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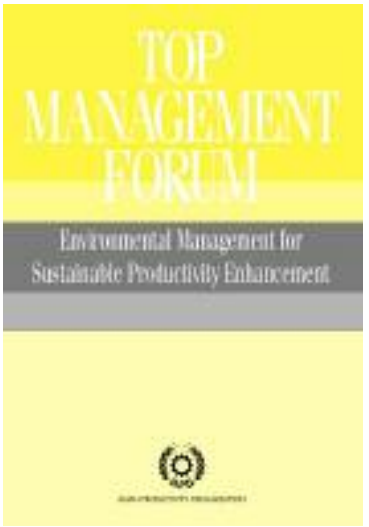
Top Management Forum: Environmental Management for Sustainable Productivity Enhancement



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TOP MANAGEMENT FORUM

Environmental Management for Sustainable Productivity Enhancement

ASIAN PRODUCTIVITY ORGANIZATION

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Environmental Management for Sustainable Productivity Enhancement

2010
ASIAN PRODUCTIVITY ORGANIZATION
TOKYO

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FOREWORD

In the 21st century, we are faced with the issue of global warming, along with the challenge of sustainable development. In line with internationally concerted efforts to reduce greenhouse gas emissions, the Asian Productivity Organization (APO) has been addressing the sustainability challenge under its Green Productivity Program since 1994. The concept of Green Productivity is derived from our conviction that the pursuit of productivity improvement is compatible with the protection of our environment, and that one is not a trade-off for the other. The APO recognizes the importance of promoting Green Productivity and has organized an annual Eco-products International Fair since 2004, showcasing the latest eco-technologies, eco-products, and eco-services to the general public and offering a close look at environmental protection and green supply chains in the Asia-Pacific region.

Japanese Prime Minister Yukio Hatoyama has pledged a 25% reduction in greenhouse gas emissions by 2020 from 1990 levels, and a draft Global Warming Mitigation Law has recently been approved by his cabinet. These initiatives will require industries to adopt environment- and energy-conscious management strategies to combat global warming, while ensuring that ecological pursuits contribute to business growth. Japanese companies were the pioneers in the environmental market and will continue to demonstrate best practices in green innovation and environmental management strategies.

The APO Top Management Forum 2010 was held in Kyoto, and attended by 32 overseas participants from 17 APO member countries. This is the 26th forum organized by the APO since its first inception in 1985. The forum invited speakers from various businesses, including members of the Green Productivity Advisory Committee launched by the APO in 2003, and offered outstanding examples of environmental management tools. Participants benefited from insightful information and experiences shared by the distinguished speakers, to whom I would like to convey my deep gratitude. With its extensive coverage of state-of-the-art environmental management, I am sure that participants will be able to adopt the knowledge and tools introduced at the forum to their own national contexts as a regional contribution to the global environmental agenda.

This publication contains summaries of the presentations on environmental management for sustainable productivity enhancement. I hope that it helps readers expand knowledge of the best practices of environmental management by leading Japanese companies.

I would like to express my sincere gratitude to the Japanese Government for the financial support and to the Japan Productivity Center for its assistance in organizing the Top Management Forum.

Shigeo Takenaka
Secretary-General

Tokyo
June 2010

I

Summary of Presentations

Environmental Management in the Business Sector for Global Warming and Sustainable Development

Prof. Ryoichi Yamamoto
Professor, International Research Center for Sustainable Materials,
Institute of Industrial Science, The University of Tokyo

Comparing scientists' predictions on rising CO2 emissions, global surface temperatures and sea levels with real observed trends lying along worst-case scenarios, it is difficult to deny the seriousness of global warming and the speed at which it is proceeding.

In my book *Climate Change +2°C*, predictions by Japanese scientists are introduced on the surface temperature increases compared to the pre-industrial level and the environmental impacts they are expected to trigger, among others, the melting of the Greenland and West Antarctic ice sheets, extinction of biospecies and serious water shortages. Predictions by scientists in other countries as well as those by the Intergovernmental Panel on Climate Change reach up to 4°C global warming by 2060 in the worst case. This has led Gwynne Dyer to entitle his new book *Climate Wars*, in which runaway global warming is manifested in the rapid decline of Arctic sea ice, methane bubbling from Siberian thaw lakes and the acidification of seawater and other tipping points.

In addition to many scientists, political leaders have taken up the critical problem of global warming as well. Last year, at the L'Aquila Summit in Italy, leaders of the G8 and MEF recognized clearly the 2°C target and supported the reduction of greenhouse gas (GHG) emissions. Japanese Prime Minister Yukio Hatoyama last year declared a 25-percent reduction of GHG emissions by 2020. There are problems as to the feasibility of such a big reduction and what will be necessary is an environmental revolution.

Many scientists are now proposing measures other than CO2 reductions. For example, the Royal Society in the UK published a report *Geoengineering the Climate* with geoengineering defined as the deliberate large-scale manipulation of the planetary environment to counteract anthropogenic climate change, such as by using carbon dioxide removal techniques, solar radiation management techniques, sulfate aerosol injection or injection of sea salt water into clouds. While geoengineering options are reasonable cost-wise, they do not come without their risks and should only be considered as part of a wider package of options for addressing climate change.

Another problem is the resource depression problem, especially for metals, for which present resources are predicted to be exhausted toward the middle of this century, so on

top of climate risks, there are also material or resource risks. For such material risks, there are no international laws, panels or treaties, so they will have to be developed, such as through the World Resources Forum.

The environmental revolution necessary to overcome such a problem will be brought about by innovations and we are now entering into the sixth wave of innovations (Kondratiev cycle). Many governments are inputting much money to the effort of eco-innovations (green stimulus) for a green recovery.

One important viewpoint is to look at climate policy as a security as well as an economic growth policy. Green growth has been a keyword in the world. The OECD is now preparing a report *Eco-Innovation in Industry* in which they talk about the mutually reinforcing links between innovation and environmental policies: environmental effectiveness, decoupling economic growth from environmental pressure, cost-effectiveness, taking advantage of win-win opportunities and market and socio-economic benefits.

An additional important field is on eco-design innovations. Eco-materials can be classified into six categories: green environmental profile, minimal environmental impact production process, high productivity, minimal hazardous substance, high recyclability and high environmental treatment efficiency. Prof. Brezet of the University of Delft classified eco-design innovation into four types: product improvement, product redesign, product concept innovation and system innovation. By these kinds of eco-design innovations we may achieve increases in productivity.

Japan has an Eco-Efficiency Forum and many Japanese companies have tried to evaluate the eco-efficiency factor of their commercial products. International standardization is being done on eco-efficiency assessment at ISO/TC 207 with the objective to establish a clear terminology and a common methodological framework for eco-efficiency assessment, to enable the practical use of eco-efficiency assessment for a wide range of product systems and to provide clear guidance on the interpretation of eco-efficiency assessment results.

Some efforts towards to spread awareness are the domestic EcoProducts Exhibition and the Eco-Products International Fairs (EPIF) in Asia promoted by APO. There is also the Eco-products Directory introducing 700 eco-friendly products and services displaying their environmental reductions. Expanding the Green Purchasing Network into the Asia-Pacific region has also been an urgent issue.

In conclusion, Earth is at the tipping point and approaching the point of no-return of global warming within 20 years, so eco-innovation and spreading eco-technology are essentially important. International sharing of good experiences, information and know-how will contribute to dissemination of eco-products. Toward this, IGPN is active in the promotion of green purchasing in the world, supporting green-public-procurement, formation of a green-business platform, research on the environmental regulations and subsidies of countries and education and training of green purchasing.

Q&A

Question: What were the reasons for the decrease in water levels and temperatures in 1985? And are there any recorded parameters?

Prof. Yamamoto: As I said, the surface temperature is fluctuating because we have many elements to control the surface temperature. The sea level was also affected by many other natural fluctuations. If you look at the long-term trend, the trend is much higher and climate scientists are predicting that the sea level will increase 50 centimeters by 2050 and 1-2 meters by the end of this century. However, this is the mean value, so it will be different from place to place. Especially in the Northeast coast of the USA, a much higher increase is expected, at least 65 centimeters by 2050.

Question: Have you studied the financial sustainability and cost side of eco-innovations and eco-technologies, especially in consideration of their workability for underdeveloped countries?

Prof. Yamamoto: There are many difficulties. We need many solutions, for example, green-public-procurement, green purchasing by the pubic sectors, greening of the supply chain and financial aid to developing countries. We have to mobilize many kinds of measures to spread the eco-innovations, eco-products and eco-technologies. I believe that this process needs much time.

Moderator: How would you respond to skeptics who claim that climate change predictions are somewhat exceeded compared to reality?

