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Feature Article

Waste Reduction and Resource Recycling

To maximize resource recycling and minimize waste disposal, the EPA has been implementing waste reduction and resource recycling measures for both general or industrial wastes. Several ongoing waste reduction measures include source reduction of single-use plastics, plastic waste recycling and reuse, waste solar panel recycling and disposal, cellphone recycling, reuse of inorganic aggregate materials and fly ash.

Analysis of the current waste data in Taiwan has shown that total waste production in 2019 amounted to 29.45 million metric tons, 32.7% of which is general waste (9.64 million metric tons). Within the general waste, 56% were recycled (including 4.86 million metric tons of recyclables and 500,000 metric tons of food waste) and the rest was incinerated or landfilled.

In 2019, there were a total of 41,531 waste source enterprises in the EPA-announced industries, which reported a total of 19.81 million metric tons of waste output. Statistics on how these wastes were

processed show that 83.9% were reutilized (16.62 million metric tons), showing that resource recycling is the primary means to achieve waste reduction, and that the EPA's resource recycling policy is on the right track.

Resource recycling structure

To maximize resource recycling and minimize waste disposal, the EPA has drawn up an implementation structure based on the recycling of the four focused types of resources: organic biological resources, organic chemical resources, non-metal residual

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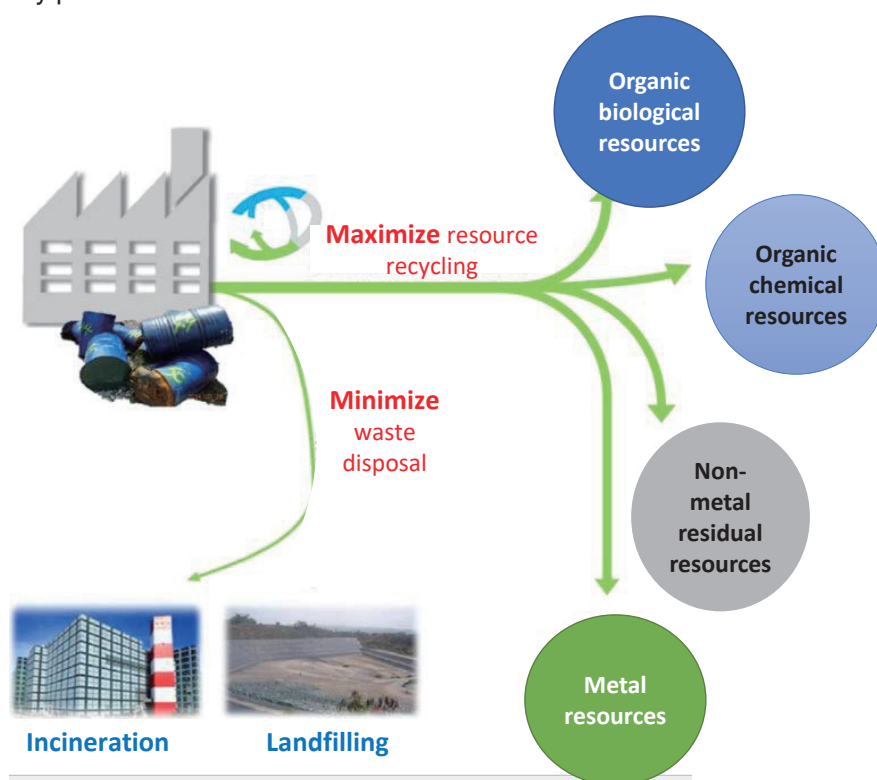
resources, and metal resources.

Marine plastic pollution has gained global attention in recent years. The statistics of past coastline cleanups in Taiwan also indicate that single-use plastics are the most commonly found waste items on beaches. In an effort to reduce marine plastic pollution, the EPA and environmental NGOs have jointly established the Marine Debris Management Platform and announced the *Taiwan Marine Debris Governance Action Plan*. The EPA also focused on the source reduction of single-use plastic products, and formulated implementation schedules to reduce the use of shopping bags, portable tableware, single-use take-out beverage cups and plastic straws in stages.

On 8 May 2019, the EPA announced 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), which requires the public sector, schools, department stores and shopping malls, and fast-food chain restaurants to cease providing single-use plastic straws from 1 July 2019. The aim was to introduce regulations that motivate enterprises to provide environment-friendly products.

