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World Summit

Taiwan Employs Green Diplomacy at World Summit

The Taiwanese delegation took advantage of their attendance at the recent UN sustainable development summit held in Johannesburg to share their environmental protection experiences with other nations. They also announced to the world Taiwan's sustainable development efforts and achievements.

The UN World Summit on Sustainable Development (World Summit) was held from August 26 to September 4 in the South African city of Johannesburg. More than one hundred heads of state and tens of thousands of delegates and other participants took part in this event. The summit's chief action was to draft a plan of implementation intended to realize the goals of protecting the environment and eliminating poverty passed at the 1992 Earth Summit in Rio.

Although Taiwan is not a UN member, it nevertheless wishes to learn about other nations' progress in achieving sustainable development and share its own sustainable development experiences and ideas with other nations. The government consequently appointed Minister of State Yeh Chun-jung (葉俊榮), executive director of the National Council for Sustainable Development (NCSD), and EPA Administrator Hau Lung-bin (郝龍斌) to lead a delegation of more than 30 agency representatives to the summit. In addition to this delegation, over 20 non-governmental organizations from Taiwan also attended the summit.

The Taiwanese delegation immediately sprang into action after arriving in South Africa. Apart from attending conferences in connection with the summit, the delegation members held eight bilateral discussions with officials at the level of department head and above from the host nation of South Africa, the diplomatically allied nations of Nicaragua, Panama, and The Gambia, and such non-allied nations as Indonesia and Canada. Delegation head and Minister of State Yeh stated that because Taiwan is not a UN member, it must employ bilateral talks as a means of participating meaningfully in international society. And because environmental protection is an international language, "green diplomacy" has become one of the most effective ways of eliciting a worldwide response.

Minister of State Yeh was invited to speak in his capacity as the executive director of the NCSD at the opening ceremony held by the International Research Foundation for Development (國際研究發展基金會) on August 28. Yeh used this opportunity to report on Taiwan's sustainable development, and outlined Taiwan's specific sustainable development policies and measures, including:

1. Setting of water prices: Including citizen participation in the setting of water prices and achieving rational protection of water resources.
2. Formulation of sustainable development indicators: Local and regional indicators and their interrelationship.
3. Renewable energy: Energy diversification and consumption.
4. Population policy: Population and sustainable development, demographic aging, community development, and medical services.

Apart from discussing the nation's sustainable development efforts and achievements, Yeh also ex-

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pressed Taiwan's willingness to share its experiences with other nations. Responding to this gesture, many delegates from developed nations indicated their hope that channels of communications could be established with Taiwan concerning sustainable development issues.

With regard to Taiwan's future sustainable development policies, Yeh stated that after he took the helm as executive director of the NCSD in May of this year, he invited the EPA, the Energy Commission, and other central government agencies to draw up an action plan for the country's Agenda for the 21st Century. The action plan, which will be completed in the near future, will guide the implementation of sustainable development in Taiwan.

EPA Administrator Hau Lung-bin, deputy head of the Taiwan delegation, held talks with the Wildlife Leadership School Trust (WLST), South Africa's largest conservation group, on August 27. After sharing insights and experiences, both parties agreed that the EPA would exchange "environmental protection seed teachers" with the WLST. Under this program Taiwan will send environmental seed teachers to South Africa, where they will gain practical experience in methods of promoting environmental protection education. In return, the WLST will send personnel to learn about Taiwan's Central Mountain Range Green Corridor, and acquire the concept for South Africa.

Because global climate change was one of the major issues discussed at the summit, EPA Administrator Hau met with Ms Joke Waller-Hunter, executive secretary of the UN Framework Convention on Climate Change, and requested that Taiwan's greenhouse gas emissions not be included within the figure allotted to China. Ms Waller-Hunter promised that the convention secretariat would study Taiwan's dilemma, which results from its exclusion from the UN, of being unable to sign the convention. She also recommended that Taiwan post the content of Taiwan's "UNFCCC National Communication" on government websites.

Regarding attendance at the summit, EPA Administrator Hau noted that the delegation's attitude had been to convey Taiwan's willingness to uphold international conventions and decisions, and to let the world see Taiwan's sustainable development achievements in hope of winning more international recognition and acceptance.

General Policy

The Clean Maritime City– Environmental Protection in Kaohsiung

Kaohsiung City is the largest center of heavy industry in Taiwan, and Kaohsiung Harbor is the world's fourth busiest seaport. Because of its predominant industrial character, Kaohsiung City faces more severe and complex environmental problems than any other city or county in Taiwan. But thanks to the efforts of the Kaohsiung Municipal Government Department of Environmental Protection, this city has gradually improved its environmental quality, and has taken the lead in implementing the *Plastic Shopping Bag and Plastic (including Polystyrene) Disposable Dishes Use Restriction Policy* in conjunction with the EPA.

