



# Sustainable Industrial Development Newsletter, SIDN 9-1

## March 2008

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Current Status & Future Trend of the Sustainable Development of Water Resources in Taiwan

## Editor's Notes

As a critical resource for sustainable development, water holds the key to our future. When facing severe challenges of water resources, we should respond bravely and reduce damages actively in order to cope with the high uncertainty of the future. When planning the development of water resources, we should bear in mind that water resources are limited and precious. In the view of sustainable use of resources, we need to obtain a balance between the potential limitation on natural water supply and the need of overall regional development in order to reach the goal of sustainable development while maintaining the environment protection, economic development and social justice.

As the water resources have undergone significant changes and resulted in complex situations, we need to plan visionary and integrated multifaceted water resource policies. Thus, we are honored to invite Director-General She-Hsien Chen of the Water Resource Agency to write an article on "Sustainable Water Resources in Taiwan" in "Special Reports section" to introduce previous water resource development problems; foresee future difficulties and develop strategic planning for sustainable use of water resources in Taiwan.

In the "Sustainable Industries in Taiwan section", we will share a series of environmental projects conducted by the Everest Textile Co., LTD. including strategic actions on "saving energy, environmental protection and love for earth" and the Everest Sustainability Model to protect Earth, practice CSR and create a win-win situation between the enterprise and environment.

With a view to better serve our readers, the SIDN has been expanded to 32 pages to provide information on sustainable industrial development in a deeper, broader manner. We hope to benefit our readers through diversified and rich knowledge on sustainability.

# Sustainable Water Resources in Taiwan

Shen-Hsien Chen  
Director-General  
Water Resources Agency,  
Ministry of Economic Affairs  
Executive Yuan, Taiwan

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ustainability of water resources in Taiwan is built upon three main bases : environmental protection, economic development and social justice. In order to fulfill sustainability in water resources, the focus of Taiwan's water resource development policy has changed from demand-oriented consideration to supply-based management, namely, from measures of the development of traditional water sources and supply of adequate water sources to the diversification of water source development and total quantity control of water resources. At the 19<sup>th</sup> council meeting held on 20 April 2005, the National Council for Sustainable Development (NCSD), Executive Yuan, made a resolution to enforce water resource sustainable development policy through two strategies: total quantity control on development and utilization of natural water resources as well as zero growth of water consumption in dry season.

## I . Introduction

At the 42<sup>nd</sup> UN General Assembly, the World Commission on Environment and Development (WCED) published the report entitled "Our Common Future". This report emphasizing on the concept of sustainable development defined sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987)". At the United Nations Conference on Environment and Development (UNCED, Earth Summit) held in Rio de Janeiro, Brazil, in June 1992, important documents including the Rio Declaration on Environment and Development (Rio Declaration) and the Agenda 21 were passed to reveal the new thoughts and directions in sustainable development of modern people.

Concerning the sustainable use of water resources, apart from treating water as one of the life-sustaining necessities of mankind, we should consider water resources as decisive infrastructures in promoting continuous social and economic development. In the past, the government engaged in aggressive development and construction of water resources in order to ensure stable and adequate water supply for industrial use as the foundation for Taiwan's economic boom. However, the condition of water resources has changed significantly in recent years, and the water resource issue for industry complicates increasingly. Therefore, at the turn of the century, it is necessary to plan visionary and integrated water resource policies in the realm of sustainable use.



## II. Evolution of water resource utilization in Taiwan

There were several major changes in Taiwan's water resource policy since 1945 as a result of changes in industrial policies. In the beginning of Taiwan's restoration, recovering food production was the prime strategy. As the food demand of the military and civilians augmented after the government moved to Taiwan in 1950, it was necessary to accelerate food production. After the completion of the Zhengwen Reservoir in the mid-1970s, water resource development has gradually changed from agricultural use to public and industrial uses. When the silting problem of the reservoir deteriorated after 1981, regional management and joint use thus became the important basic strategies. At the rise of environmental and ecological concepts in recent years, water resource development began to be diversified in order to meet with the world trend of sustainable development. The following describes the changes in Taiwan's water resource development policies during different periods in terms of industrial policy change :

### 1. Post-restoration period: agricultural recovery (1945-63)

Prompt recovery of food production and stabilization of livelihood was the government's prime target in this period as a result of food shortage.

### 2. Agricultural deceleration for industrial development period (1964-72)

In this period, agricultural development was decelerated to incubate industrial development. Though irrigation was still the center of water resource operation and management, it tended to slow down as a result of promotional difficulties. Also, surplus in paddy output was observed due to the changes of times and citizen habits.

### 3. Industry-based rapid economic growth period (1973-83)

The government's attempt to incubate industry with agriculture began to fruit in the beginning of the 1970s, and the development of export-based small and medium enterprises (SMEs) was prosperous with the government's vigorous demonstration and promotion in export processing zones (EPZes) in Nanxin and Tanzi. As a result, the irrigation-centered water resource development policy thus superseded to industrial use and public use.

### 4. Water resource development for public use period (1984-93)

Water resources for industrial and public uses have gradually become the focus of development in this period. And concepts and strategies for maintaining a balance in operation, management and development began to develop. These included:

- (1) the joint use of surface and ground water resources;
- (2) the joint operation and management of regional multiple water resources;
- (3) the sustainable use of reservoirs and water resources, particularly after the proposition of silt prevention for reservoir sustainability since 1984; and
- (4) replacing operation and management with development after 1994.

To cope with the joint operation and management of water resource regions, a central administration for regional water sources has to be established to replace the past practice of one administration for one water resource area or reservoir in order to maximize the effect of water resource operations and dispatch.

#### **5. Sustainable water resource development period for industrial use (1994 onwards)**

Though household water consumption reduced as a result of slow population growth, industrial water demand increased rapidly. While the condition of natural water resources turned harsher, and together with the rise of environmentalism, populism and water supply instability, the diversification of water resource development, including artificial lake, seawater desalination and water reclamation, can satisfy the water demand for continual industrial development and fulfill the future trend of

sustainable water resource development.

### **III . Characteristics and problems of water resources in Taiwan**

#### **1. Characteristics of water resources in Taiwan**

- (1) *Low annual distribution per person despite of high annual average precipitation* : The annual average precipitation in Taiwan is about 2,500 cm, i.e. 2.6 times of the world average. However, the average annual distribution per person is only 4,074m<sup>3</sup>, i.e. less than a fifth of the world average, as a result of its narrow shape and dense population.
- (2) *Diverse precipitation in wet and dry seasons*: About 78% precipitation comes in the wet season from May-October, and the runoff ratio during the wet and dry seasons in southern Taiwan is 9:1, thus leaving limited water for use.
- (3) *Severe washout in collection area as a result of rapid water flow from steep river slopes and poor geology* : Over three quarters of precipitation flow directly into the sea because of the narrow river valleys and limited reservoir volumes. Also, the geological formation of the collection areas is quite young and thus weak, so there are not many suitable sites for building dams.

## 2. Problems of water resources in Taiwan

- (1) *Reduced water resources usability due to water quality deterioration* : The total length of rivers in Taiwan is 2,904.2km. Results of river water quality survey in 2005 indicate that the pollution condition , of over 25.9% rivers, totaling 752.2km long, is either medium or severe, and the effective use of some river water resources is thus unavailable.
- (2) *Limited sites for building reservoirs and dams and low utilization of surface water*: The water resource utilization in Taiwan is only about 19% (approx. 12 billion tons) as a result of poor natural hydrological conditions.
- (3) *Limited volume of water storage facilities and inadequate anti-draught capacity*: Reservoirs in Taiwan are often built in steep slope areas and the capacity is not large enough. For example, the Three Gorges Dam in China is about 180m in height with a storage capacity of 39,300,000,000m<sup>3</sup>. However, the Deji Dam in Dajia River in Taiwan with a similar height contains only 232,000,000 m<sup>3</sup>. The storage capacity difference between both dams is about 170 times.
- (4) *Water supply interrupted by high turbidity during typhoons and floods* : Rivers, reservoirs and groundwater commanding at 77% runoff are the three major water resources in Taiwan. However, water supply is interrupted when raw water turbidity escalates as a result of typhoons and rainstorms from severe erosion after the Chichi Quake of 1999.
- (5) *Rapid increase in industrial water demand*: The industrial water demand grew from 892 million ton/year in 1971 to 1.544 billion ton/year in 2005. As the water demand of various industries tends to increase in the future, water source dispatch in dry season will be harsher under the condition of inadequate water storage facilities .
- (6) *Unreasonable distribution of water supply*: Though Taiwan has transformed from an agricultural into an industrial society, the water consumption of agriculture use still remains at 72%, suggesting that water supply distribution has failed to cope with the social development.
- (7) *Hydrological uncertainty increases as a result of global climate change* : Due to global climate change, precipitation in Taiwan tends to come later and shorter but in greater intensity and makes water resource utilization more difficult and uncertain.