Prof. Yamamoto: There are several examples where things are happening much faster than the predictions. First, the extent of Arctic sea ice decreased almost 40 percent compared with almost 40 years ago. The second is the rapid disappearance of glaciers in the world, such as the Alpine glaciers. With 46 billion tons of ice disappearing every year, the glaciers of Mount Kilimanjaro are in danger of disappearing like the Bolivian Chacaltaya glaciers did six years earlier than predicted. The third is the Greenland glaciers, where 270 billion tons of ice are lost every year. In addition, the acidification of the oceans is also proceeding much faster.

Question: For the lead-free production, there are two issues. One is that lead-free is more expensive, so manufacturers are hesitant. The second thing is the productivity issue, so we need to let the manufacturers know how we can improve that, for example, for lead-free soldering product. What is your opinion?

Prof. Yamamoto: I think that I would like to agree with your comment, but we have to do research to develop the most balanced and good quality eco-products. In the case of lead-free eco-materials, I think lead-free ECOBRASS and lead-free eco-materials have a good performance. For soldering, there are many problems and we have to have eco-innovations in this case.

Policy to Support and Encourage Environmental Management and Businesses

Mr. Yu Murata
Director, Environmental Industries Office, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry of Japan (METI)

Last December, the New Growth Strategy was announced, within which in the field of environment the promotion of green innovation and the implementation of comprehensive policy packages are planned to spread and promote Japan's top-level environment technologies, aiming for Japan to become the top environment-energy friendly nation in the world. In order to realize the objectives of reducing greenhouse gas (GHG) emissions, Japan plans to promote the use of renewable energies. There are several activities underway to make GHG emissions and material loss visible so that the environmental issues can be solved in a way that can exist with economic viability. For that purpose, environmentally-friendly business management and promotion of eco-friendly businesses are being promoted in the hope that businesses will take more voluntary initiative in this field.

The first theme is the Carbon Footprint. This system calculates the amount of GHG emissions for the entire lifecycle of a product from procurement of raw materials, through production, distribution and sales, consumption, usage and maintenance, all the way to disposal and recycling. This is made visible by displaying a Carbon Footprint label on the products indicating a figure for the CO2 equivalency of the total emissions that are associated with the product. Other countries have also introduced such systems and international standardization efforts have been started.

The significance of such a system for businesses is that they can identify which areas within the whole supply chain could be changed to reduce emissions most efficiently. It also serves as an appeal to consumers that the businesses are making efforts to reduce GHG emissions, thus reducing the burden on the environment. For the consumers, they are made aware of the CO2 emission that go into the products that they purchase and it is expected that they will take more environmentally-friendly actions.

In order to raise awareness about the initiative and what it means for purchasing decisions, eco-fairs are organized, the largest of which is the EcoProducts Exhibition, where samples of eco-products with the CFP label are exhibited.

In order for a product to be given a CFP label, there are three phases: (1) the drawing up of a draft of so-called the Product Category Rules (PCR), based on which data concerning CO2 emissions are collected and calculated, (2) the PCR draft is reviewed and approved by a third-party committee and (3) products are authorized to have the CFP label. Today, there are 75 items in phase 1 with about 300 businesses and organizations involved and participation is anticipated to increase.

The second theme is the Material Flow Cost Accounting (MFCA). MFCA is part of a company's environmental accounting focused upon the internal control of a company trying to link the economic and environmental activities within the company's operations. It is a system that measures the flows and stocks of materials, such as raw materials and energy, in the production process in terms of both volume and money. It gives an accurate calculation of the initial waste and emissions, which are often overlooked in normal costing, and the material loss can be made visible. By reducing such material loss, companies are able to achieve lower environmental loads and cost reduction, thus contributing to dramatic productivity gains through innovation of production processes. Internationalization of MFCA is being deliberated at ISO.

Other efforts to promote environmental management include the Environmental Report Plaza, a website which gathers information and makes environmental and CSR reports from different companies available to consumers. In another effort to spread awareness also to other countries, APO began organizing the annual Eco-Products International Fair (EPIF) held in different countries throughout Asia, providing opportunities to start or match eco-businesses.

METI offers informational websites on the CFP label as well as MFCA and the Environmental Report Plaza.

Q&A

Question: I have two questions. One, what is the percentage of greenhouse gases in Japan compared to countries like the USA (78 percent of world GHG emissions) or Bangladesh (0.3 percent). The second question, what action has been taken by the USA to reduce GHG?

Mr. Murata: I do not have a very accurate figure with me, but Japanese emissions are 4.5 percent. The concrete reduction plan is based on the Kyoto Protocol and with the yet to be implemented New Growth Strategy, Japan has a very ambitious target to reduce CO2 emissions.

Question: Is this a basic policy or is this a law or regulation? Is this on voluntary basis for a business?

Mr. Murata: The Carbon Footprint and MFCA are voluntary activities to be taken by companies. They have no obligation to conduct them, but we provide consultancy or basic tools for any interested company. However, the New Growth Strategy is a basic policy of the government.

Question: In Taiwan, the Environment Protection Administration (EPA) already issued a Carbon Footprint label in 2009. What methods do you choose to find a single product category in PCR?

Mr. Murata: The method to define the category boundary is based on the product category proposed by businesses, so we have broad as well as more narrow definitions. In the future, we may consolidate the smaller categories into one, but the current aim is to promote participation by businesses.

Question: First, regarding the Carbon Footprint, who is the third-party committee? Second, is any cost associated with the Carbon Footprint activity? And third, what are the Japanese government support incentives to promote to private industry?

Mr. Murata: First, the third-party committee members are from academia, university professors who are versed in Carbon Footprint calculations or lifecycle assessments, and there are also leaders of consumer organizations.

About the costs, it takes time and money to gather data to do the calculation and to issue a label and those are efforts that have to be borne by companies. On the part of the central government, expert consultants are dispatched for PCR and assistance is given for data gathering and calculation and also in the form of calculation software. For the verification and registration of a label, there is no cost.

For economic stimulus and also for environmental awareness, the government provides the EcoPoints program for various activities in society, including consumer products. For the Carbon Footprint system, particular incentives have not yet been considered.

Joyful Business through Eco-friendly

Mr. Norimasa Ina
President, Nippon Mosaic Tile Co., Ltd.

Nippon Mosaic Tile, a small and medium enterprise with 110 employees and 15-percent market share, was established in 1959. Throughout the company, various joyful, cheerful eco-activities are conducted that serve as a driving force to make employees more lively and positive-minded and at the same time reduce costs and improve quality.

The company's premises is located in Tokoname City with all the facilities for raw materials, glaze and other ingredients produced in-house, thus making it easier to tailor to the customers' needs. Although the company has undergone turbulent times, they led to the realization that customer satisfaction stems from employee satisfaction. Thus, upon the 50th anniversary of its establishment, a new slogan "Happy Tiles from Cheerful Eco" was adopted to promote eco-activities.

One outcome of these eco-activities has been the Ecoroad in the factory. Industrial waste stored in the dirtiest corner of the plant was relocated to the center of the premises, so that it was quite visible to everybody. Over a period of four months, much time and effort was spent to thoroughly sort through this waste and all employees participated in this waste sorting activity. Waste products were sorted into 17 different categories and by having this kind of classification, some of the waste even became a source of income. In various parts of the plant, there is an array of separation boxes that is constantly being used to separate waste. Not only did employees realize that the company is committed to making it an eco-friendly company, it also made them become more conscious about the need to reduce waste.

Furthermore, the production rate, or excess volume produced, could be reduced. In fact, although production was increased to accommodate additional orders, the company was able to improve this capability to adjust production and improve the volumes produced. The cost related to the waste used to be 30 million yen, but it went down to 7 million yen, so it was a win-win situation.

There were also activities to reduce CO2. A fuel shift was conducted from heavy oil to LNG ahead of any others in the industry. Conversion of fuel for this industry is quite risky, because by having a different fuel, the atmosphere in the kiln might change and you may not be able to successfully reproduce the color. However, the amount of CO2 after the fuel shift is about one third of that in the past and there was also improvement in fuel efficiency.

We also make eco-friendly products. Industrial waste at Nippon Mosaic is delivered to its affiliate raw material company, Maruyasu, and waste is recycled into raw materials, a cycle we already had. The raw material prepared at Maruyasu is CO2-free because the

energy of the sun is used to dry them in the open space. Maruyasu is the only company in the field to use this natural drying method. We also produce very thin tiles (5 mm) from these CO2-free raw materials.

In order to collect all kinds of proposals for our activities from our employees, we have the Eco Smile Proposal system. In the past three years, we have received 3,000 proposals. The monetary value of the cost reduction effects from the proposals is calculated and any proposal that makes the company better is welcomed. Of all the proposals, the idea on using waste heat to eliminate the tile production line's kiln cost received the million yen Smile Prize. We also have our so-called Activity Board, on which are posted handwritten messages from employees as a fun activity. The work procedures too are written in the format of old Japanese haiku poems. Messages from outside the company and in-house information are presented in an easy to view manner for everyone to see.