Kaohsiung City is the largest center of heavy industry in Taiwan, and the city's roughly 1,800 factories include many petroleum refining, petrochemical, steelmaking, power, and cement plants. In addition, Kaohsiung Harbor is the world's fourth busiest seaport, accommodates approximately 40,000 ship arrivals annually and receives 70% of the country's petroleum imports. The many pollution problems accompanying the city's industrial development have made the preservation of environmental quality a tremendous challenge for the Kaohsiung Municipal Government Department of Environmental Protection.

Established twenty years ago in July 1982 as the "Environmental Management Office," the Kaohsiung Municipal Government Department of Environmental Protection was later renamed and given more extensive duties. The department's more than 3,400 employees are responsible for various administrative tasks, the collection of waste produced by Kaohsiung City residents, and the operation of the city's central and southern incinerators and Ta-lin-pu Coast Reclamation Project. The department's 2002 budget was roughly NT$3.3 billion, of which the operating and maintenance expenses of the two incinerators accounted for NT$700 million (approximately 21%). Other major expense items included air pollution control, industrial wastewater control, industrial waste management, and environmental sanitation, and disease vector control. In general, the department spends the largest share of its budget on waste transport and disposal.

People trample ploystyrene bowls to symbolize Kaohsiung City's determination to institute restrictions on the use of disposable plastic bags and dishes.

Improving Air Quality

The "Kaohsiung-Pingtung Air Quality District," of which Kaohsiung City is a part, has the worst air quality of any district in Taiwan. According to the Pollutant Standard Index, the unsatisfactory air quality rate was roughly 12% in Kaohsiung City from 1996 to 1998. To alleviate this severe air pollution problem, the Kaohsiung Municipal Government Department of Environmental Protection began vigorously implementing the *Kaohsiung City Air Quality Improvement Plan* (高雄市空氣品質改善維護計劃) from 1996 on. Under this plan, the department collected data on pollutant sources, kept close tabs on the various types of air pollution in Kaohsiung City, set air quality targets, and implemented the pollution reduction measures needed to meet those targets. In addition, the department also mapped out control strategies for the three major types of pollution sources, namely stationary sources, mobile sources, and construction projects. The department hopes to tangibly improve the quality of Kaohsiung City air and meet the expectations of city residents.

The following amounts of air pollutants were generated within the Kaohsiung City area in 2001: 55,360 metric tons/year of total solid particulates (TSP), 57,378 metric tons/year of nitrogen oxides (NOx), 36,833 metric tons/year of sulfur oxides (SOx), 92,226 metric tons/year of volatile organic compounds (VOC), and 97,073 metric tons/year of carbon monoxide (CO). Apart from strictly reviewing pollutant emission permit applications, the Department of Environmental Protection is striving to reduce emissions by initiating compulsory inspections of stationary pollution sources, rechecking emissions from pollution sources, and inviting experts and specialists to provide on-site assistance to firms implementing pollution remediation measures and installing pollution control equipment. These steps have successfully reduced TSP emissions by 8,208 metric tons/year, NOx emissions by 8,206 metric tons/year, SOx emissions by 4,069 metric tons/year, VOC emissions by 5,186 metric tons/year, and CO emissions by 21,294 metric tons/year.

As for Kaohsiung City's mobile pollution sources, in addition to ordinary auto and motorbike emissions, the city's many heavy-duty diesel trucks also constitute a severe pollution problem. Besides stepping up regular motorbike inspections and roadside spot inspections of all vehicles, the Department of Environmental Protection is also striving to cut vehicular pollution by encouraging the owners of old vehicles to replace them with newer models, performing random inspections of diesel vehicles, and guiding the implementation of anti-pollution measures by trucking companies. With regard to the particulate matter problem caused by construction projects, the department is working to lessen the impact of these emissions on air quality by strengthening its inspection of construction sites and asking construction companies to clean the roads adjacent to work site entrances and exits to a distance of 100 meters.

Thanks to the diligent efforts of the Kaohsiung Municipal Government Department of Environmental Protection, Kaohsiung City's unsatisfactory air quality rate has fallen to roughly 8% during the most recent three years. Of this 8%, 3% can be attributed to particulate matter and 5% attributed to ozone. While particulate pollution has lessened over the last few years, the ozone problem has deteriorated. Future air quality control campaigns in Kaohsiung City will therefore target ozone and its precursors VOC and NOx. But because Kaohsiung City and neighboring Kaohsiung and Pingtung counties are home to such a dense concentration of factories – many of which are in highly-polluting heavy industry – Director Chang Feng-teng (張豐藤) of the Kaohsiung Municipal Government Department of Environmental Protection admitted, "Kaohsiung City still wouldn't meet its air quality targets even if all factory emissions met emission permit requirements. It will take regional cooperation and the implementation of a total quantity control (TQC) system throughout the Kaohsiung-Pingtung Air Quality District if we really hope to improve air quality."