## IV. Visions of sustainable use of water resources

In planning future water resources development, we should bear in mind that water resources are limited and precious. Also, a balance among soil and water conservation, environmental protection, ecology maintenance, and the supply and demand of regional water resources should be maintained when establishing water resources plans in order to promote the sustainable development of economy, society and environment, and to achieve sustainable use of water resources. In order to achieve sustainable use of water resources, the Water Resources Agency (WRA) established the Water Resources Sustainable Development Policy and Planning with 2021 as the target year based on the discussion results of the NCS D and the concept of sustainable development of water resources, and drew the short- and mid-term promotional measures.

### 1. Strategies for sustainable development of water resources

(1) *Total quantity control on development and utilization of natural water resources (20 billion ton/year in 2021)*

Based on the trend of economic growth,

the improvement of future life quality and future industrial development, water demand in Taiwan is expected to increase continuously. In consideration of soil and water conservation, environmental protection and ecology maintenance; however, usable water resources are very limited, and the demand of natural water resources should not increase limitlessly. The total quantity control on the development and utilization of natural water resources should thus be promoted.

In consideration of the river potential, future demand, the schedule of water resource development plans, reduction of ground water extraction, increase of backup water, and the supply and demand difference in regional water resources, 20 billion tons have been set as the target of total quantity control on the development and utilization of natural water resources in Taiwan in 2021 for the time being. When the equilibrium of water supply and demand reached in advance, the ceiling value can be adjusted if necessary as shown in Figure 1.

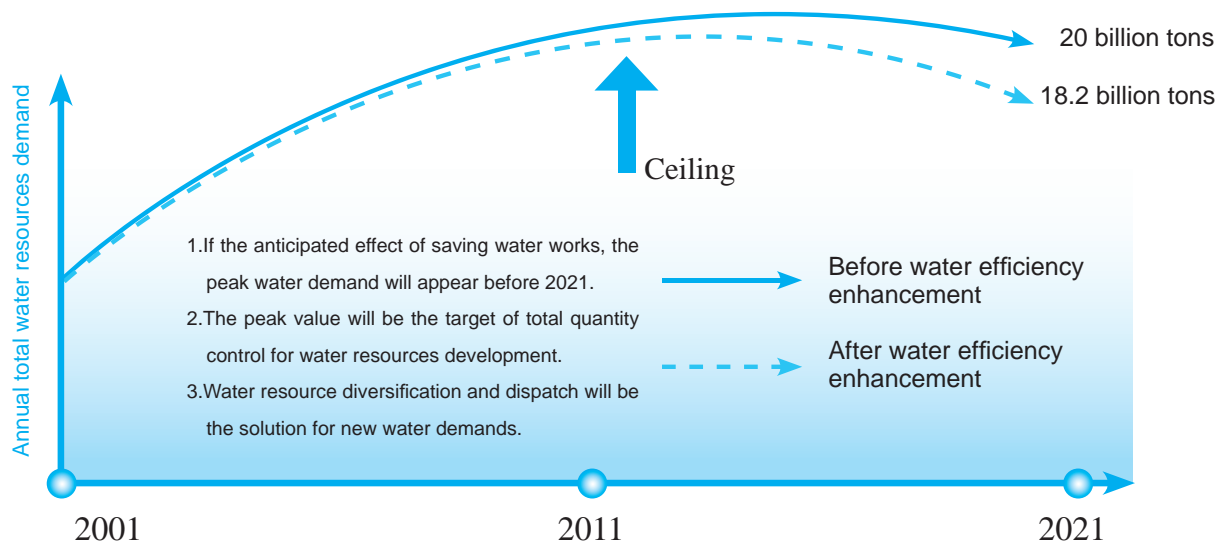


Figure 1 : Total Quantity of Development and Utilization of Natural Water Resources

## (2) Zero growth of water consumption in dry seasons

Realizing the uneven time distribution of rainfall characteristics in Taiwan, different water consumption strategies should be applied to different water consumption targets during the wet season (June-September) and dry season (October-May). The zero growth of water consumption in dry season strategy is promoted to expand the scope of saving natural water resources and to reduce water demand to the level of 2001 in dry seasons with government policies as incentives. As rainfall is abundant during the wet season, the utilization

of water resources can be expanded. Therefore, the use of river water should be reinforced and river water should be transported to storage facilities in wet seasons. In addition to supporting the water consumption in wet seasons, river water stored up during wet seasons can be an alternative for the unstable river water in dry seasons, i.e. as backup water sources for draughts.

## 2. Measures for the sustainable development of water resources

In the premises of total quantity control on development and utilization of natural water resources and zero growth of water

consumption in dry seasons, water efficiency enhancement, total quantity distribution mechanism establishment, diversification of new water source development should be the principle measures for the sustainable use of water resources in Taiwan in the future.

#### (1) *Water efficiency enhancement*

The aim of water efficiency enhancement is to make water use more reasonable. In terms of demand, the aim of saving water is to reduce unnecessary water consumption without sacrificing the same function of water use. In terms of management, it refers to the effective management of existing hydraulic facilities, such as aggressive governance and conservation of reservoir collection areas, engagement in reservoir silt cleaning and dredging, and reduction of tap water leakage. These measures can maintain existing water supply capacity and thereby save labor from developing new water sources for making up the water supply loss as a result of reservoir silting or pipeline breakage. In terms of supply, to supply water with the flexible joint use of overall hydraulic facilities on a regional basis can reduce unnecessary water source development.

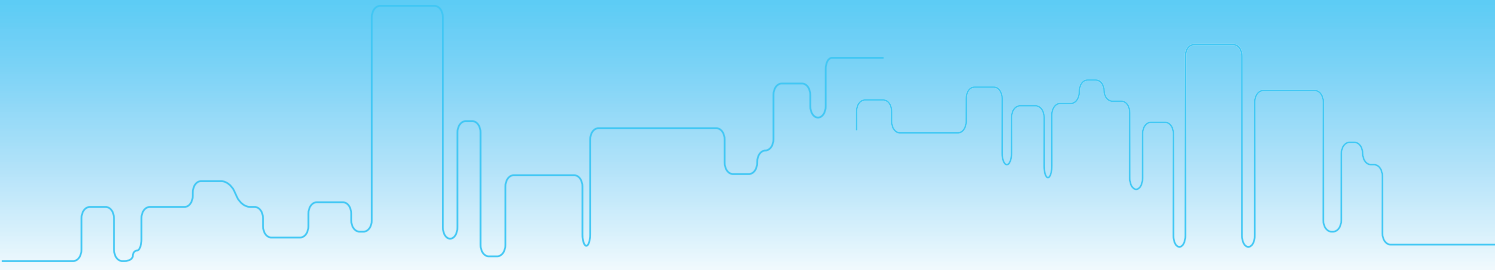
#### (2) *Total quantity distribution mechanism establishment*

To ensure full use of water resources, water resources should be re-allocated based on their value; i.e. maximizing the benefits

of water resources through reasonable adjustment and re-allocation by consumer priority and consumption period. For example, agricultural water does not need a stable supply throughout the year, and we can adjust agricultural water consumption to wet seasons with policy incentives. While the influence of a total quantity distribution mechanism is far-reaching, supportive measures should be designed to reduce consequential impacts. For example, the government can amend relevant laws to allow irrigation associations to invest in relevant businesses in order to promote the diversification of operations of irrigation associations. This way, they can establish irrigation companies to transform into regional water banks to diversify the use of existing agricultural water resources, to expand the scope of services, and to display the functional diversity and contributions of irrigation. More importantly, this will be a win-win strategy to make water resource dispatch more flexible and to improve the financial condition of irrigation associations.