There are also all kinds of events within the company. For example, the Terakoya is a classroom-like activity good for teamwork building. Another example is the refurbishment of the old tool room into a Jazz Spot, where employees can relax and have a conversation. For a minimal fee, they can eat and drink as they like. Income from this Jazz Spot of about 500,000 yen is donated to the preschool or the facilities for the people with handicaps. Furthermore, there are also seasonal and cultural events. With our aim to be good citizens in the community, we also invite students from the local elementary schools to visit the factory. Another activity is the beautification of the factory premise with greenery and flowers. For further details, there is a blog on the company website.

Through various Eco Smile Activities in 2008, costs could be reduced by 260 million yen, which was a 5 percent cost reduction vis-à-vis the overall income. While it is true that the business environment remains difficult, with Eco Smile Activities that keep employees motivated and happy, we hope to successfully survive and prosper. Eco-friendly activities are quite suitable for SMEs and you have to be serious about eco-friendliness, but the point is that your employees enjoy the activities. This was the key to the success of our activities.

Q&A

Question: How can you motivate your employees? For example, do you reward them or link such activities to their own performance appraisal?

Mr. Ina: I believe that communication is important and in particular one-to-one communication is quite valuable. This is not just on a formal basis, but we also have the Jazz Spot where we drink together. There is a system called top diagnosis by the top management, where harsh criticism is exchanged, but on the same night we might go and have drinks with those same people. You have to be strict on the one side and kind and generous on the other. Also, having fun is an important thing.

Question: You mentioned that your employees have come up with more than 3,000 Eco-Smile proposals. Can you provide some outstanding examples for us to learn from?

Mr. Ina: Whatever has a relation to eco-mindedness is important and it can be a trivial thing. It really varies. We welcome eco-activities as well as others that have to do with safety or making the workplace a more joyful place. As for specific examples, I cited the example of saying "Hello" and taking your cap off.

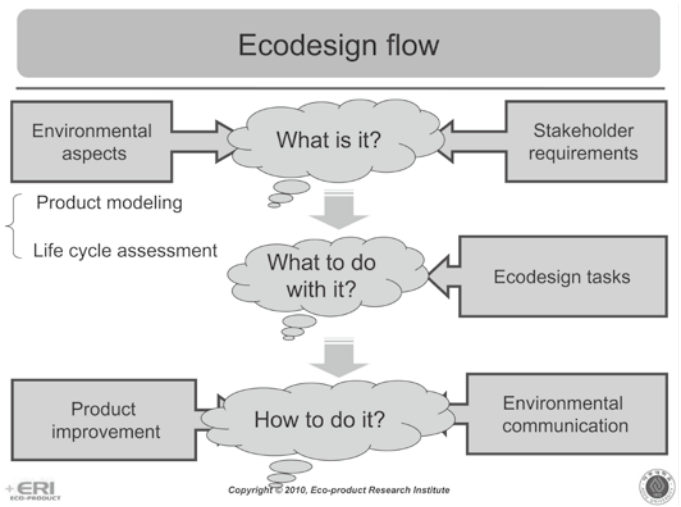
Eco-business: New Business Paradigm for the Sustainable Society

Dr. Kun-Mo Lee
Professor, Ajou University, Republic of Korea

The very issue of sustainability, climate change and the new business paradigm are of utmost importance to all of us. It is not just for our survival, but it poses a major challenge to us if we do not take action. As a business, if we do take action, there are tremendous opportunities to make more money and to be more competitive. Against such a backdrop, it is necessary to clearly define what is meant by eco-design, eco-products or eco-services.

At the core of the environmental problems are two important factors: resource depletion and increasing CO2 emissions. These problems stem from our use of industrial products and service. Society has become one of excess. The difficulty of reducing our consumption of products and services is that the solution should not adversely affect our lifestyle, even enhance it. With the new business paradigm, we are still reliant on industrial products, but the goal becomes to create a product with the same function, but one that uses fewer resources and generates less emissions.

Design is the process of making something tangible and concrete from an abstract concept. Design cannot be changed easily and will determine the fate of the product. Whatever attributes and features you decide on in the beginning will be the way in which your product will behave. It is said that design determines 70-80 percent of the total environmental property or cost of the product. In this respect, the lifecycle process (cradle-to-grave) is fundamental to consider.



In the generic process of product development, you start with a plan, but the focal point lies in conceptual design. Eco-design means the integration of environmental aspects into product design and development. In identifying these environmental aspects, it is important to consider that there are internal as well as external aspects. The internal aspects include consideration about the product's weak points in terms of the resources used and emissions generated, not only during use, but also during manufacturing, distribution, use of raw materials and end-of-life. The other aspect to consider is external, such as stakeholder requirements.

Eco-design means minimizing or reducing energy consumption, resource depletion and environmental emissions throughout the lifecycle. By doing a lifecycle assessment (LCA), namely tabulating input and output, it is possible to identify those processes that are inefficient. Through technological innovation, these problem areas should be eliminated without raising costs. On top of LCA, typical tools for eco-design include lifecycle thinking matrices, environmental quality function deployment and environment benchmarking.

The fundamental driving force for why companies integrate environmental considerations in their products is legal requirements. They must comply with the requirements in order to stay competitive in the market. One of the major legal requirements is the Energy-using Product (EuP) Directive. Any product that uses energy is subject to this regulation, except automobiles. What is expected of companies is that to improve design addressing all environmental aspects. What is more, they are expanding the requirements to energy-related products (ErP) as well, so that even if a product itself does not consume energy, if it has a close relationship with energy consumption, they become subject to the regulations. In the EU, the Integrated Product Policy (IPP) provides the philosophy to EU environmental regulations. The key requirement of the EuP Directive is conformity assessment with the values given therein.

What can be learned from the EuP Directive is that everything is linked to climate change and energy consumption of products. Once you have determined the carbon footprint of your product in its entire lifecycle and how to reduce energy consumption through eco-design, there is a golden opportunity to present this business paradigm change to the market.

This is the field of eco-business, the provision of products and services, which will result in lower greenhouse gas emissions, less resource consumption, but meanwhile generating profit. For example, IBM recognized that what their customers wanted was not powerful machines, but powerful computing ability and thus launched an information solution service.

Another example is that of a cloth company, which sold a one-time usage disposable cloth. Having developed a longer-lasting cloth, they changed to a new business paradigm of selling the wiping function by collecting the spent cloth from the customer, washing it and resupplying them with clean cloth. This lowered the costs for the customer because they did not have to pay for the disposal and at the same time increased revenue for the cloth manufacturer through lower manufacturing costs. Other examples include car paint businesses changing to a model of painting instead of only supplying paint.

The factors to consider if you want to do eco-business are identifying customer expectations and other interested parties or stakeholders. Then, you can develop strategies by looking at existing business models, of which there are 70. Customer expectations are to reduce costs, avoid risks and have improved services. The stakeholders include eco-business providers, product providers, users and user's users, companies that buy from someone else to provide a service. The most typical strategies are: use one more time (reusable or recyclable products), servicizing (selling a service or functionality rather than a product), time sharing (discouraging users to own a product and instead distribute them by leasing or rentals) and effective management (people get used to what they use).

An example of the management of lifecycle as an effective management strategy are Fuji Film's disposable cameras that were resold as new products after collection, cleaning and refurbishment. Servicizing examples are providers of photocopying machines and services (Ricoh, Xerox) as well as electronics companies that provide lighting services (Panasonic) and ink cartridges (ECORICA). As long as customers do not have to pay more, in fact less, than before for the product, they will agree to the service.

As for eco-business cases in Korea, Aladdin, an online seller for books, CDs and DVDs acted as a middle company for the sale of secondhand goods. The user knows the bigger company to be reliable and so can buy with peace of mind that the used product is of a certain quality.

One fascinating example is that of Woongjin Coway, which was a very small company ten years ago, but now is one of the big conglomerates. What they do is to rent and lease water purification systems and dispensers. What they do is let customers rent the machine for five years. After five years, they are given an option to buy the product, return it, renew the contract or get a new one. Basically, they make the original price higher so that they discourage the consumer from buying it and encourage them to lease it. Most people opt for the rental scheme, because it provides you with free maintenance. Other secondhand services are for school uniforms or children's toys where time sharing is the key word.

Eco-businesses can build operating margins by eliminating waste in energy, water and materials consumption. They can build revenue by meeting the voice of customer for better, safer and eco-friendly products and services. This will drive technological innovations. Moreover, there are steps for the strategies. First, identify the aspects of your business that could be servicized. Then, identify what the customer needs and complement existing products with added service.