Progressive Implementation of Waste Management

"Implementation of the 'Keep Trash off the Ground' (垃圾不落地) policy was the first step towards making Kaohsiung City a clean city," said Director Chang. Kaohsiung City used to have over 10,000 waste drop-off points scattered throughout the city. Every evening the city's more than 1.4 million residents all dumped their household waste at these points, where it was hauled away by the Department of Environmental Protection's sanitation crews. This system made Kaohsiung City seem like a city of garbage during the night, and the piles of waste heaped at countless locations inevitably caused severe pollution problems in the surrounding areas. Acting on the instructions of Kaohsiung City Mayor Frank Hsieh (謝長廷), the department therefore implemented the "Keep Trash off the Ground" policy. Under this policy, trash trucks make stops to pick up garbage at designated times and places allowing residents to throw their trash directly into the trash trucks, rather than leaving it on the ground as in the previous method. This measure has completely rid Kaohsiung City of its past reputation as a "garbage city," while quickly raising public satisfaction with the Department of Environmental Protection from the original 35% to the more recent 69%.

After successfully instituting its "Keep Trash off the Ground" policy, the department began encouraging waste reduction and recycling. The implementation of "compulsory garbage separation" in January 2001 required residents to separate their garbage into one of the four categories – recyclable waste, hazardous waste, bulky waste, and general waste – before handing it to a sanitation crew for removal. There are different procedures for the collection and disposal these four types of waste. If any residents who have not separated their garbage are found to have mixed recyclable waste or hazardous waste with general waste, sanitation crew personnel shall ask them to separate the garbage on the spot, and those who refuse to comply shall be punished with a fine. After more than a year of implementation, Kaohsiung City's recycling rate has jumped from 4% to more than 10% today. The city's achievement is even more impressive when recycling performed by private recyclers is included. The amount of garbage produced per person per day has fallen from 0.95 kilograms to 0.82 kilograms, while the city's average daily garbage volume has dropped from 1,408.5 metric tons to 1,231 metric tons. This reduction of 177.5 metric tons per day saves at least NT$110 million in incineration costs annually.

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To comply with EPA policy and further cut back on pollution at its source, the Department of Environmental Protection took the lead in Taiwan by implementing the *Plastic Shopping Bag and Plastic (including Polystyrene) Disposable Dishes Use Restriction Policy* (購物用塑膠袋及塑膠類（含保麗龍）免洗餐具限制使用政策) at government organizations and schools in its area of jurisdiction starting on January 1, 2002. The scope of implementation was broadened to include specified private businesses beginning on April 1, 2002. Due to effective advance promotional measures, the implementation of this policy is delivering excellent results. A public opinion survey of Kaohsiung City residents performed by the EPA in April 2002 showed that as many as 80% residents support the policy. Because Kaohsiung City implemented the policy in advance of the central government, willingness to comply was initially low among mass retailers when implementation started. But thanks to the Department of Environmental Protection's continuous promotional measures, all of the stores have now agreed to comply with the policy and stop offering free plastic shopping bags.

The Department of Environmental Protection will institute the privatization of its services in the future. Current plans call for the use of a BOT model to implement the recycling of kitchen waste. Under this scheme private contractors will turn kitchen waste into organic compost for use as fertilizer. The privatization of waste collection began this year on a trial basis in the city's Hsinhsing District (新興區). Because results have been favorable and the public is strongly supportive, the department is considering allowing private waste collection in the Chienchin (前金區) and Yencheng (鹽埕區) districts next year. In general, while the department plans to keep opening waste collection to private businesses in the future, it will maintain responsibility for over 50% of the city's waste collection resources so that it will have the ability to respond in the event of an emergency.

Although Kaohsiung City's overall environmental quality has improved markedly over the last few years, new environmental protection issues have emerged even as the air pollution and solid waste problems have gradually eased. These new issues include the remediation of soil and groundwater pollution and the prevention of marine pollution. Facing these new challenges, Director Chang already knows the solution: "The manpower and resources that are freed up by contracting private enterprises to collect garbage will all be used to tackle these new projects." We look forward to seeing Kaohsiung City realizing its promise as Taiwan's "Clean Maritime City."

Waste Management

New Municipal Waste Clearance and Disposal Regulations Stress Recycling and Reuse

The EPA has formulated new regulations based on the *Method and Facility Standards for Municipal Waste Storage, Clearance, and Disposal* in order to promote the recycling and reuse of municipal waste. These new regulations, drawn up in coordination with last year's revisions to the *Waste Disposal Act*, place the greatest importance on source reduction and recycling.

Get ready for some major changes to Taiwan's municipal waste clearance and disposal regulations. The EPA, based on Article 12 of the revised *Waste Disposal Act*, has formulated its draft of *Transportation, Separation, Storage, Throw-out, Method, Facilities, and Reuse Regulations for Municipal Waste Recycling, Clearance, Disposal* (一般廢棄物回收、清除、處理之運輸、分類、貯存、排出、方法、設備及再利用辦法). Once passed, these regulations will replace the existing *Method and Facility Standards for Municipal Waste Storage, Clearance, and Disposal* (一般廢棄物貯存清除處理方法及設施標準). These draft regulations, while promoting a policy of thermal treatment including incineration and vitrification, place the greatest importance on source reduction and recycling and reuse.