#### (3) *Pluralistic new water source development*

Based on the aims of the total quantity control on development and utilization of natural water resources and zero growth of water consumption in dry season strategies, in addition to prioritizing water-efficiency-enhancing measures, such as saving water,



effective management and flexible dispatch, the development of new water resources should be diversified to cope with the shortage of estimated household and industrial water supply in different regions. At present, the technically feasible water source diversification covers natural water resources and new water production. The former includes artificial lakes, rainwater collection and retention and agricultural return water; and the latter seawater desalination, urban sewage water reclamation, and wastewater reclamation as shown in Figure 2. The following shows the WRA's efforts to promote new water production in recent years.

**a. Seawater desalination:** To cope with the industrial water demand of the new industrial park and high-tech industries in Taoyuan Area, the Taoyuan Seawater Desalination Plant Project was approved for implementation by the Executive Yuan on 18 January 2007. The capacity of the plant situated in the Baiyu Zone, Taoyuan High-tech Industrial Park, is 30,000 ton/day, and water (seawater) will be transported to the park reservoir. As for the offshore islands, the Executive Yuan also approved on 27 March 2006 the construction a 950 ton/day seawater desalination plant each in Kinmen and Machu and a 4,000 ton/day seawater desalination plant in Penghu to cope with

local household and tourism water demand.

**b. Reclamation water :** The waste (sewage) water treatment plant water reclamation project was implemented at the urban sewage water treatment plants in Futien of Taichung, Anping of Tainan, Central District of Kaohsiung, and Bali of Taipei; and at the wastewater treatment plants of the Hsinchu Science Industrial Park, Taoyuan High-tech Industrial Park and Tainan Technology Industrial Park. At present, the pilot testing project with a daily water output of 100 tons (AOP water 50 ton/day) is in progress at the Futien Water Resource Recycling Center in Taichung City in order to verify the feasibility of reclamation water use through long-term testing and assessment at the plant, to improve public acceptance through education and publicity, and to assess the potential and create space for the development of new water production industry. Another pilot testing project (1,800CMD) was conducted at the Nanxin EPZ where water after RO AOP is consumed by factories in the zone in order to assess the feasibility of AOP reclamation water use in manufacturing industries.

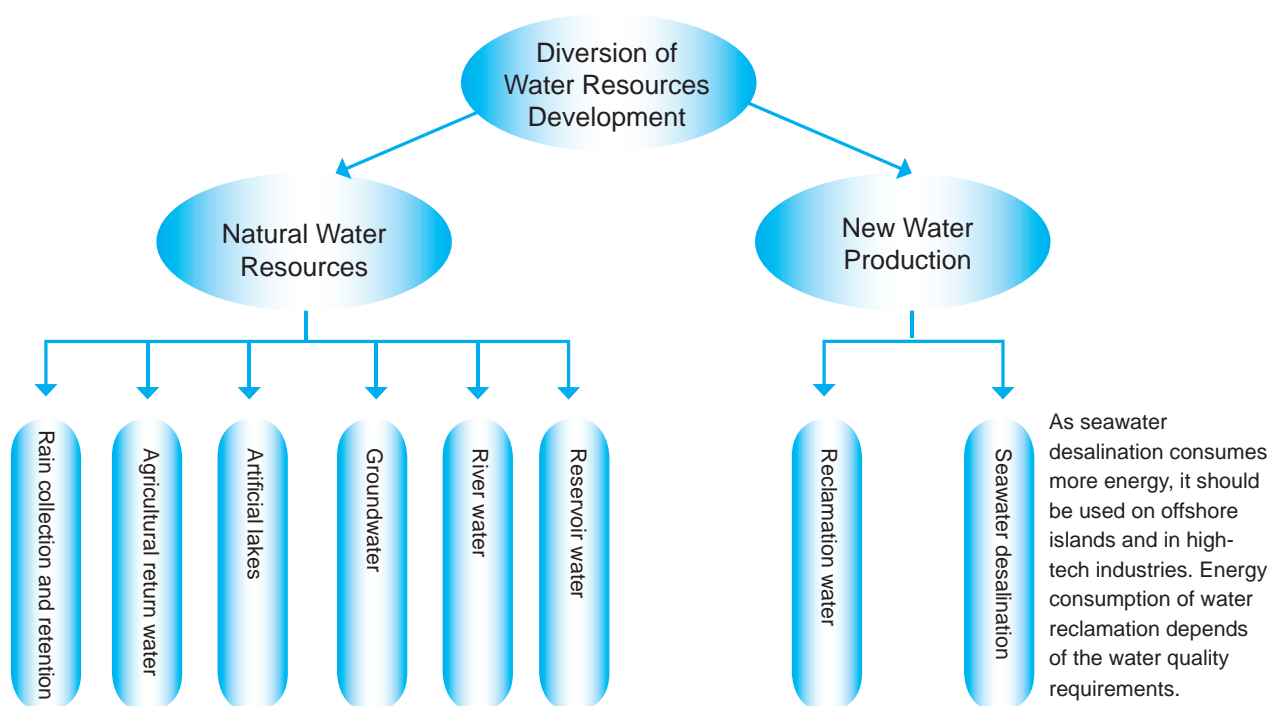
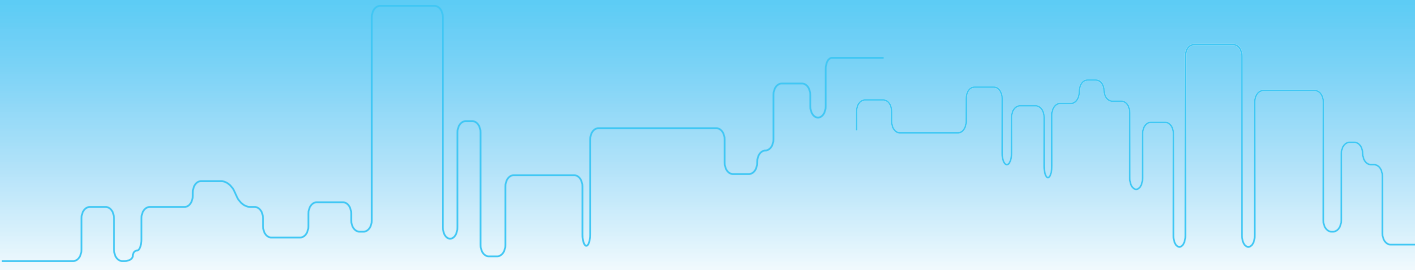


Figure 2 : Diversification of Water Resource Development

## V. Conclusions

Water is an essential resource for sustainable development, and there is no future in the absence of water. The world is facing harsh water resource problems and challenges, and we must face them courageously and minimize the disaster-inducing risks aggressively in order to handle the high uncertainty in the future. With good foundations, though Taiwan experienced less severe draughts when compared with other countries, the

government in Taiwan is making efforts to build Taiwan into a country that never lacks water and floods and is close to water sources in order to create a better living environment for the future and to enforce the intergeneration equality, sustainability and pluralistic integration and management and the three major principles revealed in the water resource sustainable development theories. From now on, water resource planning and development should address to the sustainable use of resource;



water resources are limited and precious should also be considered. To maintain a balance between the potential limit of water resources and overall regional development needs is the only way to ensure environmental protection, economic development and social justice, and to achieve the goal of sustainable development.

