September 2019 | Vol. III Issue 3

Environmental Policy Quarterly

Environmental Protection Administration R. O. C. (Taiwan)

ISSN: 1811-4008 GPN: 2008600068
http://www.epa.gov.tw

Waste

Strengthening Industrial Waste Management

From industrial waste reduction in its early days to the recent reduction at source, the direction of industrial waste management in Taiwan has gradually incorporated new concepts such as sustainable materials management (SMM) and from-cradle-to-cradle (C2C). Through combining reuse and management of industrial wastes, the EPA will keep pushing for resource cycling and zero waste as Taiwan's long-term goals.

How it began

Waste management in Taiwan started with the promulgation of the *Waste Disposal Act* (廢棄物清理法) in 1974. When established in 1987, the EPA began to keep track of industrial waste production and set up a permit system concerning clearance and disposal organizations. As different industries were gradually placed under control, industrial waste treatment became a focal point for the EPA.

Beginning in 1990, the core policy has been to cut industrial waste generation by pushing for clean production technology, specifying recycling and reuse guidelines, opening up diverse reuse channels, and improving proper treatment technology. In recent years, the approach has shifted to reduction at source. Concepts like SMM and C2C have been introduced into Taiwan one after another.

Strengthening industrial waste management can be examined in two aspects: Strengthening management of the waste disposal system, and tracking industrial waste flows.

Strengthening management of the waste disposal system

(1) Strengthening management of clearance and disposal organizations

To effectively manage the operation of clearance and disposal organizations, the EPA forms inspection plans every year for waste clearance and disposal equipment and organizations currently in operation. Regional competent authorities are also encouraged to conduct regular onsite inspection to properly ascertain actual practices and operations at treatment organizations. Inspection mainly focuses on online registration and operation documentation, storage methods and facilities, treatment

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and operation maintenance, clearance of waste generated after treatment, product flows, and so on. Moreover, the EPA continues to assist enterprises in their applications for setting up waste disposal organizations. From 2016 to 2018, a total of 23 enterprises obtained clearance and disposal permission to improve their own waste disposal channels.

On 22 December 2018, the EPA announced revisions of the *Regulations Concerning Permisssions for Citizens' Waste Clearance and disposal* (公民廢棄物清除處理機構許可管理辦法) to improve the management system for waste clearance and disposal. One of the revision details is that disposal facilities are mandated to present their own standards for taking in waste, conduct tests on waste and products, and keep records on business, management, and operations. The aim is to keep track of products reutilized from treated waste so that waste can be properly cleared and disposed of. Clearance and disposal prices are required to be disclosed to the public in order to establish a pricing and market mechanism for waste clearance and disposal. Meanwhile, the EPA is requiring clearance and disposal organizations to join relevant associations based on the *Commercial Group Act* (商業團體法) to enhance coordination among associated enterprises and tighten links among competent authorities.

(2) Management of industrial waste categorized as industrial raw material

Waste paper and plastic have been announced as industrial raw materials since 2003. As 70% of industrial feedstocks are imported due to inadequate natural resources locally, suddenly stopping imports of industry-use materials would seriously impact industries that are unable to source needed materials in Taiwan. Therefore, the EPA has been focusing on management and planning to improve material quality, setting up importer data, and adding controls on registrations.

Opinions have been collected from all stakeholders and sectors in order to understand concerns around the environmental impacts brought by imported industry-use materials. The EPA also considered the implications of China's no-waste policy as part of its effort to tighten controls of imported materials and protect the recycling system in Taiwan as quickly as possible.

On 4 October 2018, the EPA announced the *Industrial Wastes Categorized As Industrial Raw Materials* (屬產業用料需求之事業廢棄物). The content included adjusted criteria for the importation of waste plastic and waste paper, specified import limits, and relevant quality controls.

(3) Enhancing at-source reduction of industrial waste and self-management

Since 2018, civil society groups in Taiwan have been gradually and voluntarily promoting the Green Deal, based on referencing concepts of the Netherland's Green Deal. The Alliance of a Circular Economy of Marine Waste Plastic, the Green E-Resource Alliance, and the Alliance of Circular Resources for Taiwan's Construction Industry have been set up. The purpose of these alliances targets the recycle and reuse of waste plastic, e-waste, wastes generated from construction and demolition, incinerator bottom ash, and slag. Various groups voluntarily promoted the signing of the Green Deal and now strive to create win-wins for the economy and environmental protection via cooperation with the public sector. The semiconductor industry has been assisted to recycle and reuse waste solutions and solvents, with work done at source management and sorting of solvents. Moreover, the industry has begun pushing for testing wastewater treatment plants located in industrial parks, and exploring the feasibility of using low-concentration waste isopropanol, which is only generated in the semiconductor industry, as a carbon source.