The role of eco-design in this is to come up with an idea that will give your product a competitive edge, link it to a new business paradigm and determine the optimum functional requirements.

In conclusion, how eco-business leads to a sustainable society is in that it requires less resource flow, builds up relationships with loyal customers and can lower costs (initial and for maintenance) for the customers and also shorten the sales process. Then, through decreased product throughput and waste, resource saving and reducing environmental impacts, including GHG emissions, this will lead to sustainable society.

Social Responsibility of Financial Sector for the Realization of a Sustainable Society

Mr. Teisuke Kitayama
Chairman of the Board, Sumitomo Mitsui Banking Corporation

SMBC and SMFG have shown particular commitment to environmental issues in recent years to realize its social responsibilities in the core businesses leveraging its functions as a multi-faceted financial group. While the productivity movement has traditionally focused on labor productivity, in light of recent population increases and problems of capacity, new kinds of productivity, such as resource productivity, will have to be considered making it necessary to internalize costs that were traditionally externalized, such as global warming. Financial institutions can play a vital role in internalization of cost by establishment of mechanisms for carbon pricing, lifecycle assessment calculations and assessment of the value of eco-services and other functions.

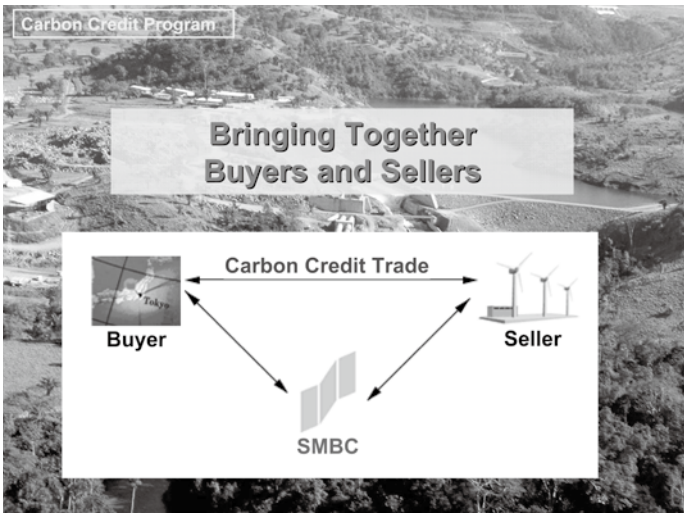
Corporate social responsibility activities should aim primarily at solving social problems through financial service businesses, i.e. contribute to the development of a sustainable society. We aim to flesh out this mission through our financial intermediary and environmental PR roles. In other words, in addition to promoting environmental protection by acting as agents for financial products, we can raise awareness among our customers and support environmentally-responsible corporate activities. The main pillars of our environmental action plan are promoting environmental businesses combined with two new goals: reducing environmental burden and responding to environmental risk.

Environmentally-responsible conduct by corporations has become a matter of rising public concern and SMBC has established the Eco-Biz Promotion Council to make environmental measures at the group more effective by arranging regular meetings for exchange of information and coordinating the cross-organizational sharing of results and targets in environment-related operations.

As a financial intermediary, SMBC has added eco-loans and the “eco value up” loans to its lineup of financial products as a tool of encouraging environmentally-responsible conduct by customer companies. SMBC eco-loans offer interest rate reductions of up to 0.5% for SMEs that have obtained certification, such as ISO14001 or other environmental management systems. An additional feature of the eco value up loan is that certification other than ISO is recognized, for example, companies under the Fujitsu Group Environmental Management System.

In another initiative, SMBC Environmental Friendliness Assessment Loans were started in October 2008, terms of which depend on assessment of a borrower company's environmental friendliness using SMBC proprietary standards carried out by the Japan Research Institute (JRI). Products and services have also been developed that encourage individual customers to consider environmental issues as a matter of course. For example, there is a carbon offset campaign for individual customers buying Japanese government bonds (JGB) enabling them to offset carbon emissions, tree planting campaigns for JGBs and carbon offset mortgage loans for environmentally-friendly home purchases.

Another new venture is investment trusts that target solar power and other new resource technologies.



As for our carbon credit business, SMFG launched an agency business in July 2005 for Japanese companies wishing to identify partners and purchase carbon credit in Brazil at our subsidiary, Banco Sumitomo Mitsui Brasileiro. Both large and small lot purchases are mediated on an ongoing basis by Banco do Brasil and other local banks. Using its networks in Japan and overseas, SMBC acts as an agent for the buying and selling of carbon credits. A small lot carbon credit purchasing service has also been launched through SMBC's trust banking arm.

As for joint energy savings initiatives by the public and private sectors, a cooperative agreement for promotion of industry was signed with the Miyagi Prefectural Municipal Government and the Shichijushichi (77) Bank. This initiative focuses on promotion of visualization of energy use, energy use diagnostics and subsidies are offered by the prefecture for building model energy savings facilities. The backdrop to these initiatives is the need to heighten public concerns about carbon dioxide emissions and respond to the amended Act on the Rational Use of Energy by putting energy savings and cost reduction first.

SMFG is also active on the PR front, keeping customers who are concerned about environmental issues informed and raising public awareness by organizing environmental events (biodiversity-related seminars at SMBC Park Sakae) and through tools, such as the bimonthly environmental information, SAFE. Another initiative is sponsoring the Eco-Japan Cup Contest, which was conceived to identify and nurture environmental business plans in an endeavor to realize a virtuous circle, that is a zero waste and resource recycling system in Japan.

The key event in SMFG's calendar of environmental events is the SMBC Environmental Business Forum at Eco-Products Japan, featuring booths for SMEs and business-matching events. In addition, SMBC is also involved with the Eco-Products International Fair to spread the message about environmental protection around the Asian region. Another international initiative is the Tianjin Eco-city, a joint project launched by China and Singapore. It will be the first large eco-city construction project ever undertaken in China with ambitious goals to use at least 20% renewable energies and SMFG through JRI won a planning consultancy contract, the first such contract to go to a foreign organization involved in a national environmental project in China. For its wide-ranging

environmental business initiatives, SMBC has also gained recognition, such as being awarded the Fuji Sankei Communications Group prize at Fuji Sankei's 18th Global Environmental Awards.

Q&A

Question: Is there any organization which assesses recipients of loans for equipment?

Mr. Kitayama: We have a so-called environmental solutions department within the structured finance group, which was formed several years ago to enable the bank to act as an agent for such activities as carbon trading. It assesses projects, either through public certification (e.g. ISO14001) or our own alternatives to measure their environmental friendliness, and does the structuring of the financing. The department works together with the marketing units for SMEs and large corporations.

Question: Is there any priority system as to who may get a loan from SMBC? Related to this, is there any possibility to give loans to Bangladesh?

Mr. Kitayama: Whatever project is related to the further promotion for the protection of the environment is given consideration for financing or loans. Until now, those loans were made in the domestic market. As for future operations, we would consider entertaining your request.

Question: I have two questions. Does SMBC's carbon credit program also apply for Indonesia? And, is SMBC also interested in financing geothermal projects?

Mr. Kitayama: Firstly, the carbon credit business includes various countries. As mentioned, the first deal was in Brazil with the bank acting as an agent with Brazil. Generally, Japanese corporations are the buyers of carbon credit and companies in Indonesia would be the sellers, with the bank acting as an agent to help in communicating between the two countries. Secondly, since geothermal projects are also environment-related, we would like to be involved in having further dialogs with such projects. We have an Asian regional headquarters in Singapore that works on such energy-related projects and also a subsidiary bank in Jakarta.

Question: What is the government role in promoting such financial support? Also, what is the percentage of GDP spent on improving the encouraging public service activities?

Mr. Kitayama: I understand that the Development Bank of Japan offers special purpose loans for environment-related projects, similar to what private banks offer to similar projects, to provide various subsidies, either nationally or in particular municipalities.

Keidanren stated long ago that 1% of ordinary profit should be utilized for CSR activities, which most companies recognize as a common standard, but I do not have any aggregate figure for GDP.

Question: Do you receive government support for the interest rate reductions of your loan products?

Mr. Kitayama: The loan products with the interest rate reductions are our own products and thus at our own cost, not government subsidies.

Shiseido's Environmental Efforts — Shiseido Earth Care Project

Mr. Tsunehiko Iwai
Corporate Officer (Technical Planning and Technical Affair) and
General Manager, Quality Management Department
SHISEIDO Co., Ltd.

Shiseido was founded in 1872 and is now active in 71 countries all over the world. The company name means making new value from the blessings of the Earth, so the environment has always been a part of Shiseido's way of thinking. The slogan at the end of Shiseido's commercials "This moment. This life. Beautifully." is our corporate message and talks not only about human beings, but also the planet's eternal beauty and thus speaks for a sustainable global environment.