On 8 August 2019, the EPA revised and announced *The Targets and Implementation Methods of the Disposable Utensil Ban* (免洗餐具限制使用對象及實施方式), which further prohibits department stores, shopping malls, and hypermarkets from providing disposable utensils made of any kind of materials at their venues where shoppers eat. The regulations also require local industry competent authorities to collect public opinions and propose to the central industry competent authorities the ban implementation dates of the respective industries. The bans will be announced and implemented after they are approved by the central industry competent authorities.

Taiwan is well-known in the world for its night market culture, which is also a focus area of the EPA. From 1 July 2020, the EPA began to work with county and city environmental bureaus and selected 22 night markets across Taiwan to be revamped into “plastic-reducing, low carbon, and clean” environment-friendly night markets. The revamping focused on six areas: single-use product reduction, recycling, low carbon and energy conservation, cooking smoke emission control, food-related wastewater treatment, and



△ The EPA's recycling structure

the cleaning of the market environment and public restrooms.

For plastic reduction, vendors are encouraged to switch to utensils that can be washed and reused, provide discounts for those who bring their own utensils, and sort garbage into recyclables, kitchen waste, and general waste. Low carbon measures include promotion of public transportation and switch to energy-conserving LED lights. Cleanliness measures include the installation of cooking smoke-control equipment and oil-water separation facilities, food-related wastewater discharge improvement, and the maintenance of the market environment and public restroom cleanliness.

In addition, the EPA collaborated with local governments to promote plastic shopping bag reuse, carry-out beverage cup or utensil rental pilot programs, and the reduced use of single-use products in large events. All these were designed to motivate the public to gradually change their habit of discard after a single use.

Moreover, to cut down on packaging wastes from online shopping, the EPA has been worked with industries, government agencies, academia, research institutes, and environmental organizations to formulate the *Online Shopping Packaging Reduction Guidelines* (網購包裝減量指引). To encourage voluntary reduction, the EPA has begun to certify online shopping platforms with the reduced packaging label. This ensures that the shipping of goods traded on these platforms will comply with the “reduced packaging, environment-friendly packaging material, or recycled packaging material” principles.

Resource recycling and reuse

(1) Enhancing plastic waste recycling and reuse

A. Promoting waste plastic wrapping recycling and reuse

Plastic wrapping used by hypermarkets and logistics enterprises is mostly made of polyethylene and is

resistant to oil and other contaminants. A platform has been set up to connect upstream and downstream enterprises to turn the wrapping into recycled plastic feedstock material. Currently, Carrefour has agreed to make its stores into demonstration sites for plastic wrapping recycling. Further tasks are underway to promote plastic wrapping recycling and reuse.

B. Promoting Bottle-to-Bottle Initiative

To be part of the global trend and enhance plastic resource recycling, the EPA has been promoting the Bottle-to-Bottle Initiative, which promotes the use of recycled plastic material in manufacturing non-food-use plastic containers. The EPA is targeting enterprises that manufacture non-food-use containers and assessing the use of economic incentives to encourage the gradual increase of the use of recycled plastic materials in manufacturing non-food-use containers.

C. Recycling and reuse of agricultural mulch films and fishing nets

The EPA has been working with the Council of Agriculture and the Fisheries Agency on the disposal of agricultural and fishing wastes (such as waste mulch films and fishing nets) that are not biodegradable. Agricultural and fishery authorities are responsible for assisting the production sources and setting up collection and recycling facilities, while the EPA helps to match the source enterprises with the back-end recycling and reuse enterprises. Current demonstration sites for mulch film recycling are Pingtung County (since July 2019) and Yuchi Township, Nantou County (since December 2019). Assistance is provided to farmers in cleaning and collecting waste mulch films, which are then sent to reuse facilities for processing. Once the whole mechanism can operate smoothly, it will be promoted in other counties and cities to enhance recycling.

(2) Promoting waste solar panel recycling and disposal

With the EPA's promotion and assistance to enterprises, a waste solar panel processing facility has been established and another one is being established in Taiwan. It is estimated that there will be four processing facilities by 2020. Should there be too many waste panels for domestic facilities to process in the short run, some panels could be shipped to facilities in Germany or Japan. Additionally, registration to dispose of waste panels has been open since October 2019. A total of 14 enterprises had set up accounts by December 2019, but no waste panels have been disposed of via the mechanism to date.