Regarding collection, clearance, disposal, and reuse of agricultural waste, the EPA has planned to establish a recycling, treatment, and reuse mechanism for waste orchard branches and other residual materials from agricultural production. Pingtung County's experiences in crushing, centralized storage and clearance and reuse of waste orchard branches, all commissioned, are greatly relied upon for reference. The practices have been promoted to municipalities, counties, cities, and townships that produce large amounts of waste orchard branches. The EPA also designated Pingtung County as a demonstration point and assisted the agricultural industry to voluntarily establish a circular system for recycling and reuse of

residual materials.

Tracking the flow of industrial waste

To better track the flow of industrial waste, the EPA announced the revised *Regulations Concerning Clearance and Transport Machinery Required to Be Equipped with Real-Time Tracking Systems* (應裝置即時追蹤系統之清運機具及其規定) on 17 August 2018. The list of clearance and transport vehicles required to install a real-time tracking system is now expanded to include those that clear and transport wastes like sludge, construction waste, and waste plastic. In addition, the EPA further required all clearance and transport vehicles with operation permissions to be equipped with such a system. The measure is expected to put all machinery and vehicles under control in four stages from 2019 to 2022. Additionally, the EPA will utilize new technology by including collision sensors and signals for power failures in vehicles and machinery specifications to increase stability and accuracy of vehicle track signals.

Future prospect

In the future, the EPA will continue to improve management of industrial waste reuse as it gradually works toward reaching Taiwan's goals of resources cycling and zero waste.

Waste Simultaneous Inspection Launched Nationwide Following Start of Ban on Single-use Plastic Straws

After a ban on single-use plastic straws took effect on 1 July 2019, inspections of the item were conducted in every county and city in Taiwan, which took place simultaneously at 1,138 sites on the first day. Two enterprises were found not compliant with the ban and subsequently received warnings. Nationwide implementation of the ban has generally gone well overall.

The *Targets and Implementation Methods of the Single-use Plastic Straw Ban* (一次用塑膠吸管限制使用對象及實施方式), announced by the EPA on 8 May 2019, requires roughly 8,000 enterprises in four categories, namely, the public sector; schools; department stores and shopping malls; and fast-food chain restaurants to stop providing single-use plastic straws for onsite dining. Before 30 June 2020, violators will receive warnings for breaking the ban for the first time, with fines ranging from NT$1,200 to NT$6,000 for breaking it a second time while showing no improvement. Before the ban officially took effect, the EPA formulated regulations concerning inspections and compiled lists of enterprises in the four categories as references for local governments to conduct inspections and awareness campaigns.

The EPA stated that since reducing marine waste is a pressing issue globally, it hoped more and more people would voluntarily answer the call to reduce waste at-source, in the face of increasingly severe environmental and ecological challenges. The main goal of the ban on single-use plastic straws that begun on 1 July 2019 is to implement phased controls and for the public to become less reliant on such straws. Citizens and enterprises can learn to adapt to such a measure starting with the first targets subject to the ban, which are onsite, indoor dining environments where use of single-use plastic straws is not necessary.

Waste EPA Promotes Recycling of Plastic Wrapping

To reduce plastic waste, the EPA promotes the recycling of plastic resources and has thus developed a platform for connecting both upstream and downstream enterprises, such as hypermarkets, logistics enterprises, as well as clearance and recycling organizations. This will allow for plastic wrapping with recycling value to become a reusable material. Initial assessments estimate that 1,700 metric tons of waste plastic wrapping can be recycled annually.

Hypermarkets and logistics enterprises use large amounts of plastic wrapping when transporting goods. The plastic wrapping is mixed with labels made of different materials along with tape and waterproofing materials that impact the sorting process. Once plastic wrapping is discarded, it is typically incinerated. The EPA has therefore created a platform to bring together upstream and downstream industries, including hypermarkets, logistics enterprises, and clearance and recycling organizations, in order to ensure that plastic wrapping with recycling value is reused as plastic feedstock material.

Hypermarket plastic wrapping tends to be made of a single material, and is thus easier to recycle.

The costs of recycling plastic bags and film are currently high due to the complexities of the material and the tendency of being contaminated with oil. However, plastic wrapping used in hypermarkets is made of a single material, most often polyethylene (PE), that is resistant to oil and other contaminants. It would be most effective to reclaim this resource if the disposed plastic could be sorted properly at its source. Presently, there are more than 150 hypermarkets in Taiwan that are estimated to produce 1,700 metric tons of waste plastic wrapping per year. The EPA has thus decided to prioritize hypermarkets as plastic wrapping recycling demonstration sites and to connect them with other enterprises for plastic wrapping recycling.