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## Shen-Hsien Chen

### Title

- Director-General  
Water Resources Agency, Ministry of Economic Affairs

### Education

- June 2006, PhD, Department of Construction Engineering, College of Engineering, National Taiwan University of Science and Technology
- August 1984-August 1985, Master of Science, Department of Civil Engineering, Colorado State University, USA
- September 1971-June 1975, Bachelor of Science, Hydraulics Sections, Agricultural Engineering Department (now Department of Bioenvironmental Systems Engineering), National Taiwan University
- 1976, Distinction, Hydraulic Engineering, Level A Special Examination for Civil Service
- 1978, Pass, Civil Engineering, Level B Special Examination for Civil Service
- Passed the Professional Hydraulic Engineer Examination and Recognition



### Experience

- March 2002-July 2003, Deputy Director, Water Resources Agency, Ministry of Economic Affairs
- December 2001-March 2002, Deputy Director, Water Resources Department, Ministry of Economic Affairs
- December 2001-March 2001, Acting Deputy Director, Water Resources Bureau, Ministry of Economic Affairs
- December 2001-April 2002, CEO, Gaoping River Area Management Committee
- September 2000-September 2001, Director, Department of Labor Standards and Executive Secretary, Labor Pension Fund Supervisor Committee, Council of Labor Affairs
- May 1992-September 2000, Director, Department of Labor Relations and Department of Labor Inspection, Council of Labor Affairs

### Honors

- 1996, Model Civil Servant of Executive Yuan
- 2007-8, Outstanding Alumni, Colorado State University, USA

# Everest Sustainability Model (ESM)

Hsu-Yin Kuo  
Everest Textile Co., Ltd.

## Introduction

The global warming issue has been getting increasing importance, and earth resource protection thus became an important issue in corporate social responsibility (CSR). To carry out our environmental CSR, Everest Textile Co., Ltd. (Everest) has embarked on a series of strategic actions on “saving energy, environmental protection and love for earth” and has brooked no delay to promote the Everest Sustainability Model (ESM).

## ESM Promotion Plan

Starting from 2007, we divided ESM actions into three parts known as the ESM trilogy: Part I—the drooping fruit: short-term and effective solutions that can be achieved fast. It focuses on the most easily accomplished resource-saving targets in work environment and production processes. The time is set on action plans that can be achieved within three months. Part II—the scientific approaches: the use of scientific approaches to gain eco-efficiency in leaps and bounds. The time is set on action plans that can be achieved within half a year. Part III—model change: the change of

the existing business models through rethinking to enhance the efficiency of resource integration. Acceptance of new economic concepts to reflect all costs, re-design of products, and a business model which combines the role of service producer and supplier. The time is set on action plans that can be achieved within one year.



Figure 1: ESM Promotion Plan

Concluding the proposals from all departments, we made an assessment in terms of environment, economy and society from a global view before establishing the sustainable development policy based on environmental protection, pursuit of profits and CSR and implementing a series of project plans.

The policy was promoted and chaired by President Yeh, and the following taskforces were formed, including teams of the Design for Environment, Cleaner Production, Marketing and Promotion, Eco-efficiency, and ESM Promotion teams. President Yeh also hired consultants and introduced related technologies from home and abroad to promote all projects plans together. Departments implemented work items according to their functions. For example, the sales and marketing departments promoted and cultivated markets based on the eco-friendly issue, and provided customers with eco-friendly product requirements and services; the R&D department

researched, developed, tested, established and reviewed specifications and made design changes for green products; the purchasing department integrated the supply chain and sourced eco-friendly material suppliers to expand the scope of purchase of eco-friendly raw materials, dyeing and auxiliaries and other materials; the production department maximized the efficiency of processes based on the green production principle, covering saving resources, reducing pollution, and resource recycling; at last, the financial and environmental departments reviewed and adjusted the operational and production processes after considering the cost, technical, environmental and regulatory issues.

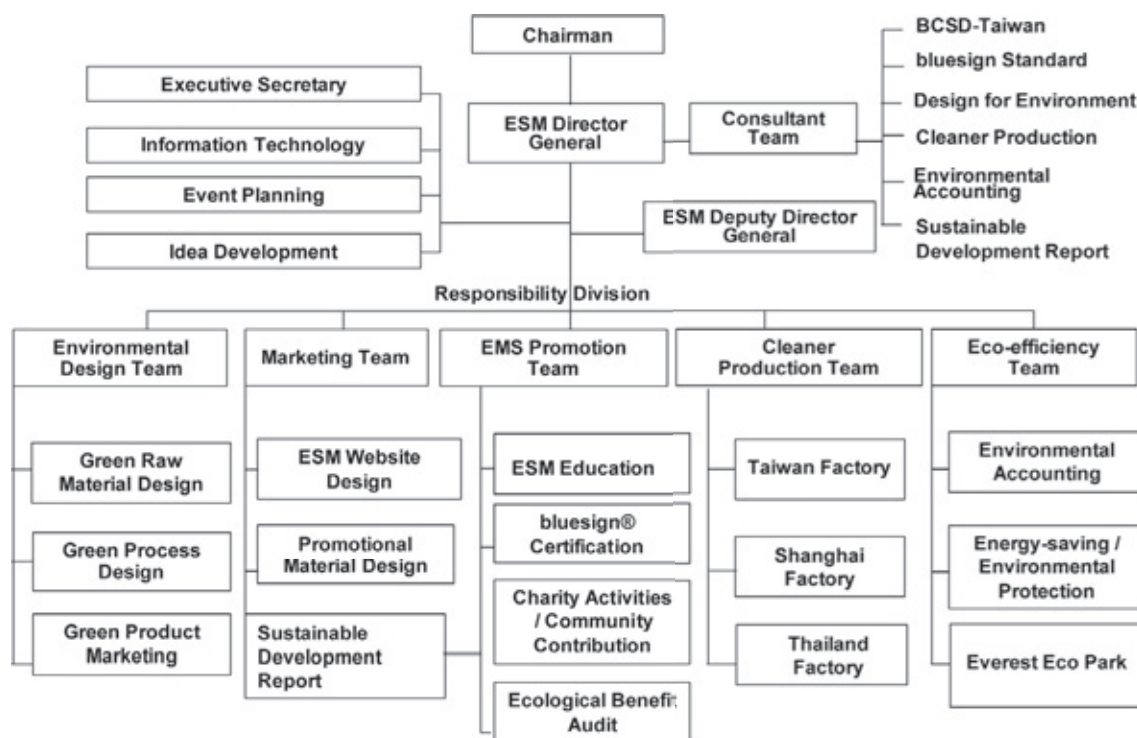


Figure 2 : ESM Global Promotion Organizational Chart

In December 2007, we supported the 168 Environmental Declaration initiated by the Taiwan Business Council for Sustainable Development (BCSD-Taiwan) and realized our commitment to sustainable development by combining the declaration to the ESM. In our Environmental Declaration 168, we promised to enforce six CSRs with eight physical actions within one year. These six CSRs included: green production, environmental culture, ecology conservation, green management, lean production and charity contribution. The eight physical actions included: 7Rs for green life, design for environment, green production, bluesign® verification, environmental accounting, charity contribution, and turning wastes into gold and ecological parks.



Figure 3 : ESM 168 Environmental Declaration

## Six CSRs

- (1) Green production: Enforce green production; and R&D, manufacture and marketing of green products.
- (2) Environmental culture: Promote green awareness company-wide of 7R actions and establish an environmental-advantageous culture with “green life”.
- (3) Ecology conservation: Establish the Everest Ecological Park and promote total ecology conservation; and maintain community ecology and environment through cooperation with communities and institutes.
- (4) Green management: Implement environmental accounting to disclose environmental cost-efficiency and to enhance environmental efficiency.
- (5) Lean Production: Eliminate wastes and enhance resource productivity based on the idea of Less Is More.
- (6) Charity contribution: Promote ecology education to communities, adopt ecological environment and enforce CSRs.

## Eight Physical Actions

- (1) 7Rs for green life

We started the 7Rs from the daily life and work environment in order to reduce waste. These 7Rs are: rethink; redesign of products or processes; reduce; reuse of resources in the daily life; promoting cherish resources and extending the life of objects by reusing them; recycle; recover; and repair; in order to think together actions toward sustainability.