(3) Promoting cellphone recycling

The EPA has designated October of every year as Cellphone Recycling Month, and held the first Cellphone Recycling Month event in October 2019. A total of 23,000 cellphones were recycled during this event. This year the activities of Cellphone Recycling Month will be jointly planned by cellphone producers, cellphone retailers, and telecommunications companies under the guidance of the Taipei Computer Association.

(4) Turning flammable industrial wastes into solid recovered fuels (SRFs)

To raise resource use efficiency, the EPA has been promoting the use of flammable industrial wastes as fuels by turning flammable wastes such as waste plastics, fibers (clothing), or paper mixtures into solid recovered fuels (SRFs), which can be used in boilers.

The EPA also locates and encourages existing industrial boilers or cement kilns to use high-heating-value wastes such as plastics, rubbers, or SRFs as auxiliary or alternative fuels, and assists them with installation of special boilers or equipment.

(5) Promoting the reuse of inorganic aggregate materials and fly ash

The EPA has been promoting the reuse of inorganic aggregate materials in public construction projects and has formulated the quality and environmental use standards. Relevant construction guidelines and manuals for these materials have also been revised. In addition, the EPA has announced and promoted fly ash reutilization and management methods. After rinsing, fly ash can be used as alternative raw materials for cement, slagging agents in manufacturing steel, and acid-base neutralizers in high-temperature smelting. All these reutilization methods can divert fly ash from landfills and extend their lifespans.



▲ Single-use Product Source Reduction Promotion Website showing the results of promoting the reduction of different single-use products



▲ Representatives from civic groups and government agencies and experts took part and exchanged ideas in Youth and National Climate Change Forum

Climate Change

Youths Invited to Voice Their Climate Change Views

The “Youth and National Climate Change Forum” was organized by the EPA on 29 July 2020, where youth organizations such as the Taiwan Youth Climate Coalition were invited to discuss ideas on climate change mitigation and adaptation. Over 100 representatives from civic groups and government agencies and experts took part and exchanged ideas. In particular, young participants did not shy away from speaking out on the topic of fighting against climate change.

In his opening speech, EPA Deputy Minister Chih-hsiu Shen noted that both central and local governments have since 2015 formulated relevant guidelines and programs in accordance with the *Greenhouse Gas Reduction and Management Act* (溫室氣體減量及管理法) and other regulations. He added that the second phase (2021 - 2025) of greenhouse gas emission control goals for different sectors would also be launched this year.

In his opening presentation titled “Between Us and 2°C”, youth group representative Chien-yu Kei gave

suggestions on the mitigation and adaptation policies for the next stage. The suggestions included setting long-term reduction goals, establishing an open, transparent, and diverse communication mechanism, and strengthening connections between science, technology, and climate actions. Other advice included climate change-related capacity building in the public and private sectors, encouraging investment from the private sector, and setting up cross-departmental competent authorities. All these suggestions were based on the six governance elements of the UN’s Nationally Determined Contributions, which are

mitigation, adaptation, finance, technology, capacity building, and transparency.

Many scholars and experts who had long been involved in climate change issues were also invited to participate. Tzue-luen Lin, Vice Director of the Office of Energy and Carbon Reduction of the Executive Yuan, pointed out that Taiwan's youths have achieved excellent results in taking part in international climate actions, and that their experiences are expected to be passed on so that Taiwan's efforts can be seen by the world. Both Professor Chien-te Fan of National Tsing Hua University and Sophia Cheng, Chief Investment Officer of Cathay Finance Holdings, expressed that successful carbon reduction requires public consensus and that only with clear and practical support from the government can Taiwan achieve more ambitious reduction goals. Also, Professor Yu-ming Li of National Taipei University took the internationally used Science-Based Targets (SBTs) as an example and elaborated on the carbon reduction targets Taiwanese private enterprises have formulated and their outstanding achievements.

National Taiwan University Associate Professor Chirong Chiou mentioned that Taiwan's next mission is to systematically train climate change professionals who can later integrate their skills with the industries. Lastly, Director of International Climate Development Institute Gong-yue Chou and Managing Director of KPMG Sustainability Consulting Co. Niven Huang both noted that since climate policies across the world tend to influence each other and have common elements, governments need to focus on jointly tackling the effects and risks of climate change when carrying out policies.