Once plastic wrapping is removed, sorted and then re-packaged, a clearance organization transports it to a recycling organization, which then sorts and breaks the material down further. After it is cleaned, dried and melted, it is turned into pellets. This process transforms the wrapping into recycled plastic feedstock material that can then be used to produce plastic bags, film, containers, and other products. As plastic wrapping recycling demonstration sites, hypermarkets must improve their processes of removing plastic wrapping. They must remove any labels or tape, and store the plastic separately. This entails enhanced employee training. Meanwhile, clearance enterprises can take into consideration the light weight of the plastic film, the puffy nature of the product, and the reasonable allocation of compactor trucks to save on the costs of shipping. Recycling enterprises can also have label-removing equipment remove labels and tape to increase the quality of the recycled material.

The EPA noted that through this demonstration plan and by encouraging more enterprises to follow through on their corporate social responsibility, the EPA will further promote plastic wrapping recycling by bringing in more hypermarkets and logistics enterprises to learn from the procedures at demonstration sites. This will further boost plastic resource recycling, by allowing more people to become familiar with Taiwan's plastic recycling technologies and join in the creation of a circular economy.

Environmenal Education

Taiwan-US Cooperation Steps Forward in International Environmental Education

The Ministry of Education and Chinese Society of Environmental Education (CSEE) in Taiwan both joined the Taiwan-US Environmental Education Task Force in 2019. The first meeting of the task force was held on 29 July. The meeting was attended by the USEPA, Japan's Ministry of the Environment, Taiwan's Ministry of Foreign Affairs and Ministry of Education, and NGOs.

It's been 25 years since Taiwan and the US signed the Environmental Protection Technology Cooperation Agreement in 1993. Over the years Taiwan has evolved from a learner and created its own path step by step. Since 2014, both countries have jointly promoted the Global Environmental Education Partnership (GEEP) and the Taiwan-US Eco Campus Partnership program. Years

Members of the Taiwan-US Environmental Education Task Force.

of endeavor have gradually shaped Taiwan into a leader in environmental education both in the Asia-Pacific region and the world.

The meeting was attended by the USEPA, Japan's Ministry of the Environment, Taiwan's Ministry of Foreign Affairs and Ministry of Education, North American Association for Environmental Education (NAAEE), National Wildlife Federation (NWF), Fairfax County Public Schools in the US State of Virginia, and CSEE. Not only were the achievements of the Environmental Education Task Force displayed, but the participants also discussed all possibilities of continuing collaboration between the US and Taiwan.

In the future, GEEP will first build a more tightknit environmental education network in the Asia-Pacific region. Aligned with this goal, the Taiwan EPA brought up in the meeting its mission of soon working with Taichung City Hall to set up GEEP's Asian center in Taichung. The center's purpose is to plan environmental education promotion in the Asia-Pacific region and communicate and coordinate promotion of international environmental education. As mentioned in GEEP's mission statement, a goal has to be large enough in order to be seen at all times, so Taiwan will always endeavor to work hard on the path to sustainable development.

Not only so, Japan's Ministry of the Environment came to the meeting as an observer to learn more about Taiwan-US joint collaboration to create opportunities for future multilateral collaboration and exchanges among Japan, the US, and Taiwan. And the American Institute in Taiwan also acknowledged the agreement as the most significant part of the bilateral collaboration between the US and Taiwan. Meanwhile, Taiwan will continue to look for opportunities to interact with the world. The Taiwan EPA aims to let environmental education take deeper root in Taiwan and keep up with developments in the international community, making Taiwan a key figure in the sustainable development of global environmental education.

Air

International Collaboration for Air Pollution Control Formed Under New Southbound Policy

The 2019 South & Southeast Asia -- Air Improvements in the Region (SSEA-AIR) Annual Meeting was held in Taipei from 29 July to 2 August. The meeting was jointly organized by the Taiwan EPA and the USEPA, and more than 30 government officials and experts in the field shared their experiences in air pollution control. Participating countries and organizations included Indonesia, Korea, Mongolia, Sri Lanka, Thailand, the Asian Development Bank (ADB), and the Asian Environmental Compliance and Enforcement Network (AECEN).

Through the help of the Asia Pacific Clean Air Partnership of the UN Environment Programme located in Bangkok, Thailand, a contingent from the USEPA visited Vietnam and Indonesia to gather information on the differences of air pollution control policies among various Asian countries. Moreover, the Taiwan EPA and the USEPA have also launched the new Air Quality Management (AQM) platform under the International Environmental Partnership to support the implementation of the SSEA-AIR. Most Southeast Asian countries have agreed that the three key parts of air pollution management

are: the establishment of air quality policies and standards, the control of transportation emissions, and the development of environmental monitoring and data management technology. In addition, most officials have expressed that they are facing similar environmental challenges. Therefore, the AQM will also serve as an important communication and collaboration network for the training of government officials and technical experts, especially for developing countries that are in their early or middle stage of development.

Taiwan has seen significant results in air quality improvement in the past 25 years. Additionally, since every city adopts different control strategies based on local air quality and pollution characteristics, Taiwan has gained a considerable amount of unique experiences in air pollution control to share with other Asian countries.