There are three layers to the guidelines at Shiseido: the Corporate Mission, the Shiseido Way (corporate behavior declaration) and the Shiseido Code (corporate ethics and behavior standards). In our corporate philosophy, established in 1989, it states that the safety and protection of the global environment are among our highest priorities. In addition, the Shiseido Eco-Policy was set up in 1992.

A survey conducted showed that there is a growing awareness on the part of customers, especially women, linking corporate activities and environmental activities. Customers claimed that they consider eco-friendliness an important factor when purchasing cosmetics. At our consumer center too, 64% of inquiries were about ways to reduce waste from packaging. However, a survey by Nikkei BP revealed that general consumers did not have a strong image of Shiseido as making environmental efforts.

To overturn this image, Shiseido initiated the Shiseido Earth Care Project to achieve resource savings and CO2 reduction. Shiseido has made significant achievements in its environmental efforts already in the past, such as eliminating CFCs and PVC and reducing CO2 emissions and waste at four domestic factories. In 2009, Shiseido was the first in the cosmetics industry to receive the "Eco-First Company" certification as the leader in its industry in many areas, except for the targets in CO2 emission reductions. In order to add momentum to the various efforts being made, the Environment Committee was established under the direct control of the Shiseido Board of Directors. In connection with receiving the Eco-First accreditation, Shiseido as an "Eco-First Company" promised (1) to continue efforts for mitigating global warming, (2) efforts for actualizing a recycling-oriented society, and (3) actualization of a society in which human beings and the Earth can co-exist beautifully, and annual reports are made to the Ministry of the Environment on the progress of our initiatives.

The Environment Committee decided that Shiseido place environmental activities at the core of its management, using environmental efforts as a competitive advantage and embedding them throughout all processes of our business activities. Hence, the Shiseido Earth Care Project was launched in April 2009 with all Shiseido employees worldwide acting as members. Some examples of the initiatives undertaken include installation of

solar panels on the rooftop of one of our US factories for photovoltaic power generation, switching from oil-based polyethylene to sugarcane-based polyethylene for our bottles and tubes, coming up with new energy-saving cold processes to eliminate the need for heating and cooling ingredients for shampoo and skin care lotions and the opening of our model environmentally-efficient plant in Vietnam this April.

As to recycle-based society, Shiseido started a nationwide system in 2001 to collect and recycle its used glass bottles. In terms of saving resources, plastic packaging was replaced with paper packages (Tsubaki brand), thickness of plastic containers was reduced (Super Mild brand) and more efficient cardboard storage boxes were devised to reduce use of resources and CO2 emissions. Also, for the polyester uniforms for Shiseido's beauty consultants, we switched to chemical recycling from conventional thermal recycling.

As for the realization of co-existence between humanity and the Earth, we created a Tsubaki Forest in Wakayama Prefecture planting our symbol's Tsubaki trees (camellia), from which we get oil for our hair care products. In China too, we started a planting program in Lanzhou in Gansu Province. In addition to our own efforts, we collaborate with other Eco-First companies, such as All Nippon Airways (ANA) in handing out cosmetics samples on flights and Nissan to introduce the Nissan Leaf electric car as our commercial cars.

Screening of our environmental efforts is done through a numbering system. In this way, all activities are given a number to express the continuity and scope of each activity.

The challenges for the future, on top of CO2 abatement, waste reduction and resource savings, are the preservation and sustainability of biodiversity. With Thailand's National Center for Genetic Engineering and Biotechnology, Shiseido is working to use genetic resources from plants to extract substances for cosmetics. Shiseido also submitted to METI the product category rules (PCR) for the cosmetics industry for the Carbon Footprint label.

CSR Activities

One of the CSR activities that is unique only to Shiseido is the Shiseido Life Quality Beauty Program (SLQ). This is not about the environment, but SLQ is a program to provide makeup advice and seminars for people who suffer from serious skin conditions like birthmarks or white spots as well as elderly women to improve their self-confidence and quality of life. There are plans to make this program global as a form of social rehabilitation. Shiseido hopes to disseminate and communicate the power of cosmetics throughout the world.

Q&A

Question: Two questions. One, could you provide an indicative value between the non-biodegradable plastic containers compared to the sugarcane-based bioethylene ones? Two, will there be an increase in the selling price after the adoption of the new plastic containers?

Mr. Iwai: The price for the sugar-cane derived ones would be twice as much as the polyethylene ones, but Shiseido feels that it should not continue using the oil-derived plastic just because polyethylene is cheap. Although the sugarcane-derived ones are more expensive, that would be offset by other cost reduction efforts and eco-friendly activities in other areas from FY2011. We do not want to transfer the cost increase to customers.

Question: Are the projects and programs voluntary or by regulation from METI?

Mr. Iwai: What I stated today are all voluntary activities by Shiseido. We came up with the ideas and are putting them into practice. For example, while METI is recommending the displays of Carbon Footprint to all the industries, we are doing this as a voluntary activity in preparation for it possibly becoming a law. We are also putting a lot of thought into this at the industry association and thus came up with the rules for our industry ahead of the regulations by the government.

Question: In switching from thermal to chemical recycling for the disposal of your uniforms, does the chemical recycling process not create more chemicals that are also difficult to dispose of?

Mr. Iwai: The chemical recycling that we have adopted uses a chemical reaction to transform chemical compositions so the item can be 100% reused. There are virtually no CO2 emissions because oxygen is not required, so this is an ideal chemical process. For the coke furnaces, coke is burned to decompose the chemical substance to hydrocarbon or further to coke and this is done anaerobically. The question is about the polyethylene and it is 100% transformed to other chemical starting materials. As for the thermal recycling, it is only about incineration and the heat generated may be used, but it is simply burning, not recycling. However, chemical recycling is a recycling process closer to true recycling.

Toray New Business Strategies Focused on the Global Environment — To Build a Sustainable Low-Carbon Society

Mr. Norihiko Saitou
Member of the Board and Member of the Executive Committee
Senior Vice President, Toray Industries, Inc.

Toray Industries, Inc., the parent company of the group, was founded in 1926, and is committed to achieving innovations through the power of chemistry. Historically, Toray has ventured into various new businesses as a form of diversification. Our lines of business can be categorized into our foundation businesses (fibers, textiles, plastics and chemicals), strategically expanding businesses (IT-related products and carbon fiber composite materials), which are the drivers of growth, and strategically developing businesses (environment, engineering, life science and others).

Environmental issues, crucially global warming, water shortage and resource depletion, have affected the business climate and companies have been using the product lifecycle approach to work on environment preservation and delivering solutions to their customers. With the growth of environment-related markets, it is expected that environmental businesses can lead to both business growth and the sustainable development of society.

Considering the global environment in all our business strategies, Toray is promoting a project called EcoChallenge as a holistic approach to ecology in order to achieve a sustainable low-carbon society and tackling resource savings and global environmental preservation. This project has two parts: (1) environmental preservation and (2) solutions for mitigating global warming and environmental impact in the form of innovative products and services. The project also tackles with lifecycle management in order to tackle with ecology and environmental issues in a scientific and quantitative manner. As the direct contribution that the chemical industry can make to emission cuts becomes limited, our company is determined to develop and promote the use of environmentally-friendly products, which emit significantly less CO2 throughout the product lifecycle. Project EcoChallenge has two specific targets by around 2020: (1) to increase our contribution factor of CO2 abatement by more than 20 times from the current level of 1.3 and (2) to increase the sales of environmentally-friendly businesses. The policy and management system for environmental preservation is uniform on a group-wide basis and for the environment audit and environment management standards, the same rules and standards are applied to our group subsidiaries and affiliates in Japan and overseas.

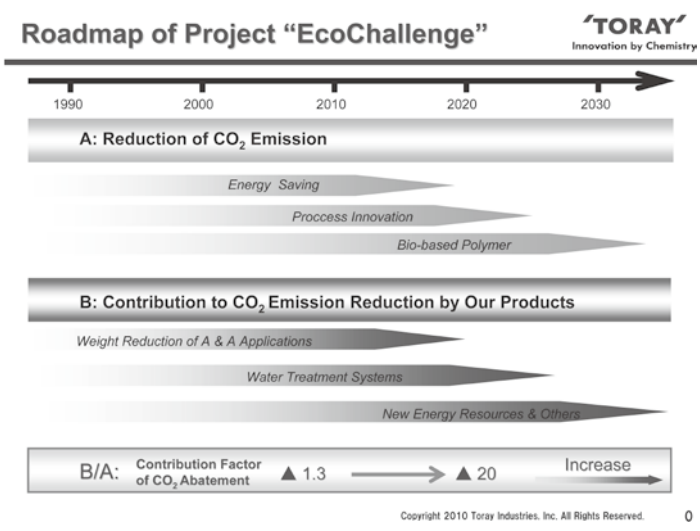
Toray has made achievements in lowering its environmental burden through reductions in SOx, BOD (wastewater effluents), waste and chemical emissions, as well as through energy savings and greenhouse gas emission reductions through the expansion of environmentally-friendly businesses, such as carbon fibers and water treatment.