This draft stipulates that recycling and reuse should be granted priority consideration in the handling of municipal waste. However, reuse options should be avoided in which the materials created through reuse would be put in long-term contact with humans, be used in the structure of buildings, or have the potential to cause soil and groundwater pollution. This draft also states that, prior to the recycling, clearance, or disposal of municipal waste, this waste must be first separated and then placed at designated sites, in designated storage containers, or at designated storage facilities.

These draft regulations, while promoting a policy of thermal treatment including incineration and vitrification, place the greatest importance on source reduction and recycling and reuse.

This draft divides municipal waste into four categories: bulky waste, recyclable waste, hazardous waste, and general waste. Bulky waste is large waste, such as furniture and tree clippings, from households or non-businesses. This category also includes general waste items that have been designated bulky waste by environmental protection authorities. Recyclable waste is defined as general waste and goods, including their packaging and containers, designated as recyclable by environmental protection authorities. Hazardous waste is general waste that meets hazardous industrial waste standards and is listed as hazardous waste by environmental protection authorities. General waste is waste that does not fall under the above three categories. These draft regulations also lay out disposal procedures to be observed by the public when disposing of bulky waste, recyclable waste, and general waste.

Concerning the treatment of incinerator fly ash, these draft regulations require that, in addition to solidification and vitrification, immobilization also be carried out so as to make the hazardous components of fly ash nonhazardous or reduce their hazardous potential. Also, this draft states that, when the solidified or immobilized forms of fly ash are sent to a landfill for final disposal, they should be placed in an area of the landfill that is designated solely for their disposal. Landfill seepage monitoring must also be enhanced for this waste in order to prevent soil and groundwater pollution. As for reuse classification and management methods for solidified and immobilized fly ash, the EPA will announce additional regulations after consulting with the relevant organizations, or local environmental protection agencies can stipulate their own regulations and present them to the EPA for reference.

For more information, please call 02-2311-7722 ext. 2620.

News Briefs

First Aquatic Environment Guardian Squad Formed

To tap the enthusiasm of environmental volunteers and help environmental authorities protect and maintain rivers and waterways, the Chiayi County Environmental Protection Bureau formed Taiwan's first aquatic environment guardian squad on August 19 in conjunction with 30 communities along the Putzu River. While attending the commissioning ceremony, EPA deputy administrator Chang Juu-en (張祖恩) told participants that few rivers and waterways in Taiwan are environmentally clean, ecologically vital, and conducive to tourism. Since pollution remediation work is starting to deliver positive results, it is hoped that the assistance of environmental volunteers will make the Putzu River western Taiwan's most attractive and approachable river.

Economic Processing Zone Administration to Review Waste Disposal Plans

To simplify industrial waste disposal plan review procedures, on August 13 the EPA formally commissioned the Economic Processing Zone Administration, MOEA, and its branch offices to perform industrial waste disposal plan review tasks. In the future, whenever enterprises legally established in export processing zones submit industrial waste disposal plans as required by law, the Economic Processing Zone Administration may perform a review on its own initiative. If the Economic Processing Zone Administration approves the plan, it need only send copies of the final plan to the local environmental protection authorities and the EPA.

Marine Oil Spill Response Drill Held at Taichung Harbor

The EPA and the Taichung County government held a marine oil spill emergency response drill at the Taichung Harbor passenger wharf on August 8. This drill simulated the response procedures that will be taken if a freighter runs aground and leaks large quantities of oil into the sea. Following the Taichung County marine pollution emergency response plan, the various units participating in this exercise performed notification and liaison tasks; mobilized personnel; dispatched helicopters, and patrol vessels; and deployed oil booms, pumped oil, and sprayed oil dispersing agents. The drill demonstrated how the marine environment could be protected by immediate action to prevent an oil spill from spreading.

EPA Administrator Hau and Kaohsiung City Mayor Frank Hsieh observe Environmental Cleanup Week activities in Kaohsiung City.

Environmental Cleanup Week – Mobilizing Against Mosquitoes

Responding to the growing problem of Dengue fever in southern Taiwan, the EPA announced that the week of August 10~18 would be Environmental Cleanup Week, and requested that the public work together to eliminate places where the carriers of dengue fever – mosquitoes – breed. EPA Administrator Hau Lung-bin personally visited the severely affected Kaohsiung area to spread awareness and oversee cleanup work. Since statistical indicators of disease vector mosquitoes were down in August relative to July, the goal of controlling dengue fever appears achievable.