The main purpose of the meeting was to exchange experiences in air quality management. The meeting focused on topics that most Southeast Asian countries showed interest in due to their similar environmental and developmental background, including funding for air pollution improvement, mobile source pollution control, and pollution prevention equipment for factories. The Taiwan EPA also arranged on-site tours for the guests to demonstrate Taiwan's practice in roadside and random inspections of mobile sources and its achievements in air pollution reduction. After the meeting, the Taiwan EPA gave Vietnam 100 sets of air quality sensors to help establish environmental monitoring technology with lower costs.

The meeting laid the foundation for not only future cooperation with other Asian countries that will be mutually beneficial, but also the implementation of the SE Asian Quality Management Platform. By providing technical assistance and implementation experiences, the Taiwan EPA aims to achieve regional air quality improvement and promote local environmental education and green industry.

Air

Volatile Organic Compound Limits for Architectural and Industrial Maintenance Coatings Announced

On 13 August 2019, the EPA announced the *Volatile Organic Compound Content Limits for Architectural Coatings and Industrial Maintenance Coatings* (建物及工業維護塗料揮發性有機物成分標準). These regulations seek to reduce the usage of volatile organic compounds (VOCs) as part of the EPA's mission to safeguard the public's health.

Architectural and industrial maintenance coating products contain high concentrations of VOCs. It is often not possible to collect and treat these VOCs during coating processes. For a short period of time after the coating is applied, VOCs continue to be released, impacting air quality, working personnel and people in general.

The concentration limit of VOCs in three broad categories and five specific types

Category	Use	Adjust stickiness method	Concentration limit of VOCs
Category A	Coatings used for interior walls and ceilings (60o glossiness < 25 GU)	water-based solvent-based	must not exceed 50 (g/L)
Category B	Coating used for interior walls and ceilings (60o glossiness > 25 GU)	water-based solvent-based	must not exceed 100 (g/L)
Category C1	Exterior wall coating	water-based	must not exceed 100 (g/L)
Category C2	Opaque exterior wall coating	solvent-based	must not exceed 450 (g/L)
Category C3	Transparent exterior wall coating	solvent-based	must not exceed 600 (g/L)

Furthermore, according to the recently amended *Air Pollution Control Act*, chemical products that are manufactured, imported or sold containing the VOCs announced by the central competent authorities must meet the content limits for such VOCs. Thus, there is a need to enhance related controls on such products.

After considering other countries' experiences in controlling VOCs, the current state of manufacturing technology development, and the VOC content testing data of the coating products on the market, the EPA announced the *Volatile Organic Compound Content Limits for Architectural Coatings and Industrial Maintenance Coatings*. The restrictions put in place will be for coatings used in buildings and in maintaining industrial equipment, as these are stationary sources of pollution. The concentration limits are for the VOC content in the products sold on the domestic market. Coatings to be exported will not be affected.

The EPA emphasized that the targets of this draft include enterprises involved in the manufacturing, importation and sale of architectural and industrial maintenance coatings containing VOCs. The regulated coatings include three broad categories and five specific types. The categories are: coatings for interior walls and ceilings (category A/B) and exterior walls (category C). Labels for the diluting solvents and the solution ratios will be required to prevent the use of solvents from unknown sources and to determine the largest amounts of VOCs used in coating products.

Soil & Groundwater

Enhancing Soil Pollution Remediation and Related Technology Development

Speeding up soil pollution remediation and developing relevant technology is a vital part of the EPA's "A Sustainable Earth" policy. Under the *Soil and Groundwater Pollution Remediation Act* (土壤及地下水污染整治法), the policy consists of two major parts: "strengthening preventive control and conducting investigations of high pollution potential" and "speeding up remediation of pollution sites and enhancing remediation technology". As tasks under the policy are gradually implemented, soil and groundwater pollution sites can be cleaned up and taken off the control list, leading to improvement of overall environmental quality.

Strengthening preventive control and conducting investigations of high pollution potential

(1) Preventive control measures

Land owners and enterprises are supervised and urged to take the soil quality of the land they use seriously as well as clear up both pre- and post-operation responsibilities. In accordance with the *Soil and Groundwater Pollution Remediation Act*, announced enterprises are required to report soil pollution assessment investigations and testing data before land transfer, as well as establishing, changing, and closing business. There were a total of 7,921 voluntary reporting cases between 2005 and 31 July 2019. In the future, current relevant regulations will undergo evaluations on a rolling basis in order to increase the effects of voluntary controls.

To enhance regional control of soil and groundwater quality, competent authorities are responsible to regularly monitor pollution trends within their jurisdictions under the *Soil and Groundwater Pollution Remediation Act*. From 2011 to 31 August 2019, the monitoring rate reached 98.7% in all of the 158 designated industrial parks in Taiwan. A color signal control system is in place in industrial parks based on current testing status and control results. The latest result (in August 2019) showed red in five sites, orange in 13 sites, yellow in 24 sites, and green in 116 sites. The EPA will continue to promote the color signal control system, enhance warning and monitoring efficiency in industrial parks, speed up pollution improvement, strengthen systematic support services for decision making and analysis, and supervise all units to actively take up various projects.