As for delivering eco-friendly solutions, environmentally-friendly products are defined as those which contribute to the reduction of environmental burdens through their lifecycle by utilizing our core technologies (organic synthetic chemistry, polymer chemistry,

biochemistry and nanotechnology). Our main products in these areas include carbon fibers and reverse osmosis (RO) membranes for seawater desalination.

Compared to steel, carbon fiber is extremely strong and helps reduce a product's weight. With a current world market share of 34%, demand is expected to grow with additional industrial applications. Carbon fibers help combat global warming by making lighter-weight automobiles and aircrafts, thus reducing their CO2 emissions, and are also used in improving the efficiency of super-large windmills for wind power generation. Toray's advanced films and resins are also used in the photovoltaic industry for solar power generation. Given the contribution that use of biomass as a fuel can make to CO2 abatement, Toray is quite active in promoting the development of non-edible biomass, particularly polyactic acid (PLA).

For water treatment to tackle the problem of water shortage, Toray has done research on reverse osmosis (RO) membrane and in 1975 was the first Japanese company which made viable businesses for RO aimed at desalination of the seawater and brackish water at reduced cost and with lower energy consumption. Through its research, Toray now has the capability to develop and sell all four different membrane types with different pore sizes (RO, UF, NF and MF). By combining the different membranes, the water treatment membrane businesses are expanding very rapidly and successfully throughout the world with projects in Kuwait, Trinidad, Algeria and Singapore, among others. R&D competition is very severe and Toray has a wonderful capability to design polymers for the membranes controlling pore size at the sub-nanometer level for high permeability and at the same time boron rejection. Using these technologies, CO2 abatement by RO was close to 10 million tons in 2007.



To conclude, through the EcoChallenge project, the Toray Group aims to reduce CO2 emissions by developing innovative processes and energy saving methods and through the use of biopolymers. Compared to conventional methods, Toray's products contribute to greater CO2 abatement. By expanding businesses for environmentally-friendly products, such as carbon fiber composite materials and membranes for water treatment, and offsetting CO2 emissions during the production with carbon intensity, CO2 abatement will increase to 220 million tons by 2020. Reducing CO2 emissions while at the same time expanding businesses is quite in line with our philosophy to be a "global top company of advanced materials." Toray offers both the materials and solutions to achieve a sustainable low-carbon society and is committed to making further technological contributions. It was a

great honor for us to receive the 2008 Humanitarian Award given by the UN Association for our environmental efforts.

Q&A

Question: Can you share more on the implementation of the overseas plants with regard to the EcoChallenge initiatives?

Mr. Saitou: Toray itself and Japanese and overseas subsidiaries are all working for environmental preservation under a uniform management system.

Question: Can we use polymer scraps for recycling?

Mr. Saitou: In the plants, we reuse scraps and products sold to the customer are sometimes recovered and recycled. In the case of carbon fibers, recycling is almost impossible, so what we do is milling and putting the carbon fiber containing material into concrete to reinforce building materials.

Question: Is the supply of carbon fiber enough and sufficient to meet the new demand?

Mr. Saitou: At the moment, to be quite honest, we have an oversupply of carbon. However, when carbon fiber is used more substantially in automobiles and vehicles in addition to aerospace, the demand will be huge, so we have to foresee the chances of demand explosion in the near future.

Question: Which is more economical: the seawater or wastewater treatment process?

Mr. Saitou: The consensus would be that reuse of wastewater may be better cost-wise. For seawater desalination, the plants need to be located by the seaside or you have to have long pipelines to draw the water to inland facilities, so the choice based on cost may depend on the size of the country.

Question: Firstly, why is Toray not operating in the countries of the Indo-Pak subcontinent? Secondly, do you have joint ventures with private companies or the government sector in the countries in which you operate? Thirdly, would there be an interest in partnering to bring more windmills to Pakistan?

Mr. Saitou: To the first question, Toray has a long history in business in Southeast Asia, but we have not reached Indo-Pak yet, although we do have representative offices for the exportation of products. When the market size is big enough, we will consider establishing manufacturing bases there.

To the second question, we want to be more aggressive in such collaboration in the future. We are a manufacturer, so we are not strong enough to do both the production and the expansion of the operations and need a local partner. For example, we are setting up joint ventures in China with local companies, because the local partners know more about the networks in the local market.

To the third question, if we find a good partner in Pakistan and there are good incentives from your government, we are ready to consider our possibilities. As for the power generation, Toray alone cannot do it as you need assembling capability of the equipment

and know-how about power transmission. In Japan, Mitsubishi Heavy Industries and Toray are working together. It may be more suitable to have a country-level collaboration between Japan with Japanese companies and your government.

Question: I have a very specific question about the application of the RO membrane. Has Toray looked into using selective membranes for sugarcane processing in the sugar industry?

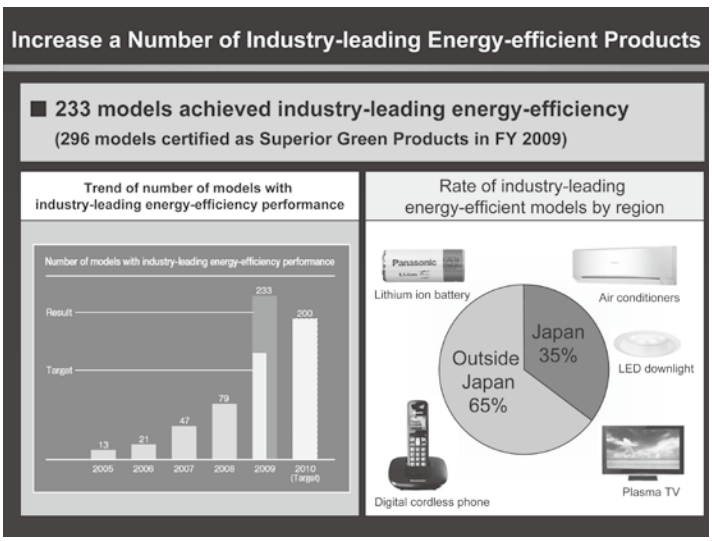
Mr. Saitou: We have not done any substantial research, but we would like to consider it in the future. I think we need to have a very good study regarding how effectively the membranes or pore size can be determined and how efficiently sugar can be extracted or concentrated from the sugarcane.

Panasonic Environmental Sustainability Management

Mr. Kuniaki Okahara
Director, Corporate Environmental Affairs Division, Panasonic Corporation

Panasonic was started in 1918 and today there are roughly five business segments: AVC and networks, home appliances, devices, Panasonic Electric Works and PanaHome and others. The major issue is that of energy consumption, in particular the rise in household energy consumption, so it is our responsibility as an electronics company to further increase the energy saving performance of home appliances. The basic thinking for our environmental management is rooted in the thinking of our founder, Mr. Konosuke Matsushita, that a company is a public entity of society and should thus not damage the natural environment as it will undermine the happiness of the people.

Under such a recognition, the company's environmental management strategy 'eco ideas' was announced in October 2007 with (1) 'eco ideas' for products (thorough energy savings for products), (2) 'eco ideas' for manufacturing (reduction of CO2 emissions in the production process), and (3) 'eco ideas' for everybody, everywhere (spreading environmentally-friendly activities from plant to community). For fiscal 2010, we conducted environmental management based on these three 'eco ideas'.



On 'eco ideas' for products, in order to accelerate time to market and improve performance of environment-friendly products, various measures based on in-house standards are being taken to evaluate all products in their performance for energy efficiency, resource savings and chemical use reduction. Products above a certain level of performance are classified as green products (GP) and, among them, those products having the best environmental performance in their respective industry are certified as superior GPs and put on the fastest track of development. In FY2009, 233 models achieved this industry number one status and two-thirds of our overseas models have this best in class recognition for reduced rated, annual and standby power consumption. Most recently, Panasonic's new household products are installed with EcoNavi functions, sensors that control energy according to the needs and living conditions of residents.

