' commitments for finding solutions to natural resource issues

(Japan's strength in natural resource development)

Amid the situation where the supply of and demand for natural resources is expected to tighten in

the medium- to long-term and where prices are on an upward trend, developing natural resources by taking advantage of Japan's technology and funds would greatly contribute to the response to such increasing demand. For example, in 2008, Japan Oil, Gas and Metals National Corporation (JOGMEC), an independent administrative agency, entered into an agreement with Vale, the largest resource major in the world, in regard to mineral resource exploration technology based on analysis of satellite imagery. Under the agreement they will cooperate with each other as strategic partners in SADC countries,¹⁰⁰ including Botswana, which are rich in rare metals such as platinum, cobalt and nickel. JOGMEC is expected to contribute to finding solutions to natural resource issues by taking advantage of Japanese technologies.

The impacts of the financial crisis have made it difficult for companies to raise funds, and what is worse, a material decline in natural resource prices curbed the momentum for the world's natural resource development projects (production reductions, suspensions and discontinuances related to the projects). Meanwhile, there are some cases where Japanese-owned trading companies and resource-related business companies have positively strived to capture rights and interests in natural resource development even after the financial crisis, by taking advantage of their comparative affluence in funds and increase of purchasing power backed by the strong yen, and have made contributions to solving natural resource issues (Figure 2-2-4-10). For instance, Sumitomo Corporation, which used to have 35% of the interests in San Cristobal mine of Bolivia, which produces the fifth-largest quantity of zinc in the world, purchased the 65% of interests in the mine held by its partner company in March 2009, as a result of which 100% of interests in the mine has been acquired by a Japanese-owned company.

¹⁰⁰ SADC: Southern African Development Community. The member countries are Tanzania, Zambia, Botswana, Mozambique, Angola, Zimbabwe, Lesotho, Swaziland, Malawi, Namibia, South Africa, Mauritius, the Democratic Republic of the Congo, and Madagascar.

Date	Details of investment	Investment amount	Company
Apr. 2008	Acquisition of 30% of interests in copper mine in Chile (Sierra Gorda district) from Antofagasta.	Approximately ¥190 billion	Marubeni Corporation
Jun. 2008	Additional investment in Oresteel Investments, the holding company of Assmang a major natural resources company in South Africa and acquisition of 49% of shares in that company.	Approximately ¥30.0 billion	Sumitomo Corporation
Jun. 2008	Additional investment in Vale, a major Brazilian natural resources company.	Approximately ¥78.4 billion	Mitsui & Co., Ltd.
Jul. 2008	Acquisition of 100% of interest in coking coal project in Western Australia, through BMA (a wholly owned subsidiary of Mitsubishi Corporation makes 50% of investment therein). The total quantity of natural resources to be excavated under the project is approximately 0.69 billion metric tons.	Approximately ¥126 billion	Mitsubishi Corporation
Oct. 2008	Acquisition of 16% of shares in Nacional Minerios S.A. (a company engaged in production and development of iron ore), a subsidiary of Companhia Siderurgica Nacional, which is a major steel company in Brazil, under a joint venture between five Japanese major steel companies and Posco of South Korea. The joint venture has acquired 40% of the shares in total.	Approximately ¥113.7 billion	Itochu Corporation
Nov 2008	Additional investment for enhancement of capacity of iron ore business in Western	Approximately	Itochu Corporation/Mitsui & Co., Ltd.
1000. 2008	Australia, jointly with BHP Billiton of Australia and UK	¥79.8 billion	Sumitomo Corporation
Mar. 2009	With regard to a company having interest in San Cristobal mine of Bolivia, 35% of whose shares were held by Sumitomo Corporation, Sumitomo Corporation reached a basic agreement with a joint investor (U.S.) holding remaining shares (65%), under which Sumitomo acquires such remaining shares at \$27.5 million and acquires such company as its wholly-owned subsidiary.	Approximately ¥2.7 billion	Sumitomo Corporation
Feb. 2009	Mitsubishi Corporation reached an agreement, under which it will acquire from Eramet S.A. 33.4% of shares in Strand Minerals (Indonesia) Pte Ltd. which holds 90% of shares in Weda Bay nickel project in Indonesia.	Approximately ¥14.5 billion	Mitsubishi Corporation