The passion and creativity of Taiwanese young people were fully displayed when the representatives of the youth groups discussed global environmental issues from science-based angles and provided the government with new ideas for policy planning. As climate issues requires participation from all, the EPA will keep having dialogues with all sectors through the transparent dialogue mechanism provided by the Climate Talks website (<https://www.climatetalks.tw>), and strive together with others for Taiwan's sustainable development.

Air Quality

Old Vehicle Phase-out Achieves Outstanding Results

The EPA has since 2017 provided subsidies to expedite the phase-out of old diesel vehicles to reduce air pollution. By the end of June 2020, a total of 37,966 diesel vehicles of phases 1 to 3 had been replaced, resulting in cutting down 51,755 metric tons of pollutants. And with the subsidization program to phase out old motorcycles implemented since 2015, 1,230,947 motorcycles in total including two-stroke types had been replaced between June 2017 and June 2020. Such a measure has led to the reduction of 23,747 metric tons of pollutants. The combined result is equivalent to 1.3 times of Chiayi County's total air pollution emission in 2016.

The subsidy programs will continue to be implemented to encourage the replacement of old vehicles. For diesel vehicles, the policy is to lower the price of new vehicles and reduce owners' burden at the same time. Each diesel vehicle can receive a subsidy of up to NT\$1.05 million. The EPA says that replacing old motorcycles with new electric motorcycles or phase-7 gas ones can enjoy an early-bird subsidy of NT\$5,000 before the end of this year. Next year the subsidy will drop to NT\$3,000, the EPA advises.

Analysis of data from all traffic monitoring stations showed that PM_{2.5} concentration continued to go down year after year, dropping 28% between 2014 and 2019. Random inspections of diesel vehicles

conducted by the county and city environmental bureaus have revealed that noncompliance rate went down from 6.1% in 2014 to 4.2% in 2019. And regular motorcycle inspections showed that the average hydrocarbons (HCs) and carbon monoxide (CO) pollution were also going down gradually, dropping 76% and 36%, respectively. All these figures have shown that vehicle pollution emissions have been improving gradually over the years.

To cope with the impact brought by the coronavirus, the EPA, together with relevant enterprises, has postponed the subsidy deadline for replacing large diesel vehicles from 10 December 2020 to 10 December 2021. Additionally, the EPA also revised and announced the *Mobile Pollution Source Air*

Pollutant Emissions Standards (移動污染源空氣污染物排放標準) on 27 July 2020 to postpone the deadline by six months for manufacturing, producing, and importing phase 5 new gas and small diesel vehicles. All these were done to lessen the impact of the pandemic on the industry.

Many environmental groups have offered suggestions on subsidy schemes for both electric motorcycles and phase-7 gas motorcycles. Pollution emissions are 19.39g/km for phase-4 gas motorcycles, 0.12gg/km for phase-7 motorcycles, and 0.01g/kg for electric motorcycles. That means an impressive 99.38% or 99.95% pollution reduction can be achieved respectively by replacing phase-4 motorcycles with phase-7 or electric motorcycles. In addition, the government must take into account the insufficiency of charging stations and other infrastructures in remote areas and the poor performance of electric motorcycles when going uphill in mountainous areas to come up with a fair subsidy program. The EPA expressed that it would reevaluate these programs in

the future as they are only transitional policies.

The EPA pointed out that phase-7 gas motorcycles have much lower air pollutant emission than phase-6 ones but still perform as well in other aspects. Phase-7 motorcycles were originally scheduled to be launched on 1 January 2021, but at the government's request, the industry produced them earlier and phase-7 motorcycles were already on the market by the end of 2019. Currently, there are a total of 63 models produced by five Taiwanese brands which consumers can choose from.

The EPA pointed out that phase-out is not compulsory as vehicles can be used if they comply with the emission standards when they come out of the factory, but their pollution emission can still impact air quality and people's health. Therefore, the EPA will continue to implement the assistance and subsidy measures, and strengthen the inspection and control of high-polluting vehicles.