EPA Provides Doorstep Service to Complainants

To improve its responsiveness to environmental complaints and gain a better understanding of the public's level of satisfaction towards the handling of complaints, in addition to better communication with complainants, the EPA has begun sending personnel to visit persons making environmental complaints. In connection with the more than 2,000 environmental complaints received from January to August of this year, 749 meetings were held with complainants, and it was found that 83% of the people talked with felt satisfied with the handling of their complaints by environmental protection personnel.

Work on Yungkang Incinerator Stops due to Contractor Bankruptcy

Construction of the Yungkang Incinerator (永康焚化廠) in Tainan County, now 85% completed, has come to a halt since July due to the announcement of bankruptcy by the general contractor, the German firm L. C. Steinmuller GmbH. In accordance with the Government Procurement Act, the EPA will now issue a new bid request for a contractor to complete the project.

Waste Management

Industrial Waste Regulations Revised in Line with New Waste Disposal Act

The EPA has revised *Method and Facility Standards for Industrial Waste Storage, Clearance, and Disposal* in coordination with last year's revisions to the *Waste Disposal Act*. These revised standards, which will be promulgated in the near future, now comprise six chapters and 38 articles.

Following the revision of the *Waste Disposal Act* (廢棄物清理法) in October 2002, the EPA proceeded with the revision of related regulations under this act. In August, the EPA completed its draft of revisions to *Method and Facility Standards for Industrial Waste Storage, Clearance, and Disposal* (事業廢棄物貯存清除處理方法及設施標準), which are the primary regulations governing the clearance and disposal of industrial waste in Taiwan, putting these standards in line with the new *Waste Disposal Act*.

Concerning the treatment of mercury sludge, an issue that has drawn a great deal of public attention, the EPA has added "vitrification" to the thermal treatments that can be adopted for this purpose. These expanded regulations explicitly define the treatment methods that can be used to recover heavy metal steam through the thermal treatment of industrial waste. These regulations state that thermal treatment should be used to recover mercury from hazardous industrial waste that has a mercury or mercury compound concentration of 260mg/kilogram or more. Following treatment, TCLP testing of the mercury content of this waste should achieve a level of less than 0.2 mg/liter. As for hazardous industrial waste with a mercury or mercury compound concentration of 260mg/kilogram or less, post-treatment TCLP testing should reveal a level of less than 0.025mg/liter if an intermediate treatment process other than thermal treatment is used to treat it before it can be sent to a landfill.

This draft requires a sterilization efficacy rate of 99.999% when sterilization methods are used in the treatment of infectious industrial waste. Sterilization efficacy should be determined through *bacillus stearothermophilus* spore tests (嗜熱桿菌芽孢測試) when autoclaving is used and through *bacillus subtilis* spore tests (枯草桿菌芽孢測試) when other sterilization methods are adopted.

In these revisions, the EPA focused only on revising the less controversial articles of these standards. However, it intends to conduct a comprehensive evaluation and revision of these standards in the near future because they have not undergone an in-depth evaluation since they were last revised in 1995.

To ease the introduction of new waste treatment methods, permits for new treatment methods will no longer be issued only to industry and public and private waste disposal organizations. These revisions would allow any individual to apply for a permit. One needs simply to present the proper documents and an application form to the local government environmental protection bureau, and this bureau will send the application on to the EPA for review. Once the EPA has approved a new waste treatment method, those wishing to use this method in other operations will be permitted to do so, without having to apply for an additional permit, if conditions and equipment are similar to those for which the new method was approved.

The EPA says that, as the primary motivation for the present revisions is to make the *Method and Facility Standards for Industrial Waste Storage, Clearance, and Disposal* comply with the revised *Waste Disposal Act* and complementary *Waste Disposal Act Enforcement Rules* (廢棄物清理法施行細則), it focused only on revising the less controversial articles of these standards. However, the EPA intends to conduct a comprehensive evaluation and revision of these standards in the near future because they have not undergone an in-depth evaluation since they were last revised in 1995.

For more information please call 02-2311-7722 ext. 2640.

Announcement

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Water Quality

Marine Environment Monitoring Regulations Drafted

The EPA has formulated a draft of the *Marine Environment Monitoring and Monitoring Station Establishment Regulations*. These regulations, intended to improve marine environment monitoring and establish long-term marine environment baseline data, are to be followed by all government agencies when conducting marine environment monitoring work. Also, aiming to prevent the construction of fisheries installations from polluting the marine environment, the EPA has drafted the *Permit Regulations for the Construction of Artificial Fish Reefs and Other Fisheries Installations*.

Following the promulgation of Taiwan's *Marine Pollution Control Act* (海洋污染防治法) in November 2000, the EPA proceeded immediately to formulate related regulations under this act. The EPA announced its draft of *Marine Environment Monitoring and Monitoring Station Establishment Regulations* (海域環境監測及監測站設置辦法), drawn up in line with Article 9 of this act, on August 15. These regulations detail the monitoring regulations, standards for the establishment of marine monitoring stations, and sampling and analysis methods each competent authority must follow when pursuing marine environment monitoring work.