Figure 2-2-4-10 Examples of large-scale natural resources investment project recently implemented by Japanese trading companies

Thus, Japanese-owned companies consider such post-crisis change in momentum as business opportunities, and are positively striving to acquire rights and interests in natural resources. However, a prospective medium- to long-term soar in natural resource demand will compel Japanese-owned companies to intensively compete with foreign-owned companies in procuring natural resources.

(3) Utilization of sophisticated recycling technology and alternative technology

As pointed out thus far, the prospective medium- to long-term tightening of global supply and demand of natural resources requires Japan to encourage effective resource use and utilization of alternative technology.

In recent years, in Japan, commitments for recycling rare metals, for which stable procurement has gained importance, and commitments for developing alternative materials have been under way. In addition to the government's policy measures and research institutes' technology development, there has been a movement where private sectors implement resource recycling projects and the commercialization of alternative materials. The advancement of such commitments toward the future would arouse expectations for contributions to finding solutions to resource issues.

<< Example case>> A company contributing to the world by establishing a sound-material cycle society through resource recycling business

Dowa Eco-System Co., Ltd. has technology based on its ore dressing and refining technology, which enables the recycling of 17 types of metals, including gold, silver and copper, from recyclable

materials such as personal computer CPUs and scrapped substrates. The company also carries out the business of extracting recyclable materials taken from scrapped home electric appliances, scrapped cars, etc., waste disposal businesses, and soil purification businesses.

Amid the worldwide tendency for tightening up environmental regulations, the company has expanded its business, mainly in East Asia and Southeast Asia, including China, Thailand, Singapore, Indonesia and Taiwan, in addition to Japan. The company has contributed toward reuse and recycling and the reduction of environmental risks worldwide.¹⁰¹

Material: The Website of Dowa Eco-System Co., Ltd.

(3) Food issues

(A) Movements involving food issues

With regard to food issues, international prices began to rise from around the autumn of 2006, reaching a peak in 2008. Food prices in April 2009 increased, compared to those in August 2006, showing an increase in prices of soybeans and rice of 1.8 times, the price of wheat of 1.2 times, and the price of corn of 1.5 times (Figure 2-2-4-11).





Note: Corn and wheat prices are based on FOB Gulf of Mexico, soy bean prices are based on CIF Rotterdam, and rice prices are based on FOB Bangkok

Grain, the world's staple food, is expected to continue to gain demand in the future, mainly in developing countries. According to the prospective supply-demand balance of grains, developed countries will see growth in annual grain demand of only approximately 107 million tons between 2000 and 2030. In contrast, developing countries will see such growth of approximately 674 million tons for the same period. Further, developing countries tend to suffer extended shortages in production quantity within their areas. It is expected that, in 2030, production in developed countries will exceed demand by 202 million tons a year, while demand in developing countries will exceed production by

¹⁰¹ The Dowa Eco-System Co., Ltd. website

232 million tons a year (Figure 2-2-4-12).

Such food issues mainly involving developing countries are expected to grow more serious in the future, and swift countermeasures will be required.

Figure 2-2-4-12 Future estimate of supply-demand balance of grains in developed countries and developing countries



Source: World agriculture: towards 2030/2050 Interim report (FAO, 2006).

(B) Commitment of Japanese-owned companies to finding solutions to food issues

(a) Developmental utilization of agricultural technology

In recent years, the demand for fresh vegetables is growing in regions such as the Middle East and Southeast Asia. The exporting of plant factories which require less water than open-field cultivation and allow planned production of vegetables, etc. throughout the year is expected to contribute to finding solutions to issues in these regions (further details on plant factories are provided in Chapter III, Section 1).