For example, we rethink the quality of water that used in dyeing, finishing and weaving; enhance the reuse rate of weaving water, and reconsider the chlorine ions and control the pH value of in water. After adjusting the optimal pure water and soft water ratio, we can largely enhance the usability of recycled water and thereby reduce wastewater. Stainless flatware is used in the factory canteens and employees bring their own environmental chopsticks and cups. This not only is a matter of personal health, but also reduces the human damage on ecology and environment. Take the plants in Taiwan for example, there are about 1,500 employees, in doing so, we can reduce the garbage produced from about 60,000 pairs of disposable chopsticks and save about 23,000 disposable cups. We also aggressively promoted the saving water and saving energy policies, including turning of unused lamps, enabling

the screen saver feature on PCs, setting air-conditioners to the optimal temperature, using A/C together with fans, reducing water supply of faucets, and using environmental toners. In addition to saving water, energy, fuel, raw materials and dyestuffs, chemicals, and auxiliaries, we also promoted saving manpower saving time and saving administrative resources.

With the concerted efforts of all employees, we have made the following accomplishments. In 2007, 299 out of 394 proposals were completed, thus creating an accumulative annual benefit to over NT\$142 million.

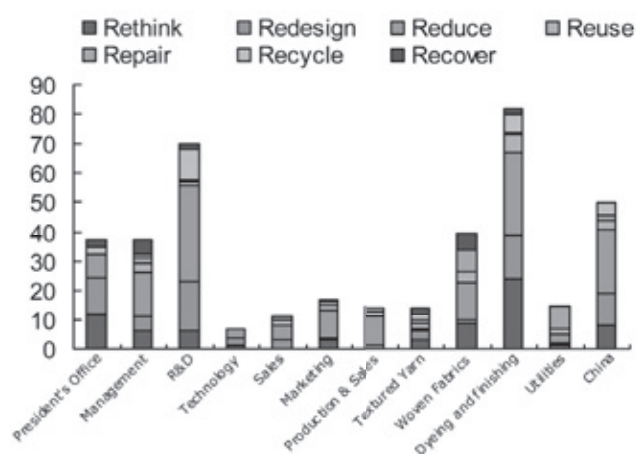


Figure 4 : Statistics on ESM-Green Life 7Rs

## (2) Design for Environment(DfE)

In addition to function, cost, quality and marketing, our design for environment considers the environmental impacts of

products at different stages of their lifecycles in order to integrate environmental factors to product design and development based on product lifecycle and the present environmental management system. The evaluation includes R&D and availability of raw materials, pre-processing and manufacture, packaging, distribution and transportation, use and reuse, and recycle and disposal.



Figure 5 : Life-cycle Assessment of DfE

This also includes the assessment of raw materials and dyeing and auxiliaries with reference to different brands, such as the Restricted Substances List (RSL) of Nike; establishment of raw material purchasing and use references and criteria to ensure the use and consumer safety of every chemical. In process optimization, we are devoted to the reduction of dyeing and auxiliaries and optimization of formula in order to save energy. We improved and adjusted related formulae and used

dyeing and auxiliaries with low environmental impacts to reduce consumption for wastewater treatment, to enhance cost efficiency and to protect the environment. In raw material selection, we used environmental elements as much as possible and put this on top of the R&D and sales lists. In process design, resource recycling and reuse were considered. Process experiments were conducted to locate the optimal process and chemical dosage. We also replaced dryers with dehydrators to reduce heat and energy consumption and enhanced the reuse rate of water that used in the color-fastening stage. In terms of package, efficiency enhancement and dimension reduction were the foci. Compression air was used to reduce the dimensions of products; cartons were replaced with corrugated paper or biodegradable materials to minimize environmental impacts by reducing packaging material consumption.

### (3) Green production

The baseline was applied to inventory and understand the three axes: product, process and service. Environmental protection was enforced in industrial processes, such as design, purchasing, process, delivery and sales services. Space for improvement in saving water, saving

energy, waste reduction, hazard reduction etc was investigated. In addition to collecting and analyzing data, technical and instrumental instructions and training were applied to gather new concepts and review improvement plans.

Performance indicators were established to finish data quantification in order to compare and pursue cleaner production efficacy. At present, assessment of wastewater treatment, boiler system, lighting and occupational safety and health has been completed; and the feasibility survey of improvement recommendations is in progress by all departments in order to establish an improvement plan as a reference for the future performance analysis. Also, the cleaner production assessment items were applied to reduce energy and material consumption, production cost, wastewater discharge, waste disposal and total waste quantity.

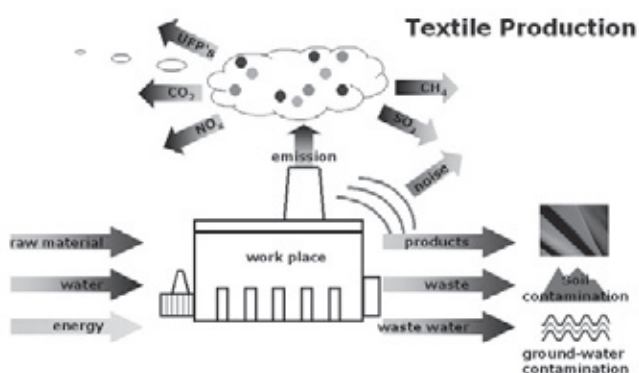


Figure 6 : EHS Aspects in textile production, bluesign technologies ag., June 2007.

Moreover, we also paid attention to the overall cleanliness of the plant site. In order to provide employees with a clean and comfortable work environment, we established the 5S Promotion and Management Procedures, i.e. Structuralize, Systematize, Sanitize, Standardize and Self-discipline, to request employees realize the ideal of “no line on the ground but on the mind” with tour inspections, audits, efficacy announcements as well as penalty and reward.

#### (4) bluesign® verification

We implemented and integrated various management systems, including the ISO 9000 quality management system and ISO 14001 environmental protection system in the beginning to the OHSAS 18001 labor work environment improvement system, and the Oeko-Tex 100 internal environmental textile standards for textile inspections. To ensure that our processes and outputs meet the high-level health and environmental standards, we signed in 2007 the bluesign®, the internationally recognized environmental textile verification. We also investigated the resource productivity, supply chain safety and environmental issues to ensure consumer health and to minimize environmental impacts of processes. The five

pillars of the bluesign® standard are : Resource Productivity, Consumer Safety, Air Emission, Water Emission and Occupational Health and Safety. After a series of detailed onsite screening of resources, environment and work condition, we applied the core technology of bluesign® to input, output and process in order to enhance the resource productivity and saving energy.

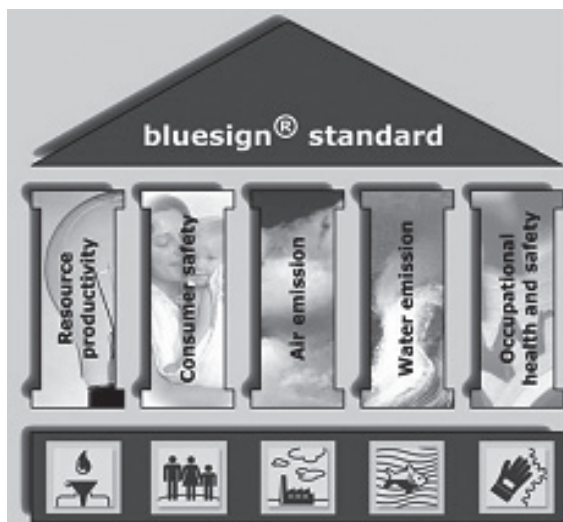


Figure 7 : The five pillars of the bluesign® standard, bluesign technologies ag., June 2007.

### (5) Environmental Accounting

To cope with the global and governmental regulatory requirements on environment, and to fully disclose information of the organization's investments in activities relating to environmental improvement and protection, we implemented the environmental accounting system and established the Everest eco-efficiency indicators. At present, environmental

activities are divided into seven categories (organizational operating and environmental costs, upstream and downstream association cost, environmental management cost, R&D cost, social activity cost, environmental loss cost, and environmental taxes and fees) and 44 subcategories. New IDs were added to investment expenditure and current expenditure to ensure that the costs of pollution prevention, global environmental protection and resource recycling are disclosed in the operating cost.