According to this draft, marine environment monitoring stations will be positioned at the mouths of all primary and secondary rivers, the outlets of major pollution sources, harbors, lagoons, marine water quality background monitoring points, and at areas designated special areas under Article 15 of the *Marine Pollution Control Act*, such as nature reserves, ecology conservation areas, and the ecology protection zones of national parks. Monitoring items for each station must be determined based on the particular characteristics of each marine monitoring point and/or the type of pollution source. Basic monitoring items include 1) marine hydrology, such as water current speed and direction, 2) marine water quality, including salinity, pH value, and dissolved oxygen (DO) levels, and 3) marine organisms, including plankton, bottom-dwelling organisms, and specially targeted organisms. The monitoring frequency for each of these basic monitoring items is set at once per season. This draft also provides additional regulations for marine environment water quality sampling methods in order to guarantee the quality of marine environment monitoring data. Furthermore, to protect the public's right to know, each local government competent authority must report their marine environment monitoring results two months after the end of each season.

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Marine pollution and overfishing have caused a gradual depletion of Taiwan's coastal fishing resources. In response to this decline in fish stocks, the construction of artificial fish reefs has become one of the major measures adopted by the government to develop fishing resources. Therefore, based on Article 25 of the *Marine Pollution Control Act*, the EPA has drafted the *Permit Regulations for the Construction of Artificial Fish Reefs and Other Fisheries Installations* (投設人工魚礁或其他漁業設施許可辦法). These regulations are intended to ensure that the marine environment does not suffer as a consequence of the construction of artificial reefs and other fisheries installations at sea.

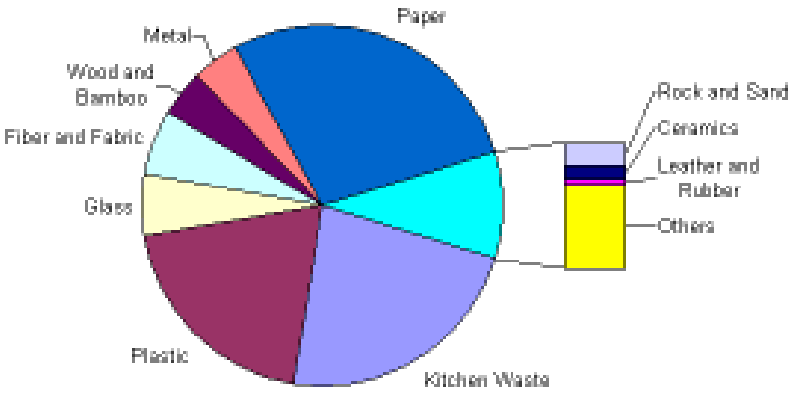
Prior to the implementation of the *Marine Pollution Control Act*, the competent authorities in charge of the fishing industry managed the construction of artificial reefs. In drawing up these new regulations, the EPA has assigned the responsibility for the review and approval of installation permits for fisheries installations to the Fisheries Administration, under the Council of Agriculture, so as to simplify the related administrative procedures. This draft stipulates that the construction of artificial fish reefs may not interfere with the navigation and safety of seagoing vessels and that, in the instance an artificial reef causes serious marine pollution or is seen as having the potential to cause such pollution, operators must immediately implement response measures and notify the competent authority.

For more information, please call 02-2311-7722 ext. 2840.

Waste Management

Percentage of Recyclables in Taiwan Garbage Remains High

An EPA survey of the composition of Taiwan's garbage in 2001 shows that paper, kitchen waste, and plastic account for more than 70% of Taiwan's garbage. While the amount of garbage has declined as a result of the EPA's garbage reduction and recycling policies, these figures show that the EPA still has a great deal of work to do in order to lower the volume of recyclable materials being sent to landfills and incinerators.



Physical composition (dry base) of Taiwan's garbage in 2001.

The amount of garbage generated in Taiwan, seemingly keeping pace with the country's economic growth, rose through the 1990s to a peak of 8.88 million metric tons in 1997 (see EPM Vol. 5, Issue 6). In response to this growth, the EPA made municipal waste management one of its primary policies. For nearly a decade now, the EPA has been conducting sampling and analysis work on in order to determine the composition of Taiwan garbage. The qualitative and quantitative data generated by these surveys is essential in helping the EPA in the planning and design of waste management facilities and the formulation of its waste management policies.

From May 2001 to March 2002, the EPA collected samples once every season from municipal waste in 45 townships (15 each in northern, central, and southern Taiwan). In all, it analyzed 180 samples. The results of this analysis reveal that the average density of Taiwan's garbage was 225.6 kilograms per square meter. The highest average density was 368.5 kilograms per square meter, while the lowest was 150.5 kilograms per square meter.