On 'eco ideas' for manufacturing, Panasonic announced its commitment to reduce CO2 emision to 3.68 million tons in FY2010 on a global group-wide basis, while expecting to increase production volume at the same time. This target was met one year ahead of plan with total global emissions at Panasonic in FY2009 at 3.47 million tons. Although the production volume decreased due to the economic downturn, this was mostly achieved through tedious efforts, such as detailed production management and process improvements as well as energy saving measures on the shop floor. These incorporate four basic initiatives for reducing emissions systematically: (1) the meter-gauge approach, using instrumentation to make energy use visible and bring out evaluable results, (2) energy saving diagnosis, to identify areas of energy saving potential at each site and drive improvement measures, (3) process innovation, using simulations to develop advanced energy saving technologies, and (4) group-wide sharing of good practices. As an example, at the washing machine plant in Hangzhou in China, by using these initiatives, CO2 emissions were reduced by 14% per unit volume of production.

On 'eco ideas' for everybody, everywhere, various activities have been organized since the Love the Earth Citizens Campaign (LE) activities in 1998, in particular to extend environmental activities to the community. These include the Panasonic Eco Relay, in which environmental themes are spread throughout the company globally as a voluntary activity by the employees, and in Asia, according to the Asia-Pacific 'eco ideas' Declaration announced in Singapore on 5 June 2009, the experience-focused environmental caravan activity in the Asian countries. In Europe, the 'eco ideas' model factory in Pilsen was announced in June to proactively promote the 'eco ideas' and co-exist with the region. There are also collaborative activities with the World Wildlife Fund for biodiversity conservation.

The newest concept is a house with zero CO2 emissions, the 'eco ideas' House, which can be visited at the Panasonic Center Tokyo in Tokyo. From the home appliances through to the construction materials, the house as a whole house represents first-hand the idea of reducing CO2 emissions through thorough energy savings, creation and storing of energy and through synergy between technology and nature. This is not a dream, it is practical and it is feasible in the next three to five years

On the environmental management policy for fiscal 2011 onward, with Sanyo Electric joining the Panasonic Group, we have added solar cells, rechargeable batteries and industrial equipment to our traditionally wide range of products. For our future vision for the centennial, Panasonic aims to fully make use of its merits to serve as a leader as the "No. 1 Green Innovation Company in the Electronics Industry". The environment would be the cornerstone for all the business activities and innovations. Green Life Innovation will be promoted, which means to realize a green lifestyle that enriches people's lives by proposing 'eco ideas' and an optimum green business style. We would like to pursue ideal manufacturing (zero cost, zero lead time, zero inventory and zero emissions of CO2 and waste) and get as close as possible to that ideal. Moving toward this vision, the two goals are to consistently exceed global excellence index standards and to be the global leader in green index performance in the four global excellence indexes: sales, operating profit through sales ratio, ROE and number one global market share in more than one product. Promising areas in this respect include comprehensive energy solutions for homes and entire communities, solar cells, lithium ion rechargeable batteries for energy storage and energy management, such as Panasonic's joint experiment on a smart grid with SEAS-NVE, a Danish power utility company.

Q&A

Question: How many Panasonic products have been eco-labeled in the countries where you operate?

Mr. Okahara: I do not know the number of eco-labels that are in place in various countries. However, our objective is for 30% of our products to be among the top products for eco-savings in the industry in China, Europe and the United States as well. In Japan, we have a system to rank energy savings and 30% of our products are top performers for energy savings.

Question: What does it mean to have zero inventory and zero time?

Mr. Okahara: We would like to reduce the cost as close to zero as possible. Zero time means zero lead time, so from the moment you get the placement of the orders until you can ship the product. For some products, it could take months or weeks or just a single day. We would like to reduce the lead time to a minimum. Right now, it is not that the lead time is zero, but we would like to come as close as possible to zero.

Question: To your initiative for CO2 reduction and process innovation, what are the initiatives undertaken besides the technology-driven initiatives to improve the process?

Mr. Okahara: For instance, advanced complicated technologies could be one, but low-cost measures have been taken to drive down energy consumption. In a plant, for instance, when products are not being produced and the production machinery is not in use, they are still on standby mode and some power is consumed. On holidays and weekends also, some of the production facilities and production equipment are on. By turning off such power supply, the cost of the process can be improved.

Question: What is the market for your solar cells? I ask the question because in the Philippines, solar cell manufacturer's products are solely devoted to Europe, for example.

Mr. Okahara: At present, the solar cells are being manufactured by Sanyo, our member company. Most are sold to residences in Japan, but I think that the demand will be growing in the world and therefore we would like to take a look at overseas market opportunities.

Group Discussion Session

Dr. Kun-Mo Lee acted as facilitator of the group discussion session. Participants were divided into five groups, ensuring that all group members were from different countries. Each group was tasked to pick a topic concerning any one of the eight presentations and report on the key points of the chosen presentation as well as offer applications of those key points to the respective participants' home countries or organizations.

GROUP DISCUSSION AND PRESENTATIONS

Group 1: Topic on Toray/chemicals

Since the construction industry is gaining momentum in Singapore, one of the ways to reduce the environmental burden would be the adoption of carbon fibers. The second key point discussed was the introduction of bio-based polymer products to the commercial sector, which is particularly in line with the government's policy in Singapore.

With regard to Pakistan and the extreme shortage of power supply and power generation there, the main source of power generation is expected to be from hydroelectricity. However, one lesson learned was exploring the potential use of CRFP-based windmills. Similarly, solar power could be increasingly implemented to lead to CO2 emission reductions and ultimately improvement of the environment.

As Thailand is going for a green economy and a low-carbon society, the technologies mentioned by Toray pertaining to windmills and solar energy would be applicable. For India, the emphasis is on environmental preservation and sharing of information with the society to improve awareness and thus contribute through environmental technology. For Taiwan, the zero waste policy (recycling and reuse) for metals from electronic items was stressed. For the Philippines, potable water supply to remote areas without access to fresh water and exploring the use of RO for the desalination were highlighted.

Q&A

Question: Concerning Pakistan, only hydropower has been mentioned, but solar power and windmills also do not emit carbon, so all three kinds of technologies should be established.

Comment: Yes, hearing this today, it appeared that Toray is doing business in Asia except in the Indo-Pak subcontinent, so we feel that there is certainly a large scope.

Group 2: Topic on eco-business

Eco-business is a canvas of wide opportunities, so it was viewed from the perspective of a corporate entity. However, other stakeholder perspectives have to be considered as well. For the society, it is very important to have sustainability, environmental protection and above all

resource security. For governments, compliance and welfare are important.

As for the eco-business strategy, the first thing is to examine the business as usual process to benchmark what is available and then look at best practices around the world. Forecasting technologies is very important and also eco-imagination to convert invention into an opportunity. Then, eco-design must lead to a sustainable eco-business plan, which requires compliance and total business process engineering, which must relate to the efficiency of a product. Ultimately, the environmental impact is important to address and how it leads to environmental profit.

We learned that identifying emerging opportunities requires a lot of time. There are endless opportunities, but we all agreed on one big potential area: trash to cash. One very important area where Asian countries at least share a perspective is biomass conversion. Finally, given that there is so much money and so many opportunities in this greener business, it is profitable to adopt clean technology and services as a business for a company.

Q&A

Question: While you are supposed to talk about eco-business, this is rather conventional energy savings.

Presenter: It needs a little elaboration. When I say clean technology business, it has two facets: one is hardware and the other is software.

Group 3: Topic on climate change

On the topic of climate change, the goal is not country-specific. The key points on climate change were its causes, primarily global warming and use of fossil fuels.

The solutions that we envisaged are to have government policy in place as soon as possible regarding the generation of greenhouse gases and preventing global warming. The steps should be clearly laid down. Exploration of power generation should be more hydro-based and nuclear-based and G20 countries should transfer clean technologies to developing countries. National cleaner production centers should be established and should be functioning more rigorously. More awareness creation is needed, particularly in the developing countries and rural areas. Population control is another area which has to be taken into account as well as usage of clean energy, non-conventional energy or renewable energy sources. Another solution is to switch to energy-efficient green buildings using natural lighting and natural heating systems. Zero carbon emission, eco-products and eco-services, eco-manufacturing, compulsory auditing of Carbon Footprint for industries should be made mandatory.

While for Korea, India, Indonesia and Singapore, it is easy to implement green policies, for Laos and Cambodia, it will take a longer timeframe to implement.

Q&A

Comment: You have been talking about the solutions, but we would like to consider an issue like enhancing the awareness among the players in the industry.

Presenter: That point was there in the slides on increasing awareness. Work is already being done in that direction, for example, through holding the Eco-International Fair in Jakarta, Indonesia and similar fairs in other countries as well.

Group 4: Topic on Mosaic Tile

The key points of the presentation by Mr. Ina were identified as follow. First and foremost is about the visible commitment and participation from top management. The second key point is the effective two-way communication. The third key point that is that the selling of ideas must be joyful and create a better working environment. We have also observed that what is important to proceed with any change initiatives is continuous staff engagement. The fourth key point is about information dissemination, both to staff and customers. Last but not least, the culture of openness and joyfulness is key to the success of the change initiatives at Nippon Mosaic Tile.