(b) Movement of overseas development by taking advantage of "Japan Brand" agricultural products

The value of exports of Japan's agricultural, forestry and fisheries products is on a year-on-year upward trend. The value of exports, which was ¥278.9 billion in 2003, increased to ¥431.2 billion in 2008 (Figure 2-2-4-13). The Ministry of Agriculture, Forestry and Fisheries has set the goal of increasing the value of exports to ¥1 trillion by 2013. A commitment for expanding exports of Japan's agricultural, forestry and fisheries products is under way, based on the "Comprehensive Strategy for Exporting AFF Products and processed foods" approved by the "National Council for Export Promotion of AFF Products and Processed Foods."



Figure 2-2-4-13 Changes in value of exports of Japan's agricultural, forestry and fisheries products

Source: NORINSUISANBUTSU YUSHUTSUNYU GAIKYO (Ministry of Agriculture, Forestry and Fisheries).

In recent years, Japanese food has become globally prevalent while the wealthy class has grown larger, backed by economic growth in regions such as Asian countries. Such factors have expanded opportunities to increase exports of high-quality Japanese agricultural, forestry and fisheries products and foods. The Ministry of Agriculture, Forestry and Fisheries implemented the "Commissioned Project for Advancement of Smooth Export of Agricultural, Forestry and Fishery Products for 2007 (survey on actual conditions of overseas markets categorized by product items)" in regard to major Japanese agricultural, forestry and fisheries products, etc., with the objective of studying the actual conditions of markets in the countries and regions which would be targeted for export expansion and disseminating such study results to the relevant parties of the origins of such products.

Presently, as consumer reliance and demand for high-quality foods and the importance of securing food safety are growing in overseas countries, the overseas development of the agricultural products business, and in connection, the promotion of the "Japan Brand," has been expanding in size and area. Agricultural products, including apples, which were primarily exported to neighboring countries in East Asia, such as China, Taiwan and South Korea, have begun to be distributed to other countries with a growing population of the wealthy class.

According to a survey implemented by the Ministry of Agriculture, Forestry and Fisheries,¹⁰² the factors which motivated local consumers in Hong Kong, Taiwan and Singapore to purchase fruit produced in Japan were healthiness, and safety and security, in addition to taste.

<<Example Case>> Contribution to the global environment by utilizing effective microorganisms

EMs (effective microorganisms) are symbionts of effective microorganisms primarily consisting of lactic acids, yeast and photosynthetic bacteria. They are a multi-purpose bacteria material available for

¹⁰² Ministry of Agriculture, Forestry and Fisheries (2008), HONG KONG, TAIWAN, TONAN ASIA NI OKERU HINMOKU BETSU SHIJO CHOUSA JITTAI

such diverse areas as agriculture, stockbreeding, fisheries and environmental purification. EMs are used in areas related to environmental issues, such as in the recycling of general industrial waste, deodorization and water purification through microbial treatment, and countermeasures to air pollution and water pollution through a microbial treatment.

For instance, in Bangladesh, 80% of three- to four-thousand tons of municipal garbage emitted from Dacca, the capital city, comprises organic garbage. A project to compost such garbage and to reuse it for agriculture based on EM technology was implemented. This project won the "Fight Against Poverty" award for 2002 (Asia and Pacific region) sponsored by UNEP.



Composting municipal garbage in Bangladesh using EM technology

Source: the EM Research Organization website (including photos)

<<Example Case>> A business which contributes to assurance of customer reliance, motivated by increased awareness of food safety in China

Asahi Breweries, Ltd. and Itochu Corporation jointly incorporated a milk product manufacturer "Shangdong Asahi Green Source Milk Products Co., Ltd." in Laiyang, Shandong Province, China, and launched the distribution of milk under the "Asahi Green Source" brand in Shanghai, Peking, and Qingdao of Shandong Province. Importance has been placed on customer awareness of food safety and their reliance on manufacturers, especially in the urban districts of China, and the demand for high-quality foods, such as organic vegetables, is growing. In recent years, demand for milk, in particular, has been growing, and the market for high-quality milk has been growing rapidly.