A breakdown of the physical composition (dry base) of Taiwan's garbage shows that 86.88% is combustible, while 13.12% is noncombustible. Paper, kitchen waste, and plastic account for most of Taiwan's garbage, with percentages of 28.43%, 22.66%, and 19.72% respectively. Glass and metal are the primary forms of noncombustible waste, accounting for 5.66% and 4.12% respectively of Taiwan's garbage. This data reveals that the percentage of recyclable materials in Taiwan's garbage remains quite high.

Three component analysis shows that Taiwan's garbage has an average water content of 55.5%, an average ash content of 11.3%, and an average combustible materials content of 33.2%. The water content of garbage changes depending on the season. The first quarter of the year is a dry season in Taiwan so the water content of garbage is lower during this period. Conversely, the third quarter is a rainy season so the water content is higher. The EPA has also conducted chemical composition analysis of Taiwan's garbage. The average annual volume of carbon is 17.13%; oxygen: 11.47%; hydrogen: 2.63%; nitrogen: 0.446%; sulfur: 0.127%; organic chlorine: 0.11%; potassium: 0.181%; phosphate: 0.002%. Heat value analysis of Taiwan's garbage reveals an average high heat value of 1,851.4kcal/kilogram, an average high heat value of 1,370kcal/kilogram, and an average dry base heat value of 4,852.2kcal/kilogram. The high ratio of kitchen waste in Taiwan's garbage means an excessively high water content. By reducing the overall heat value of garbage during incineration, a higher water content can lead to a less efficient energy recovery from incineration. A higher water content can also cause an increase in seepage from landfills.

In general, although the overall percentage of recyclable materials in Taiwan's garbage remains too high, the percentages of each type of recyclable material have been falling over the last few years. This trend indicates that the EPA's recent recycling and waste reduction policies are already producing initial results. However, with the combined percentages of paper, kitchen waste, and plastic reaching over 70%, the EPA has a great deal of room for improvement in its recycling efforts.

For more information, please call 04-2252-1718.

Waste Management

Restoring Landfills as Parks

While it is a small world after all, land in Taiwan is all the more valuable because of Taiwan's small size and high population density. Therefore, beginning in 1996, the EPA initiated plans for the restoration of landfills as public parks. Aiming to achieve the sustainable use of land resources, this agenda provides subsidies to local governments for the transformation of sealed landfills into public environmental parks.

In the early days, landfills were the primary waste management method in Taiwan, and, even now, regions which have yet to build large-scale waste incinerators still rely on landfills to deal with their garbage. With such a heavy dependence on landfills, over 300 landfills have been constructed in Taiwan over the years in order to handle the garbage of most county, city, and township governments.

As the trash has continued to pile up, many of these landfills have already reached their expiration dates and must be sealed. However, the high volume of organic matter in Taiwan's garbage means that it will continue to decompose for many years after landfills are sealed. Therefore, proper sealing methods and follow-up maintenance programs must be utilized in order to prevent the leakage of methane and other pollutants from harming the environment.

The EPA started actively promoting its landfill restoration plan in 1996. It has used the Air Pollution Control Fund and other related funds to subsidize the landfill restoration projects of local governments. These projects utilize pollution prevention and environmental engineering technology and take into consideration technological, economic and public acceptance factors.

Current landfill restoration work can be divided generally into two stages. The construction of secondary pollution control facilities and revegetation work are the main foci of the first stage. This includes sealing the landfill surface with an impermeable layer and constructing seepage and methane collection systems. The primary goals of this stage are stabilizing the condition of the landfill and controlling secondary pollution. The second stage must be conducted in coordination with the maintenance and management of the facilities constructed in the first stage. In this stage, the land reclaimed by sealing the landfill is used to construct public parks, sporting grounds, and other recreational facilities in order to provide the public with space for recreation and sports. As of the end of 2001, the EPA had already provided subsidies totaling NT$1.0356 billion for landfill restoration projects at 108 landfills around Taiwan. These restored landfills cover an area of 393 hectares.

While Taiwan has completed the construction of its large-scale waste incinerators, the EPA is continuing to work of the construction of regional landfills in order to make room for the disposal of incinerator ash and provide a place to dispose of garbage when incinerators are shutdown for annual maintenance work. As for landfills that have already been sealed or have reached maximum capacity, the EPA will actively pursue landfill restoration projects, speed up the stabilization of landfills, and step up planning for the establishment of public and ecological parks. These efforts will help alter the public's negative perception of landfills, quell public opposition to the construction of landfills, and help achieve the sustainable use of land resources in Taiwan.

For more information, please call 04-2252-1718.

A landfill makeover: The Tainan City Chenghsi Incinerator before restoration (left) and after (right).