On the application, this is a very micro-enterprise company, so we wanted to look also more at the enterprise level. First, the takeaway message to bring back to our countries is the hands-on approach to manage a business. Second, what we thought is very useful is the sharing of best practices to enhance leadership capability, not just learning internally, but from other organizations, business partners and the community. Third, the issue about situational leadership is important to be addressed, because creating a joyful and open culture is different in different kinds of businesses. Fourth, continuous education should be adopted to enhance the understanding, skills and the mindset change. Last but not least, a powerful application is the communication process and using powerful visual to promote the corporate message.

Q&A

Question: How can you engage in continuous staff engagement?

Presenter: Continuous engagement with employees builds trust and eventually they can come forward with better ideas to improve the performance of the organization. In this particular case, Mr. Ina is able to get 3,000 recommendations from the staff is because he was continuously talking, communicating and engaging with the employees.

Questions: How do you know you have achieved your objective of a joyful business?

Presenter: How do I know? Maybe you can look at their faces and if they are smiling, they are enjoying it. The numerous participation at the company's events and activities is testimony or a barometer that reflects achievement.

Question: Do you think in reality joyful business can survive?

Presenter: If the joyful situation is there, the enterprise will be earning a profit, which will be distributed to employees also. That will be the major criteria for continuation.

Comment: Alternatively, take a look at the article in today's newspaper about UK Prime Minister Gordon Brown and his (over-)demanding actions.

Group 5: Topic on eco ideas

From Mr. Okahara's presentation, we chose the three key initiatives of the eco ideas as our key points.

The first one is eco ideas for manufacturing. For the participant from Thailand, the initiative on process innovation was helpful and he suggested using waste gas to produce electricity and also to use biomass-substitute solid fuel. The member from Vietnam suggested that due to increasing electronic consumption, manufacturers should focus on recycling-oriented products. With many countries in Southeast Asia facing similar situations, the governments should establish a recycling system for electronic products in the future.

The second key point is eco ideas for products. For example, Taiwan has already established a green label and in the future the LCA and other tools could be used to expand the green products system and establish those products which are top environmental performers.

The third key point is eco ideas for everyone, everywhere. The member from Fiji suggested promoting environmental education for youths, to establish factory open days for communities and to collaborate with the government, NGOs and stakeholders to enhance communication. The member from Cambodia suggested measuring and managing energy consumption by themselves. In Iran, the group member suggested that water saving is a very serious problem so that water conservation certification label and legislation, and a wise water pricing policy are very important.

Q&A

Comment: One important thing in Japan is that there is a regulation for electronics manufacturer to take back the finished goods and recycle a minimum of 50% of the materials which have been consumed in making those commodities, which means reduction of pressure on landfills.

Comment: When you look into the productivity improvement by process innovation, what you are trying to do is to ensure that your process is more efficient and environmentally-effective and the issue is how to achieve those objectives.

Comment: I agree with that. If the process is more efficient, the energy consumption and material consumption per product as well as the cost will go down and it is very environmentally-friendly.

II

Appendixes

Top Management Forum on
Environmental Management for Sustainable Productivity Enhancement
(22–24 February 2010, Kyoto, Japan)

List of Participants and Resource Speakers

Participants

Bangladesh	Mr. Md. Abul Kashem Director (Production & Engineering) Bangladesh Sugar & Food Industries Corporation (BSFIC) Chinishilpa Bhaban, 3, Dilkusha Commercial Area Dhaka
Cambodia	Mr. Ngoun Kong Deputy Director General Ministry of Environment #48 Samdech Preah Sihanouk Bldg. Tonle Bassac, Chamkar Mon Phnom Penh
	Mr. Oung Vuthy Chief Officer EIA Department Ministry of Environment #48 Samdech Preah Sihanouk Bldg. Tonle Bassac, Chamkar Mon Phnom Penh
	Mr. Pok Leak Reasey Director Khmer Nature Handicraft Donmann Village, Samrong Leu Comune Ang Snul District Kandal Province
Republic of China	Mr. Chang Yu-Cheng Team Leader Taiwan Green Productivity Foundation 5F, 48 Bauchiau Road, Shindian Taipei 231
	Mr. Lin Hua-Yu Staff Industrial Development Bureau Ministry of Economic Affairs 5F, No.41-3, Hsin-Yi Road, Sec. 3 Tapei

Fiji	Mr. Kitione Kotoisuva Raratabu Group Health, Safety and Environment Officer Basic Industries Limited Level 6, Vanua House P.O. Box 369 Suva
	Mr. Timoci Qio Laqai General Manager Corporate/Administration & Company Board Secretary The Fiji Sugar Corporation Limited 3F, Western House, Private Mail Bag Lautoka
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	Mr. Vanhxay Phiomanivone Technical Officer Water Resource and Environment Administration (WREA) Department of Environment (DoE) P.O. Box 7864 Vientiane Capital
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	Mr. T. K. Udairam Chief Executive Officer Changi General Hospital No.2, Simei Street 3 Singapore 529889
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	Dr. Tran Thien Dung Director SG Sundries Investment and Trading Joint Stock Company Ha Thanh Branch 43 Ngo 1141 Giai Phong Street, Hoang Mai District Hanoi

Resource Speakers (in order of presentations)

Prof. Ryoichi Yamamoto
Professor
International Research Center for Sustainable Materials, Institute of Industrial Science
The University of Tokyo

Mr. Yu Murata
Director
Environmental Industries Office, Industrial Science and Technology Policy and Environment Bureau
Ministry of Economy, Trade and Industry of Japan (METI)

Mr. Norimasa Ina
President
Nippon Mosaic Tile Co., Ltd.

Dr. Kun-Mo Lee
Professor
Ajou University
Republic of Korea

Mr. Teisuke Kitayama
Chairman of the Board
Sumitomo Mitsui Banking Corporation

Mr. Tsunehiko Iwai
Corporate Officer (Technical Planning and Technical Affairs) and
General Manager, Quality Management Department
SHISEIDO Co., Ltd.

Mr. Norihiko Saitou
Senior Vice President
(Member of the Board and Member of the Executive Committee)
Toray Industries, Inc.

Mr. Kuniaki Okahara
Director
Corporate Environmental Affairs Division
Panasonic Corporation

Top Management Forum on
Environmental Management for Sustainable Productivity Enhancement
(22–24 February 2010, Kyoto, Japan)

Program and Itinerary

Monday, 22 February

08:45–09:20	Opening Ceremony
10:00–11:15	Session I: "*Environmental Management in the Business Sector for Global Warming and Sustainable Development*" by Prof. Ryoichi Yamamoto, Professor, International Research Center for Sustainable Materials, Institute of Industrial Science, The University of Tokyo
11:30–12:45	Session II: "*Policy to Support and Encourage Environmental Management and Businesses*" by Mr. Yu Murata, Director, Environmental Industries Office, Industrial Science and Technology Policy and Environment Bureau, Ministry of Economy, Trade and Industry of Japan
14:15–15:30	Session III: "*Joyful Business through Eco-friendly*" by Mr. Norimasa Ina, President, Nippon Mosaic Tile Co., Ltd.
15:50–17:00	Session IV: "*Eco-business: New Business Paradigm for the Sustainable Society*" by Dr. Kun-Mo Lee, Professor, Ajou University, Republic of Korea
17:15–18:30	Session V: "*Social Responsibility of Financial Sector for the Realization of a Sustainable Society*" by Mr. Teisuke Kitayama, Chairman of the Board, Sumitomo Mitsui Banking Corporation

Tuesday, 23 February

09:30–10:45	Session VI: "*Shiseido's Environmental Efforts—Shiseido Earth Care Project*" by Mr. Tsunehiko Iwai, Corporate Officer (Technical Planning and Technical Affairs) and General Manager, Quality Management Department, SHISEIDO Co., Ltd.
11:00–12:15	Session VII: "*Toray New Business Strategies Focused on the Global Environment —To Build a Sustainable Low-Carbon Society*" by Mr. Norihiko Saitou, Senior Vice President, (Member of the Board and Member of the Executive Committee), Toray Industries, Inc.
13:45–15:00	Session VIII: "*Panasonic Environmental Sustainability Management*" by Mr. Kuniaki Okahara, Director, Corporate Environmental Affairs Division, Panasonic Corporation

15:20–18:00	Session IX: Group Discussion and Presentations "Application of Environmental Management Learnt to APO Member Country" Facilitated by Dr. Kun-Mo Lee

Wednesday, 24 February

09:30–11:30	Company Visit: Hitachi Maxell, Ltd., Kyoto plant
12:30–13:30	Closing Ceremony & Farewell Luncheon

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