Every year, the EPA holds two to three training seminars on sediment quality testing and reporting as well as sediment

reporting coordination meetings so as to supervise and help competent authorities conduct testing and reporting tasks. The purpose is to strengthen control of water body sediment quality, disclose testing data, and set up an Environmental Resource Open Data Platform for the public to look up testing data. It also assists competent authorities and agencies in charge of water body control to complete various reporting operations.

Between January 2014 to 31 August 2019, authorities of 473 sites, including 83 rivers, 91 lakes and reservoirs and 299 irrigation ditches have submitted sediment investigation and sampling plans for reference. The plan submission rate reached 100%. Among them, 90.7% have completed the inspections and submitted the reports for references.

For the 453 regional groundwater quality monitoring wells, monitoring is conducted regularly in order to get a grip on groundwater quality background in Taiwan. In 2018, a total of 750 samples were taken from monitoring wells and the testing results that met the *Groundwater Pollution Monitoring Standards* (地下水污染監測標準) (Category 2) was 92.3% on average.

(2) Investigation of high-polluting potential

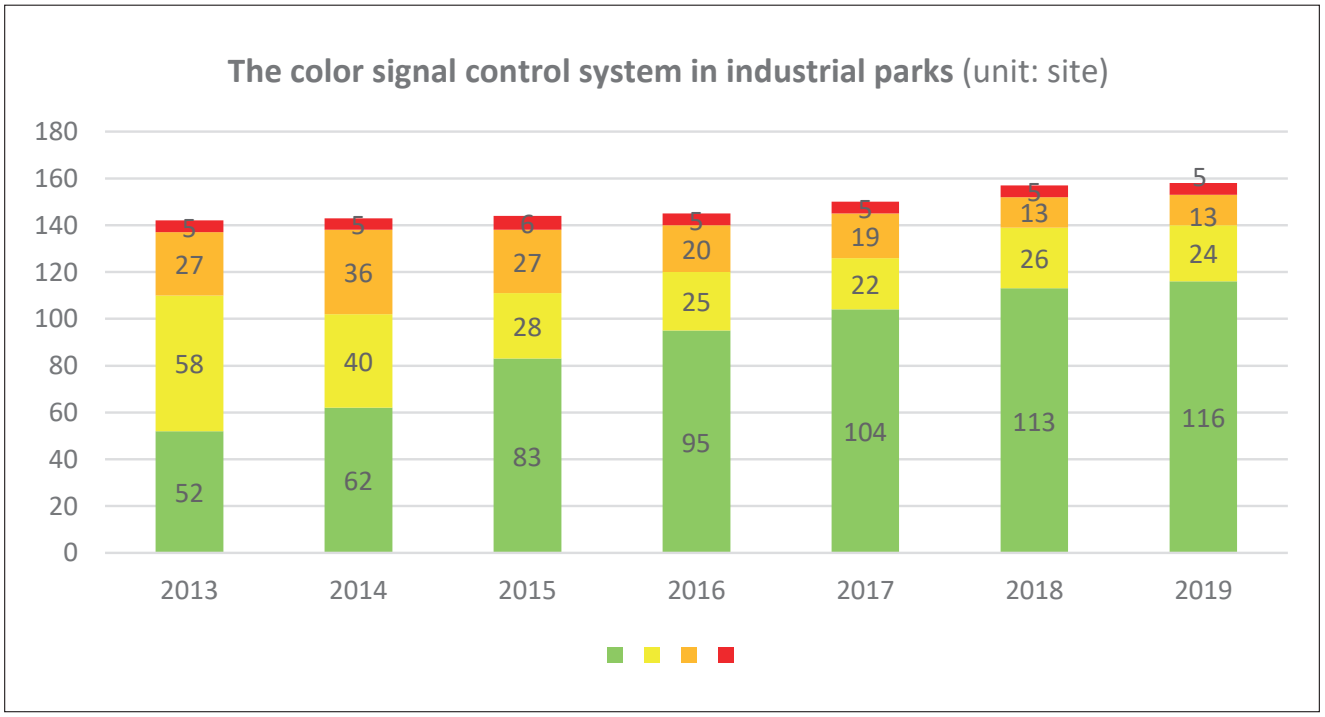
A. Enterprises

To enhance control of abandoned factories, the EPA has inspected and rated 504 enterprises as sites with high-polluting potential. Inspection was done on 359 of these enterprises between 2004 and August 2019, 157 of which were confirmed with pollution, or a detection rate of 44%. Currently, 98 enterprises have been removed from the regulatory list. The investigation of the rest 145 enterprises is expected to be completed in two years.