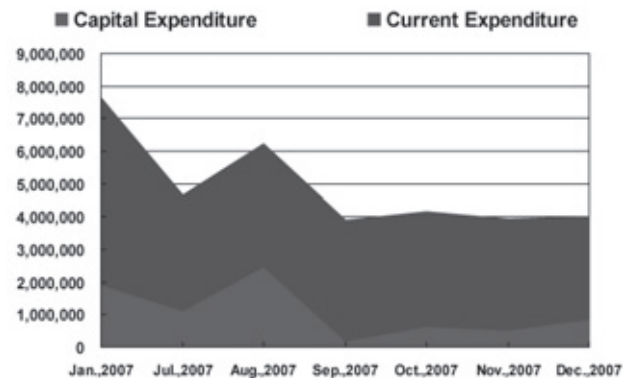


Figure 8 : Environmental Expenditures of Everest in 2007

Statistics of June-December 2007 indicate, our average monthly environment expenditure is NT\$5 million, including 22% of capital expenditure and 78% current expenditure. In capital expenditure, 63% went to resource recycling and 30% to pollution prevention. In current expenditure, 54% went to pollution

prevention and 19% to environmental management. This reveals that in addition to pollution prevention, we have placed huge resources and efforts to establish the environmental education and environmental monitoring systems.

After making reference to the WBCSD and OECD definitions on eco-efficiency, we have established four eco-efficiency indicators corresponding to the correlations between sales turnover and water resource, heavy-oil, electricity consumption and waste, and the most indicative dyeing and finishing plant

water to fabric ratio (water consumption for producing every ton of fabric) according to the input and output general formula: eco-efficiency indicator = product and service values/environmental impacts in order to quantify eco-efficiency. As a result, the water consumption in the dyeing and finishing processes has reduced by 40% of the same period last year. Also, the process adjustment has largely reduced pollution and the purchasing cost of auxiliaries.

**Table 1 : Water-to-fabric ratio of all Everest Plants during 2006-7**

Plant Period	Filament plant in Taiwan	Stable plant in Taiwan	Shanghai Plant	Thailand Plant
2007 (Dec 1-31)	<b>129</b>	<b>159</b>	<b>100</b>	<b>134</b>
2007 (Apr 1-30)	147	180	170	167
2006 (May 1-31)	207	210	200	248



### **(6) Charity contribution**

In neighborhood friendliness and community contribution, we have spared no pain to participate in various activities organized by communities and groups in the neighborhood, such as sponsoring the reconstruction of temples in local townships; local community development associations; activities organized by long-life clubs and women associations; commencements, anniversary celebrations and library reconstruction of local elementary and junior high schools. All these activities have revealed our continual efforts to promote community harmony.

To protect the endangered bird in Taiwan, pheasant-tailed jacana, we participated in the Leaf Walker Recovery Plan by adopting 10 units of the pheasant-tailed jacana ecology education park, hoping to contribute to the recovery of the pheasant-tailed jacana. We also expressed our support for the Coexist With Earth proposed by the Tze Chi Foundation and participated in the Environmental and Recycled Product Enterprise Team to aggressively promote the use of recycled yarns, recycled polyester from PE bottles and recycled fabrics.

### **(7) Turning wastes into gold**

We promoted the concept of “from cradle to cradle” in order to be friendly to ecology, and planned the “environmental park” based on the positive thinking toward economic growth. We broke away from the “cradle to grave” concept by reusing wastes that are indecomposable by recycling systems in the natural cycle, i.e. wastes that are filled up or incinerated, such as turning sludge produced in the sewage treatment plants into resources. By combining with environmental construction materials, recycled plant effluents and solar energy streetlamps, we built an environmental and ecological park for employees to spend their leisure in order to let them feel the organization’s determination in environmental protection and to motive customers and suppliers on the supply chain to understand and concern for ecology. This way, from employees to community, we can make a step forward in protecting the resources on earth.

### **(8) Ecological park**

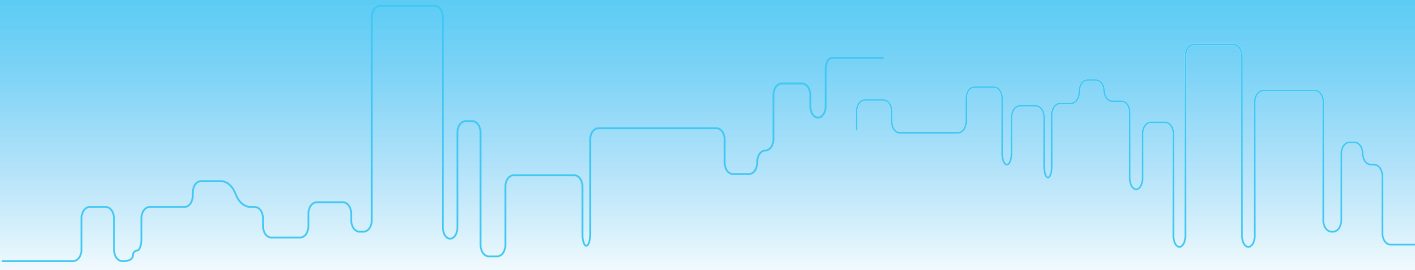
We have also embarked on the planning of an ecological park by establishing the Everest Ecological Society in order to work for ecology conservation together. We hired ecology experts of The Society of Wilderness to help

us in planning the parks and held unscheduled ecology training meetings to cultivate ecology seed personnel to prepare for the planning and construction of the firefly and butterfly ecological areas. During the construction and after the completion of the ecological park, communities, schools and groups can participate in the event in order to grow together.

After the efforts of all colleagues for one year, benefits of the ESM gradually emerged. In addition to winning the Performance of Excellence in Continual Improvement 2007 in Environmental Safety and Health Management System from the Industrial Development Bureau (IDB) of the Ministry of Economic Affairs (MOEA), we were invited to participate in the Footprint Chronicles™ by Patagonia, a world-leading outdoor brand. The benefits in saving resources and environmental protection also emerged. In terms of the purchasing cost of dyestuff and auxiliaries, we saved over NT\$10 million a month from process adjustment and fees control. In saving resources, particularly water resources, the average water-to-fabric ratio has reduced by 40% of the same period last year, and the effect is more significant in plants in China. At various international

exhibitions, our green, energy-saving and environmental products also attracted the attention and feedbacks from many buyers and international media. These products include recycled, organic and sustainable materials and green, environmental post-processing products

- a. *Tencel Plus EverTek* : Made with natural cotton yarns extracted from eucalyptus, the product is soft and gives a nice touch. Moreover, it is moisture-permeable, antibacterial and warmth-keeping, and is more environmental than pure cotton.
- b. *Ever Bamboo Fiber* : As there are countless pores of different sizes on the cross-section of natural bamboo fiber, the product is cool and air-permeable. Also, UV resistant, antibacterial and deodorization features can be added.
- c. *Ever Organic Cotton* : Made with organic cotton containing no disinfectants, weed killers, pesticides, defoliants, etc. the product is soft, delicate, but tensile, air-permeable and moisture absorbent.
- d. *Ever PLA* : PLA is decomposable new polyester made with maize, wheat, sugar beet and other starch-based agricultural products. It has excellent moisture



absorbency, anti-wrinkle and hydrophilic performance, recovery rate, crimp property, high memory, etc.; and it is naturally antibacterial and antifungal.

- e. *Ever Recycled Polyester* : It is made with recycled plastic bottles through re-polymerization. After the chip is made, it is threaded. Though it is made with recycled material, its performance in extendibility and color-fastness is no second to general polyesters.
- f. *Ever PFOA/PFOS Free* : Conventional water and oil repellents made with C-8 fluoride are replaced by the C-6 fluoride to prevent the production of hazardous substances like PFOA and PFOS when using C-8 fluoride in the process.

In order to grasp this green opportunity, we have aggressively established eight environmental-advantageous strategies with focus on “environmental protection” and “technology”, including increase resource productivity with environmental efficiency enhancement; minimize environmental cost and regulatory cost with environmental fee reduction; reduce upstream and downstream costs with environmental benefits of value

chain; manage environmental-oriented business risks with environmental risk control; fulfill customer environmental satisfaction with environmental design; establish environment-based product positioning and customer loyalty with environmental sales and marketing; promote value innovation and develop revolutionary products with new market segmentation using environmental protection; and establish organizational reputation and brand worth with intangible value.