Shangdong Asahi Green Source Milk Products Co., Ltd." is regarded as a part of the business of Shandong Asahi Green Source High-Tech Farm Co., Ltd., an agricultural company incorporated in 2006 by Asahi Breweries, Ltd., Itochu Corporation and Sumitomo Chemical Co., Ltd, with the objective of helping to improve Chinese people's diet.

This agricultural company puts into practice recycling-based agriculture (a method wherein waste generated from agriculture, such as stems, for example, is used as livestock feed, and wherein manure generated by stockbreeding is used as compost for making soil). The company processes some ingredients found in the non-adjusted raw milk it produces and provides customers with milk products. In addition, in 2007, the company launched the production and distribution of value-added products — in other words, safe products — such as sweet corn and strawberries. These products have gained a good reputation among customers, enabling sales at prices 1.5 to 2 times as much as the average market prices of the products.

Recycling-based agriculture



WEIPIN pure milk



(4) Water issues

(A) Movements involving water issues

Water is essential for maintaining human life and social life, and for preserving the environment. It is an important resource that serves as the basis of industries. In addition, water is a circulating resource.

There is approximately 1.4 billion km³ of water on the earth, but fresh water, such as groundwater, river water and inland waters, constitutes only 0.8% of all water. In short, even though Earth is called a "planet of water," the absolute quantity of fresh water actually immediately available to humans, for their lives and industries, is very limited. Meanwhile, regarding demand for water, worldwide demand was approximately 4,000 km³/year as of 2000, but it is expected to reach approximately 5,200 km³/year in 2025, which is an increase of approximately 30%.¹⁰³

According to the estimate provided by UNDP (*Human Development Report 2006*), about one billion people spend lives with water stress (i.e. the level at which the maximum amount of water resources available per person is 1,700m³ or less), and such population will reach 3.7 billion in 2025.

In Asia, demand for water for agricultural use will further increase, due to growing internal food demand leveraged by population increase (Figure 2-2-4-14). In addition, in industrializing countries, such as China and India, assurance of safe water is at risk, as in these countries, demand for water for industrial use is increasing, and contamination of rivers and groundwater is accelerating.¹⁰⁴

¹⁰³ SHI and UNESCO (1999)

¹⁰⁴ For example, the report of the New Energy and Industrial Technology Development Organization, an independent administrative agency (*CHUGOKU NI OKERU ODEI SHORI NI KAKARU KISEI KYOUKA NO UGOKI*, September, 2008), points out that major rivers in China are suffering serious contamination caused by discharges of large quantities of untreated waste water from industries and households, and that forty percent of all freshwater in China is not suitable for drinking.



Figure 2-2-4-14 Breakdown of changes in global water demand

Source: World Meteorological Organization (1996)

The Council on Competitiveness-Nippon has estimated the scale of the global water-related market. It has also estimated that markets related to plant equipment and services will expand, to approximately \$700 billion in 2025 (Figure 2-2-4-15).



Figure 2-2-4-15 Estimate of global water-related business markets

2. "Plants, etc." refers to the total value of operational costs for waterworks and drainage 3. "Services" refers to the total value of operational costs for waterworks and drainage.

 A. The data for 2007 and 2016 is based on the value stated in the material.
The data for 2025 was tentatively calculated using annual a verage growth rate for the period from 2007 to 2016. Source: Global Water Market 2008 (Global Water Intelligence, 2007)

(B) Contribution of Japanese-owned companies to finding solutions to issues

(a) Water-related equipment and water-related services

Japanese water-related sectors have been accelerating their active commitment to overseas business expansion, shown by such examples as a seawater desalination project in the Middle East, and sewage water treatment projects in countries such as China. Such sectors are in the process of shifting and expanding their business of distribution of individual equipment and devices into system maintenance and system operation. As for the areas targeted for business expansion by Japanese-owned companies, they are primarily expanding their businesses to Asia, which is comparatively easy to access, rather than to developed countries, in which European water majors have already launched businesses.