Furthermore, the EPA surveyed 943 enterprises and inspected 198 enterprises from 2008 to August 2019 for plants with high-polluting potential that are still in operation. The detection rate reached 62% as 122 of them were found to be polluted. To date, 29 enterprises are off the regulatory list. Onsite inspection at another 194 plants will continue and is expected to finish in three years.

B. Underground storage tank systems

To prevent underground storage tank systems from leakage, enterprises are required by law to self-monitor them on a regular basis before reporting to the local environmental agency. Targeting abnormalities in these reports, the EPA has continued inspection and



For the soil and groundwater pollution remediation network, color signals for pollution control in industrial parks are updated to effectively keep track of environmental quality and improvement status.

pollution investigations in order to prevent pollution. Inspections have been conducted since 2001 with a total of 3,524 station-times, leading to confirmation of pollution in 289 stations. A total of 224 stations have been removed from the regulatory list so far, and 65 stations on the list are currently undergoing remediation implemented by their respective enterprises.

Speeding up pollution-site remediation and enhancing remediation technology

(1) Promoting remediation on polluted sites

The EPA has set up site management plans, a mechanism to improve sites where remediation has halted, and a control system to oversee the entire operation. The aim is to hasten improvement of sites with soil and groundwater pollution and effectively increase remediation progress by keeping an eye closely on the status of site remediation. The use of the Soil Pollution Fund is maximized through taking inventory of polluted sites, keeping track of investigation information such as site history and current pollution status, evaluating new evidence, and assessing the needs for additional investigation.

As of 31 July 2019, a total of 8,680 sites had been put under control. As many as 5,724 sites had been removed from the regulatory list, leaving 2,956 sites that are currently under control, 2,515 of which are farmland (374 hectares) and 441 sites of enterprises.

(2) Enhancing remediation technology

A. Developing and testing new technology

Technologies suitable for pollution investigation and remediation in Taiwan have been developed and tested based on the features and remediation needs of polluted sites. It includes phyto-sensors, high-resolution site investigation technology, bio-remediation, and onsite smoldering remediation. The technologies developed are being tested on seven sites.

B. Promoting development and application of local technology

(i) Since 2010, the EPA has been promoting the 2019 Soil and Groundwater Pollution Remediation Funds-subsidized Research and Pilot Study Program. Research centers in universities in Taiwan (both national and private) as well as public and private research facilities are encouraged to investigate soil and groundwater and develop remediation and rehabilitation technology. The program also helps link remediation technology with those in need of it in order to speed up removal of polluted sites from the regulatory list. Up to December 2018, major results included 205 projects subsidized with NT$220 million, 129 research manuscripts submitted to international journals, 23 patents, five technology transfers, 43 instances of technology applied to polluted sites, and more than 800 soil and groundwater professionals trained.

(ii) In 2019, the EPA has kept on promoting the research and pilot study program, accepting applications between 31 August and 26 September 2018. Research units were welcomed to submit applications to develop technologies suitable for domestic needs. A two-stage review was carried out from October to December 2018. Twenty-eight applications were approved, which included 18 research projects and ten pilot study projects. The total subsidies amounted to NT$30 million.

(iii) For commercialized technology with great potential developed under the research and pilot study project above, the EPA has established a soil and groundwater pollution technology matching mechanism. A conference with 360 attendees was held in June 2019 to promote soil and groundwater remediation results and match available technologies to those in need of them. It aimed to strengthen local technical capacity, link up industries and academia, and enhance the potential for application of technology.

C. Introduction of advanced technology and related training

In 2018, Dr. James Landmeyer of the US Geological Survey and Dr. Song Jin of the University of Wyoming were invited to speak at seminars and staff training programs titled “Green Investigation Technology” and “Electrokinetic Remediation Technology”. A total of 413 people attended 13 training sessions. Soil and groundwater investigation and remediation technology in Taiwan were greatly enhanced through such training courses and case sharing.

Green Mark

Green Point Scheme Expands to Include Smile Logo-certified Products

EPA Minister Tzu-Chin Chang announced that MIT smile logo-accredited products are to be included in the green point redemption program starting from 1 September 2019. The green point scheme allows participants to earn and collect points by taking public transportation, renting public bikes, and taking part in environmental protection activities. The green points can be used in exchange for food, clothing, accommodation and transportation. For example, the points can be redeemed for products with the Green Mark certification, or entrance to environmental education facilities and national forest recreation areas. Points can also be used for purchasing green products or dining at green point partner restaurants.

Minister Chang announced that the EPA would be launching new incentives in September as part of the green point scheme to encourage public participation. Starting from September 2019, the EPA will hold weekly giveaway events to give out one million points to randomly selected participants. Also, purchasing specific items will be given 2000 extra points and purchasing MIT smile logo-accredited products on weekends can earn participants 10 times the number of points.