## Conclusions

We will continue to promote “saving energy, environmental protection and love for earth”, reach consensus among all colleagues, and enforce the 7Rs-based green production and green life to establish an environmental-advantageous culture. The goal of sustainable development in 2015 will continue our sustainable development, innovative green management with environmental protection, and CSR policies, in order to cover all operational aspects with “innovation”, to increase resource productivity (Less is More), to gradually reduce interference on ecology, and to enforce all environmental actions and plans step by step for gaining intellectual

property with saving energy and environmental protection, initiating a win-win scenario for the organization and environment protection, and accomplishing the ultimate goal of sustainable development of Everest.

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# ANC

# 2008 Forum on the Achievement of Security Industry Promotion

P

romoted by the rapid growth of the global security market and the elevation of domestic technological capacity, the production value of our security industry has been rising rapidly in recent years. According to the statistics of the Industrial Development Bureau, MOEA, the production values of our security industry has reached NT\$ 105.8 billion and that of 2007 is estimated to reach NT\$ 124.5 billion. Foreseeing a potential of two-digit growth rate in the following years, the IDB continues the “Security Industry Promotion Project” in 2007 starting from 1 July 2007 to 29 Feb 2008 to assist the industry to grow. This project focuses on promoting domestic industrial safety/fire fighting, security monitoring and system integration in the hope to protect the public through security technology; promote the development of security industry and encourage the growth of security industry. The achievements of this project include: 1. Industrial Safety/ Fire Fighting and Security Monitoring Technology Platform Integration and Alliance including four alliance promotion

conferences and two industrial alliance forums; 2. Integration of inter-industry technology and system to expand the application scope including industrial safety/fire fighting and security monitoring industries. With limited resources, this project effectively promote inter-industry integration of relevant technology and system to produce maximum benefit; 3. Strengthening of marketing strategy and actively organizing of publicity events including five security marketing strategy conferences and three international media/marketing exhibitions.

To demonstrate the achievements and promote the latest applications of security technology, the Forum on the Achievement of Security Industry Promotion is held between 2:00-5:00 p.m. Thursday, 14 February 2008 at the NTU Conference Hall with estimated participants of 400 representatives from the industry, government, academia, and media. Enterprises participating in this project, the visually impaired and the public are also

invited to share their experience in using the application of security technology.

By Adopting an innovative arrangement of agenda, this forum uses security equipments such as video phones, web cams, 3G cellular phones (with GPS function) and RFID to create a safe time tunnel. Through real-time service, interactive forums on industrial park/factory security, home security (including CO detection alarm), long-term home care are conducted to fully demonstrate the substantial achievement of practicality and sales. These forums effectively demonstrate the importance of security industry development and care for the security of the civilians.

Through the technological upgrade of security-related industry and promotion of added values, the production value is expected to increase to NT\$ 400 billion. The security industries also aims at being the third star industry in Taiwan, expanding the overseas market, encouraging foreign investment and introducing new technology in order to emerge to another trillion dollar industry and become an important foundation for a safe society and economy.

(Source: IDB, MOEA)

# Global Raw Material Shortage--- Achievement of Recycled Material Application Promoted by the Government

## A

According to the Waste Disposal Law, this Ministry is responsible for the waste recycling of target businesses. The resource recycling industry has become an important component of industrial production and source of material as the quality of recycled materials has reached to that of raw materials. Through the use of recycled material, the procurement dependence on the international raw material market, production cost and risk can be reduced. Thus, recycling business has become a key industry and the Ministry has been actively promoting the development, providing consultancy and assistance in the area of strengthening of business structure, promoting the operation environment and expanding the market of recycle industries. Since the promotion of recycling industry in 2001, the number of recycling enterprises has increased from 500 to 900; the recycle volume of industrial waste has increased from 8 million tons in 2002 to 11.82 million tons this years; the recycle ration has exceeded 75% with an annual production value at NT\$ 42 billion dollars. Most importantly, the ratio of using recycled materials is increasing each year. Recycling business becomes an important foundation in the development of other industries and significantly benefits the

overall economic development.

Satisfying the needs of social development, the industrial use of recycled material is very common. For example, almost 50% of our steel production, with an approximately 10 billion tons of production volume, uses recycled steel. The hundred-billion-dollar PCB industry mostly uses recycled etching liquid produced in Taiwan. Recycling copper sludge has enabled Taiwan to develop the metal industry without natural copper resources. All these achievements are best demonstration of the overall national industrial development promoted by the recycling industry.

To promote sustainable development of the recycle industry, this Ministry has assisted in the establishment of the recycling union in 2004. Through this organization, we can build effective communication and cooperation between the government and recycling enterprises in order to promote the development of the recycling industry. In the future, we will promote cooperation between the industry and academia, encourage cooperative alliance among recycling industries in order to open the international market.

(Source: IDB, MOEA)

# National Annual Event-Announcing the TQM Role Models

# T

he 18<sup>th</sup> National Quality Award Ceremony hosted by the IDB, MOEA was held at the Civil Service Development Institute on March 13. A total of 8 awards including the Corporate, Mid-and-Small Business, Organization and Individual categories were presented and over 600 guests participated in the annual event. Approved and recognized by the Executive Yuan, the National Quality Award encourages and recognizes corporations, organizational and individuals with excellent Total Quality Management performance. Over the 18 years, 903 elite corporations, organizations and individuals have filed applications and only 90 corporations, organizations and individuals were awarded after reviews. The fierce competition has made this award even more valuable and we hope to promote high quality and international competitiveness of our citizens through this award.

With the spirit of “Striving for Perfection, Seeking Excellence”, the National Quality Award has undergone hardship at the beginning

stage. After winning supports and recognitions from the society, the National Quality Award starts to glow in the world gradually. “The National Quality Award” represents the honor of the highest quality. To receive the National Quality Award, the applicants have to undergo strict review process and 8 criteria including leadership, management philosophy, strategy management, RD, innovation, customer and market development, human resources application and management, flowchart (process) management and operating performance.

To implement total quality management, the 8 evaluation criteria have been expanded to 33 items with more detailed and specific quality demands. The award ceremony, demonstration and presentation of the award winners can not only benefit the national economic growth but also set the evaluation criteria to benchmark for self-evaluation and inspire organization to pursue excellence.

A total of 8 enterprises, organizations and individuals have won the National Quality



Award this year and each award winner is the best out of the best. Moreover, the corporate award winners: both Panasonic Taiwan Co., LTD. and E. Sun Commercial Bank have been awarded twice displaying the “Striving for Perfection, Seeking Excellence” spirit of the National Quality Award; Ron Hong Precision Co., LTD developed new engineering technique to significantly reduce construction period and established a fast construction model for the industry.

Persisting the management philosophy of “Integrity, Brand and Surpassing”, White Wood House Food Co., LTD. outstands itself among keen competition in the bakery industry; Aurotek Co., LTD transformed itself from the trade industry to manufacture and service industry and has won several patents and received warm acclaims from the judges indicating a dramatic improvement on the overall quality of domestic SMEs.

Organization Award winners: Far Eastern Memorial Hospital and National Cheng Kung University Hospital established the “Reassuring healthcare”, “participative management” and “quality-oriented” policies which comply with the National Quality Award concepts of “Total

participation, Continuous Improvement” and total quality management. Their achievements have extensively improved the quality of domestic healthcare.

The Individual Award winner, Mr. Tze Jiang Tseng, continuously promotes the TQM spirit and philosophy to meet the customer demands and successfully led Unimicron Technology Corp. to become the second largest circuit board company. His achievement is the best role model for everyone.

Emphasizing the constant commitment of “cultivating capability and improving quality, business structure and investment environment”, the IDB, MOEA, hopes the industry and government can vitalize the economy of Taiwan. We also hope the National Quality Award winners this year will continuously promote total quality management, serve a role model for the industry and establish a high quality Taiwan.