Meanwhile, Japanese-owned companies have captured a large share in the business of distribution of equipment and devices, based on the advantages provide by advanced Japanese technologies. In regard to the entire market for water treatment membrane (the global market for reverse osmosis membrane for seawater desalination alone is worth ¥55 billion (in 2006)),¹⁰⁵ Japanese-owned companies occupied approximately 60% of the world share. In regard to the market for reverse osmosis membrane, which requires highly advanced technology, Japanese-owned companies occupy approximately 70% of the global market (Figure 2-2-4-16).

Figure 2-2-4-16 Share of Japanese manufacturers in global water treatment membrane market



(C) Expansion of business to include provision of services, which will become a topical issue

However, filtration membrane, etc., for which Japan maintains its dominant position, only constitutes about 5% of the revenue generated from the entire water-supply business. As Japanese-owned companies have only little experience in providing maintenance and operation services for entire projects,¹⁰⁶ they lag behind foreign-owned companies in such business domain. Japanese-owned companies' highly advanced elementary technology and water-saving system have not been effectively and sufficiently used in finding solutions to global water issues.

In the future, Japan will be required to expand its vision to downstream businesses (i.e. maintenance and operation), which will be prospective targets for expansion of Japanese-owned companies' markets. Currently, some Japanese-owned companies have shifted their business domain of distribution of equipment and devices to include operational services. Further, some companies, in collaboration with each other, have accelerated their commitments to seek overseas business expansion while expanding their business.

¹⁰⁵ Original source: Fuji-Keizai, 2007 MIZU SHIGEN KANREN SHIJO NO ZENBOU TO SHOURAI YOSOKU

¹⁰⁶ As examples of Japanese-owned companies' development of overseas water supply businesses, Manila Water (Philippines), developed by Mitsubishi Corporation, and Thai Tap Water (Thailand), developed by Mitsui Co., Ltd. can be pointed out, but the number of such cases is small (Japan Foreign Trade Council, Inc. (2008), *NIHON BOEKI KAIHOU*)

<<Example Case>> A company which contributes to solving sewage issues, etc., by the use of advanced water treatment technology

Kurita Water Industries Ltd. is a company which has advanced technology related to water treatment, and which carries out business involving water treatment devices (water for service, sewage, collection and treatment), chemicals for water treatment, and purification of soil and groundwater, etc. For example, the company offers a system that detoxifies industrial waste water emitted from factories, etc. without affecting the peripheral environment, and at the same time reduces the quantity of waste, including dirt. It also provides a system that collects and recycles waste water emitted from factories, etc. Further, the company offers systems that enable the processing of valuable substances contained in waste water into recyclables, and the collection thereof.

The company has hubs in Asian countries such as China, Taiwan and South Korea and has contributed much to the protection of the global environment. The company's contribution consists of: its manufacturing system that produces ultra pure water, which is essential for manufacturing semiconductors and liquid crystal; its selling of such pure water to local semiconductor plants; and its provision of products and services of treatment and waste water recycling.

Material: Kurita Water Industries Ltd. website.

<<Example Case>> A company which contributes to solving water issues by producing a water purification agent

Nippon Poly-Glu Co., Ltd., with its corporate vision of "making raw water available as safe drinking water for people throughout the world," produces "PG α 21 series," a unique and safe water purification agent made from polyglutamic acid, a biodegradable substance contained in *natto* (fermented soybeans). Adding such product to contaminated water enables aggregation of fine particulates scattered in contaminated water that will grow into a contaminant and accelerated precipitation and levitation of such particulates. Solid-liquid separation of such processed water generates pure water. Further, sterilizing such water enables assurance of water available as drinking water. As the product makes it possible to purify a large amount of waste water without producing negative impacts on the environment, the company strives to disseminate the technology to countries suffering from severe water problems, such as Southeast Asian countries.

(Aggregation process of PG α 21Ca)



Material: Nippon Poly-Glu Co., Ltd. website (including photos)