Soil & Groundwater

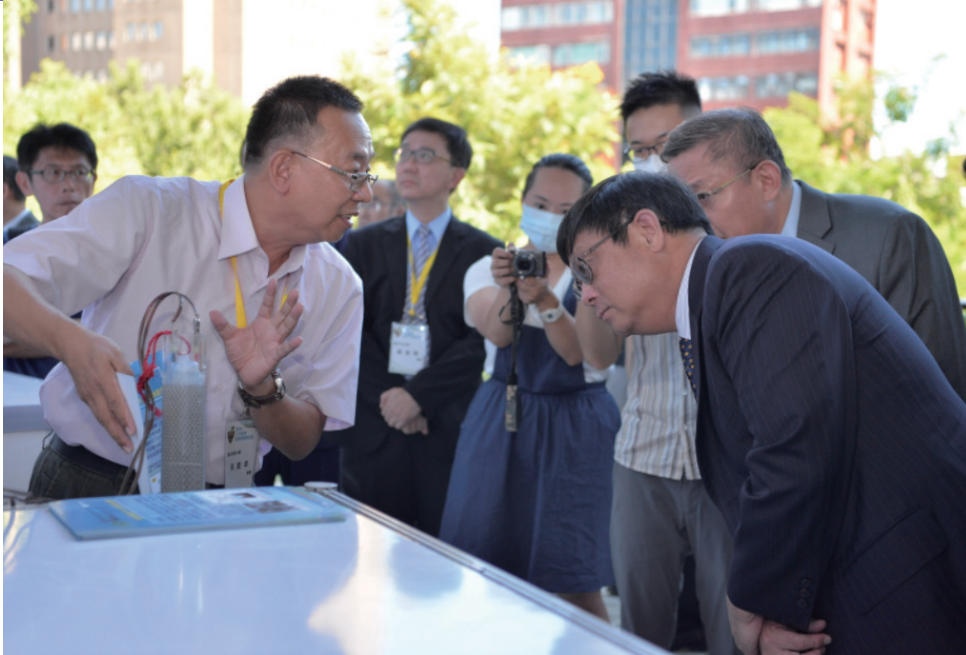
Industry-Academia Collaborative Exhibition Showcases New Remediation Technologies

To showcase new technologies and research results in soil and groundwater remediation, on 29 July the EPA held the 2020 Industry-Academia Collaborative Exhibition on Soil and Groundwater Remediation Technologies and Applications. During the event, scholars and experts in Taiwan introduced their latest research on soil and groundwater remediation and also shared their experience in industry-academia collaboration. The exhibition featured various technologies with a wide array of potential applications and attracted more than 200 attendees, including business leaders, experts in the field and students of the subject.

In his opening speech, EPA Minister Tzi-Chin Chang mentioned that soil and groundwater remediation gained attention late compared to other environmental issues such as air pollution, water pollution and waste management. Not until the cadmium-contaminated rice incident in 1987 and the subsequent RCA pollution incident did Taiwan start to make legislative changes. With the Soil and Groundwater Pollution Remediation Act promulgated in 2000, the EPA had the regulatory tool and mechanism to set pollution standards, and created the Soil and Groundwater Pollution Remediation Fund to carry out soil and groundwater pollution prevention and remediation work. After twenty years of hard work, it is now time to look back and reflect on achievements.

Minister Chang stated that back then the EPA implemented extensive surveys on farmland all over Taiwan and started to remediate contaminated areas. During these years, the EPA poured in countless effort which led to both successes and failures. The EPA's current goals are to complete the remediation work on all polluted farmland by the end of next year and focus on effective monitoring to prevent farmland pollution in the future.

Minister Chang disclosed that the EPA has invested NT\$290 million in promoting domestic academic research and development, and has completed 262 research and development projects on pollution remediation and investigation technologies, which have resulted in 23 patents and 5 proposals for



▲ Minister Chang views research and development results at a technology and equipment display at the exhibition.

technology transfer. These technological research achievements were estimated to have created NT\$203 million in annual profits and 230 to 350 jobs in total.

The exhibition offered an interactive platform for attendees to try out products or technologies presented in the six participating projects under three categories, which have all been tested successfully in pilot cases. Projects in the investigation tool category include the “nemesis of illegal discharge – time-lapse resin capsule” developed by National Taiwan University that promises to leave polluters nowhere to hide, and the “three-dimensional optical-fiber scanner” created by National Chiao Tung University that can scan and give a whole picture of the hydrological features of a site.