Waste Management

Environmental Technology Park Plan Passes CEPD Approval

The Executive Yuan Council of Economic Planning and Development has finally approved the EPA's Environmental Technology Park Development Plan. Under this plan, NT$15 billion will be invested in the establishment of three environmental technology parks, one each in northern, central, and southern Taiwan, over the next ten years. The plan will provide economic incentives including subsidies, tax deductions, and special financing in order to encourage enterprises to set up in these zones. The EPA is busy evaluating the establishment plans submitted by the many county and city governments that have already expressed their desire to become the homes of these zones.

The EPA has formulated its Environmental Technology Park Development Plan (環保科技園區推動計畫) with the multiple goals of promoting the reuse and recycling of waste materials, encouraging technology research and innovation among domestic environmental enterprises, and promoting the coordination of ecologically sustainable manufacturing and recycling/reuse within industry. Following evaluation and deliberation by all related parties, the Council of Economic Planning and Development, Executive Yuan, finally granted its approval to this plan on August 5.

EPA Administrator Hau Lung-bin, while meeting with the press, stated that while environmental technology parks will be established in science-based industrial parks, the companies that will be based in these zones will be environmental industry enterprises. Hau said that the plans calls for setting up three environmental technology parks, one each in northern, central, and southern Taiwan, over the next ten years. These zones will cover a combined area of approximately 100 hectares. The EPA hopes to bring 60 environmental enterprises and 150 research enterprises and organizations to these zones and attract NT$15 billion in private investment.

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In line with the plan's goal of integrating the environmental industry with other industries in Taiwan, the enterprises and organizations that will be permitted to set up in these zones are limited to the following six categories.

1. Enterprises developing or using green production technology
2. Enterprises developing recycling technology or manufacturing products from recycled materials
3. Enterprises developing new resource technology and products
4. Enterprises manufacturing clean or renewable energy products and systems
5. Enterprises providing equipment, key technology, and parts that help industry resolve its environmental problems
6. Environmental enterprises that are listed by the government as emerging strategic enterprises

The plan provides a number of economic incentives for enterprises setting up in these environmental technology parks. Lease subsidiaries will cover half of an enterprise's lease costs up to a value of NT$500,000 per hectare annually. Production subsidies of 10% of an enterprise's capitalization will be provided up to a value of NT$25 million. The plan also offers research and development subsidies, up to NT$5 million annually for startup R&D and up to NT$10 million annually for R&D applied in production. Enterprises in these zones will also be permitted to utilize the *Statute for Upgrading Industries* (促進產業升級條例) to obtain tax deductions. Furthermore, they can also enjoy special financing and one-window service.

County and city governments will ultimately be responsible for inviting enterprises to set up in these zones and for the establishment, operation, and management of these zones. The EPA, aiming to encourage these local governments to apply for the establishment of these zones within their jurisdictions, will therefore provide subsidies for initial planning costs, zone infrastructure construction costs, and zone management costs based on the plans presented by these governments.

Administrator Hau, pointing out the serious idle land problem currently troubling many industrial parks in Taiwan, has stated that priority will be granted to the establishment of these environmental technology parks in existing industrial parks. This is intended to avoid the waste of land resources that would result from the establishment of these zones on unde-

veloped land. Taipei County, Taoyuan County, Changhua County, Tainan County, Tainan City, and Kaohsiung County have already expressed their desire to become the homes of these zones. Hau said that the EPA would establish the Environmental Technology Park Promotion and Guidance Committee in order to decide where these zones will be established.

The EPA says that a total of NT$30 billion will be provided for the promotion of these three environmental technology parks. The central government will supply funds of NT$5 billion, which will be used primarily for planning, construction, infrastructure projects, and subsidies for encouraging enterprises to set up in these zones. The remaining NT$25 billion will come from local governments and private investment. The EPA estimates that using this NT$30 billion to set up these zones will generate an annual production value of NT$35 billion from enterprises in these zones and cut waste handling costs by NT$2.5 billion per year. In addition to these economic payoffs, these zones are expected to use waste materials to generate energy and produce 2.5 million metric tons of products.

For more information, please call 02-2311-7722 ext. 2643.

Activities

2002 World Summit Response Strategy Conference Held

To jointly draft response strategies for the main issues discussed at the UN World Summit recently held in Johannesburg, the EPA invited domestic experts and specialists to a lecture conference held on August 9. The conference, which addressed the topics of eliminating poverty, the transfer of resources and technology, energy policy, water resource policy, and biodiversity, attracted close to 100 persons interested in environmental protection issues. Productive discussions were held with the main speakers.

Environmental Magicians Give Trash New Life

To encourage the public to apply their creativity to the reuse of recyclable waste, the EPA teamed up with the Juming Cultural and Educational Foundation and other organizations to hold the "Recycling is Magic." This event asked citizens to exercise their creativity by transforming the ordinary trash all around them into practical objects with real value. The contest selected a total of 30 award-winning works in elementary school, junior high/high school, and open sections. An award ceremony was held on August 6 at the Juming Museum of Art.

The first-place work in the junior high/high school section used an umbrella frame and other discarded items to make this rotating merry-go-round.

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