(Source: IDB, MOEA)

## Evaluation Standard for Corporate Award, Mid-and-small Business Award and Organization Award

Evaluation Item	Weight	Evaluation Item	Weight
<b>1. Guiding and Operating Principle</b> 1.1 Operating beliefs and values 1.2 Organization's mission and goal 1.3 Senior level leadership 1.4 Overall quality control culture molding 1.5 Social responsibility	160	<b>5. Human resource and knowledge management</b> 5.1 Human resource planning 5.2 Human resource development 5.3 Human resource utilization 5.4 Employee relation management 5.5 Knowledge management	130
<b>2. Innovation and strategic management</b> 2.1 Creating new values 2.2 Operation model and strategic planning 2.3 Strategy execution and improvements	90	<b>6. Information strategy, practice and management</b> 6.1 Information strategic planning 6.2 Internet utilization 6.3 Information utilization	90
<b>3. R&amp;D and Innovation</b> 3.1 R&D and Innovation Strategy and Procedure 3.2 Development of R&D and Innovation 3.3 Result evaluation of R&D and Innovation	90	<b>7. Operation flow (process) management</b> 7.1 Product flow (process) management 7.2 Supportive events management 7.3 Cross-organization relation management	90
<b>4. Customers and market expansion</b> 4.1 Product (service) stratagem 4.2 Customer and market information management 4.3 Customer relation management	100	<b>8. Operation Outcome</b> 8.1 Customer satisfaction 8.2 Market expansion achievements 8.3 Financial achievement 8.4 Human resource development achievement 8.5 Information management achievement 8.6 Operation flow management achievement 8.7 Innovation and core competitiveness achievement 8.8 Society feedbacks (quality awards)	250

# Good Occupational Safety Brings Good Money

## A

iming at establishing an occupational safety mechanism for national participation, improving national occupational hazard prevention knowledge and skills, elevating our standards for occupational safety, highlighting government's emphasis and sustainable care for the safety and health of labors, we have launched the "National Occupational Safety Week" activity since 2006. Each administrative department is responsible for promoting occupational safety and health.

This event is held as the core activity of the "National Occupational Safety Week" incorporating with resources of the government, labor, industry and academia to promote occupational safety and prevent occupational hazards. The Council of Labor Affairs is invited to present the management strategies and trends of labor safety. Through conferences the industry, government and academia discuss the problems and countermeasures on the promotion of labor safety management. In addition to continuously improving occupational safety and health, reaching the goal of improving occupational safety, we hope to reduce accidents and increase competitiveness.

## 1.Participants

- Occupational safety and health management staff (including operation managers) for the manufacturing industry in Northern, Central and Southern Taiwan.
- Staff of the manufacturing industry in Northern, Central and Southern Taiwan.
- Others

## 2.Time

Northern Taiwan : 20/05/2008 to 23/05/2008

Central Taiwan : 27 May to 30 May

Southern Taiwan : 10 June to 13 June

## 3.Venue

Northern Taiwan : WuGu Labor Recreational Center (9 Wugong 6th Road, Wugu Industrial Park)

Central Taiwan : Environmental Training Center, MOEA (No 17, Industrial 27 Road, Nantun District, Tai Chung City)

Southern Taiwan: Linhai Industrial Park Service Center(37 Dayeh N. Road Kaohsiung City)

#### 4. Agenda

- Labor Safety Policy Promotion
  - Domestic Labor Safety Management Policies and Trends
  - Labor Safety Management Strategy Conference
- Management System Establishment
  - Guidelines for Taiwan Occupational Safety and Health Management System Certification
  - Business Continuity Management
  - Change Management Practicum
  - Underwriting Safety Management Practicum
- Occupational Health Promotion
  - Occupational Health Promotion
  - Chemical GHS Safety Management
  - Selection and Maintenance of Personal Protective Tools
- Hazard Identification and Control
  - Case Study and Countermeasures for Occupational Hazards
  - Plant Fire Safety Management Practicum
  - Electrical Hazard Prevention and Safety Management
  - Mechanical Hazard Prevention Technology

5. For details, please visit: <http://proj.moeaidb.gov.tw/cesh/>

# Application for the 19<sup>th</sup> National Quality Award Starts Today

# T

he purpose of the National Quality Award is to recognize enterprises and individuals with excellent performance in Total Quality Management (TQM) and promote them as models. We also hope to encourage domestic enterprises and organizations to implement TQM; to invite more experts, scholars and staff to join the practice, research and promotion of TQM in order to cultivate and internalize quality culture and becoming a trend.

Covering each level and department of the organization, each TQM staff participates and holds responsibility, from managers to staff, R&D to marketing as well as support staff. Everyone is fully involved with the maintenance and improvement of quality to break the concept and method of superficial product/production/operation quality in the past. In other words, successful TQM requires the accumulation of perfection at each stage in order to produce superb quality.

This award aims to recognize excellent promotion of TQM in order to create the trend of seeking excellent quality and establish a model for quality management. The evaluation criteria and procedure serve as a reference for the enterprises to strengthen their structure

and improve competitiveness. By doing so, we hope to elevate the overall quality and establish an exceptional image of our industry and country.

## **Types of Award :**

### **Corporate Award :**

To bestow corporations with outstanding achievements in carrying out extensive quality control.

### **Mid-and-small Business Award :**

To bestow mid-and-small business with outstanding achievements in carrying out extensive quality control.

### **Organization Award :**

To bestow organizations with outstanding achievements in carrying out extensive quality control.

### **Individual Award :**

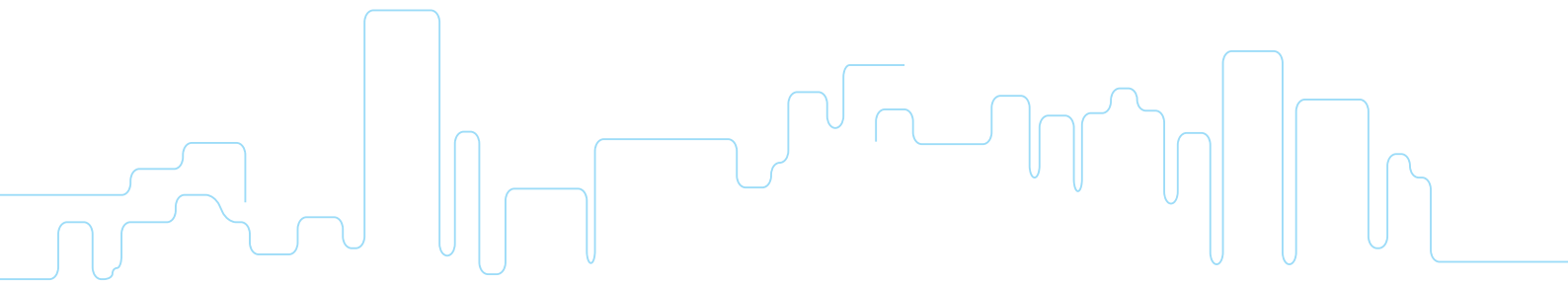
To bestow individuals with outstanding contribution in research, promotion, and practice of quality control.

Application Deadline : 13 June 2008

Website: <http://nqa.csd.org.tw>

Organized by : Industrial Development Bureau, MOEA

Implemented by : Corporate Synergy Development Center



**Publisher :**

Dr. Chao-Yih Chen, Director General  
Industrial Development Bureau, Ministry of Economic Affairs

**Address :** No.41-3, Hsin Yi Rd., Sec. 3 Taipei, Taiwan, R.O.C

**Publishing Directors :**

Aaron Shie, Po-Keng Yang, Liang-Tung Chen, Cheng-Hua Wu

**Advisory Committee :**

Wen-Huei Chen, Young Ku, Shu-Min Kuo, Kung-Chen Li, Ji-Sen Lin, Shuh-Woei Yu

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**Executive Editors :**

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**For inquiries to the newsletter, please contact :**

6F-1, 48 Bauchiau Road, Shindian, Taipei County 231, Taiwan, R.O.C.

Tel: 886-2-2912-2910

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