Both Minister Chang and Director General Jang-Hwa Leu of the Industrial Development Bureau of the Ministry of Economic Affairs urged retailers to support the green point program to stimulate green consumerism and a circular economy. The scheme also motivates manufacturers to obtain MIT smile logos, Green Mark certification, and carbon footprint labels.

Director General Leu also encouraged consumers to support the domestic products and take part in environmental protection by purchasing MIT smile logo products. The green point system recently expanded to include 814 MIT smile logo products (such as clothing, towels, shoes and small home appliances) and, with the existing green products, now consists of a total of 1,858 green products. The purpose of the green point scheme is to boost green business participation, support a circular economy, and promote green consumerism and sustainable lifestyles.

Individuals can redeem their green points in exchange for more than 1,000 available Green Mark-certified or eco-labelled products (including home appliances, household cleaners, thermos cups, stationery, food and groceries) through the following retailers: E-Life Mall Corporation, RT-Mart, Far Eastern A-Mart, Hilife, 7-Eleven, and ET Mall. The green point system has a total of 320,000 users who have accumulated more than five billion points.

To start earning points, individuals only need to create an account on the Green Point website or app and link up their smart cards or retail customer reward cards to their accounts. Points can also be acquired through shopping from a range of 1,000 eco-friendly products on the website. The green point redemption program is the best reward program in the market where points can be exchanged for up to 10% of discounts on products.

The EPA encourages everyone to download the Green Point app and sign up to enjoy the various benefits of the redemption program while practicing environmental protection in their daily lives. For more information, please go to its official website: https://www.greenpoint.org.tw/.

General Policy

EPA Celebrates Its 32nd Anniversary with Former Ministers

On 22 August 2019, the EPA marked the 32nd anniversary of its founding. To celebrate its birthday, the EPA held an event and invited former EPA ministers, deputy ministers, and all retired employees to share its accomplishments in environmental protection.

With the joint efforts of 16 former ministers and the entire EPA staff, environmental protection sprouted and has become deeply rooted in Taiwan's education system. On this special day, former ministers were invited to join the celebration and share their experiences in environmental protection over the past 32 years. Participating former ministers included: Eugene Chien, Larry L.G. Chen, Chu-Enn Chang, Stephen Shu-Hung Shen, Kuo-Yen Wei, and Ying-Yuan Lee.

The theme of the event was to honor the EPA staff's hard work and commitment in promoting environmental sustainability. Hence, to commemorate the EPA's growth over the past three decades and to show gratitude for the joint cooperation of the entire staff, the EPA made a large mosaic poster with thousands of images of current and past staff. The EPA also made special anniversary albums with photos of major environmental events throughout the last 32 years and gifted them to every former minister.

On 22 August 2019, the EPA hosted its former ministers and deputy ministers to celebrate past accomplishments.

In recent years, Taiwan has experienced significant improvement in both its environmental regulations and awareness. In the future, the EPA will continue working on resource reuse and recycling and striving for environmental sustainability. Through this event, the EPA also wished to show the public its determination and perseverance in environmental protection.

Air

Stricter Air Quality Standards Preannounced to Tackle Air Pollution

To further improve air quality in Taiwan, the EPA plans to tighten the air quality standards and lower the daily average PM_{10} limit to 100 μg/m^3, and the maximum one-hour average of SO_2 concentration to 0.075 ppm. In addition, the EPA will also impose stricter standards for NO_2 and lead.

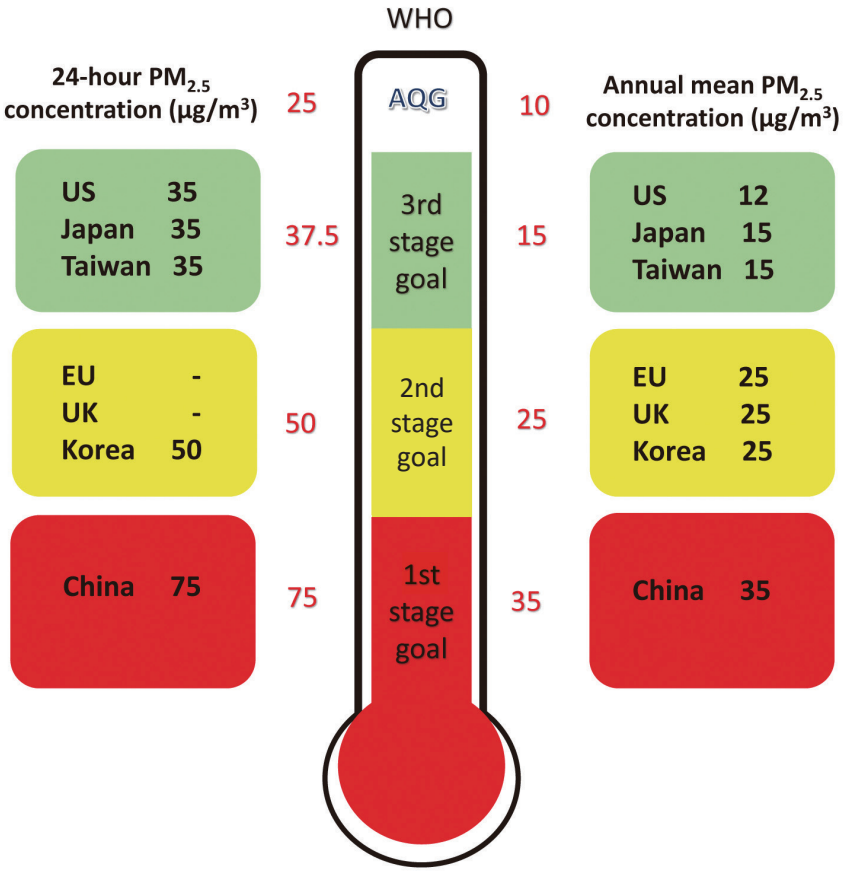
The *Air Quality Standards* were last amended on 14 May 2012, in which both the annual and 24-hour $PM_{2.5}$ concentrations were added to strengthen $PM_{2.5}$ control. To enhance air quality improvement, the EPA plans to lower the daily average PM_{10} limit from 125 μg/m^3 to 100 μg/m^3 and reduce the annual average limit from 65 μg/m^3 to 50 μg/m^3. Moreover, the EPA will lower the maximum one-hour average SO_2 concentration from 0.25 ppm to 0.075 ppm and the annual average concentration from 0.030 ppm to 0.020 ppm. As for the NO_2 standards, the maximum one-hour average NO_2 concentration will be brought down from 0.25 ppm to 0.1 ppm and the annual average from 0.050 ppm to 0.030 ppm. Lastly, the air quality standard for lead will be set at 0.15 μg/m^3 as a rolling three-month average concentration.

According to the air quality guidelines published by the World Health Organization (WHO) in 2005, the interim target values for the 24-hour $PM_{2.5}$ concentration and the annual mean $PM_{2.5}$ concentration are set at 25 μg/m^3 and 10 μg/m^3, respectively. The interim targets are provided to encourage air quality improvement and to reduce adverse health effects posed by $PM_{2.5}$ emissions. However, the WHO did not set a

fixed threshold for $PM_{2.5}$ and the interim target values provided are relatively lenient. Hence, the EPA won't change the air quality standards for $PM_{2.5}$.

The WHO suggested that national air quality standards should be set based on factors such as health risks caused by local air conditions, current pollution sources, technological feasibility, and social and economic development. The WHO also provided three interim target values for both the 24-hour $PM_{2.5}$ concentrations (75, 50, 37.5 $\mu g/m^3$) and the annual mean $PM_{2.5}$ concentrations (35, 25, 15 $\mu g/m^3$).

The US first established its $PM_{2.5}$ standards in 1997, which originally set the 24-hour concentration at 65 $\mu g/m^3$ and the annual mean concentration at 15 $\mu g/m^3$. The standards for the 24-hour concentration were then tightened to 35 $\mu g/m^3$ in 2006, and the annual standard was lowered to 12 $\mu g/m^3$ in 2012. Even though the annual standard finally dropped from 15 $\mu g/m^3$ to 12 $\mu g/m^3$ after 15 years of adjustments and efforts, most states were still unable to reach the tightened standard of 12 $\mu g/m^3$. South Korea started implementing an annual $PM_{2.5}$ standard of 25 $\mu g/m^3$ in 2015. Singapore currently does not maintain air quality standards for $PM_{2.5}$, but a goal of reaching an annual mean concentration of 12 $\mu g/m^3$ by 2020 has been set. Thus, Taiwan enforces stricter $PM_{2.5}$ standards compared to other Western and Asian countries.



From the *Clean Air Action Plan* promulgated in 2015 to the *Air Pollution Control Action Plan*, the EPA has shown its devotion to the control of $PM_{2.5}$ and its precursors. According to the data collected by manual monitoring devices, the annual average $PM_{2.5}$ concentration in 2017 was 17.5 $\mu g/m^3$, which was an improvement over the previous three years.

The WHO set three interim target values for both the 24-hour $PM_{2.5}$ concentrations and the annual mean $PM_{2.5}$ concentrations.

Environmental Policy Quarterly
R.O.C. (Taiwan)

Publisher
Tzi-Chin Chang, Minister

Editor-in-Chief
Shyn-Wei Chen

Executive Editors
Shiuan-Wu Chang; Yu-Ling Yang; Chun-Wei Yang; Shaowen Chang; Ken Lee; Jason Hoy

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行政院新聞局出版登記證局版北市誌字第1611號
中華郵政北台字第6128號執照登記為雜誌交寄