As for projects in the remediation solution category, National Sun Yat-sen University presented the “comprehensive pollution remediation agent”, an environmentally friendly and energy saving approach to soil remediation, while National Central University brought in the “local high-efficiency microbial inoculant”, an effective solution to treat chlorine-contaminated soil. Under the remediation device category, there were the “green electrolytic remediation device” developed by Kun Shan University and the “all-in-one solution and eco-friendly porous filtering material” developed by National Chung Hsing University. The “green electrolytic

remediation device” would be the foremost choice for those looking for an energy-saving groundwater remediation tool that delivers long-lasting results. The “all-in-one solution and eco-friendly porous filtering material” offers speedy and effective treatment for chlorine contaminated soil that can be later transformed into porous material.

Another highlight of the exhibition was the signing of a letter of intent and the sharing of the collaboration experiences by the four separate business-academia partnerships sponsored by the EPA. Nineteen top domestic experts in the field of soil and groundwater were also invited to present potential technologies, such as fast screening for arsenic in groundwater, biochar adsorption technologies, mechanical separation of oil-contaminated soil, and environmental forensic technologies. During the in-depth exchanges, participants were inspired to think beyond their fields to promote the application of the technologies.

The EPA expressed that it would continue to pay attention to the effectiveness of onsite application of the technologies, closely observe the development of soil and groundwater technologies in Taiwan, and help bring industry and academia together. In this way, the creative and collaborative energy of “Team Taiwan” can be fully realized to restore the clean soil and water of the nation.

Microbial Agents Promoted to Reduce Use of Chemical Fertilizers and Non-Point Source Pollution

In response to Europe's new green policy "Farm to Fork", the EPA is urging farmers to use environment-friendly pest control technology and cut down the use of agrochemicals and antibiotics. Not only will doing so help cut down on the cost, it will also increase the yields and profits, reduce water body pollution, and improve reservoir water quality.

The EPA explained that excessive use of agrochemicals is one of reasons non-point source pollution occurs in water bodies. Research shows that only 20-50% of spread fertilizers are absorbed by crops, while the rest causes soil deterioration. The leftover fertilizers are also washed by storms into water bodies and cause excessive growth of algae, upsetting the biological equilibrium in the water. Particularly, pollution from nutrients like nitrogen and phosphate can lead to eutrophication in reservoirs and water sources. Furthermore, insecticides and herbicides are toxic, either acutely or chronically, to aquatic organisms.

The EPA mentioned that agricultural non-point source pollution is mainly controlled through source control or structural best management practices (BMPs). Structural BMPs like manmade wetlands, grassed swales, and vegetated buffers, as well as multi-soil layering are able to intercept rainstorm water at the early stage and reduce the amount of fertilizers and pesticides that enter water bodies. However, source control, which involves reducing the use of fertilizers and pesticides or more reasonable use of them, is more effective. But farmers might worry that reducing fertilization lowers crop yield and be reluctant to take this approach. Therefore, promoting innovative green pest control technologies to encourage farmers to reduce the use of agrochemicals will not only lower the cost of fertilizers and pesticides, it will also increase crop yields and reduce water body pollution at the same time.

Microbial agents are more environment-friendly and able to increase soil absorption of both chemical and organic fertilizers, leading to more fertile soils and less dependency on chemical fertilizers. On 3 June 2011, the Council of Agriculture (COA) announced a list of Microorganisms Identified as Safe Microbial Fertilizer Species, based on which fertilizer enterprises are able to register microbial fertilizers. To date, 18 enterprises have registered 57 brands of microbial

fertilizers. Since 2017, microbial fertilizers have been covered by government subsidy programs, with up to NT\$5,000/acre. Moreover, the COA has been actively carrying out programs that utilize environment-friendly agricultural resources and commissioning relevant organizations to assist in promoting agricultural microorganisms such as photosynthetic bacteria.

There have been successful examples of organic farming utilizing microbial agents: lemons from Jen Shin Organic Farm, dragon fruits from Rainbow Jade Eco-Farm, guavas from Diving Coach Guava Farm, and wax apples from Chuan Chi Education and Leisure Farm. By mixing microbial agents with fertilizers, these farms have reduced fertilizer use by 32-88%, saved on the cost of fertilizers and pesticides by 29-88%, and produced higher quality crops with a 20-67% yield increase, all leading to much higher profits.

Annual use of chemical fertilizers in Taiwan roughly amounts to 1 million metric tons. With the successful experiences above, use of microbial agents in 30% of total farmlands can result in lowering use of fertilizers by 100,000 to 260,000 metric tons and saving on costs by NT\$950 million to NT\$2.47 billion. It will also greatly benefit the protection of water quality in water bodies and reservoirs. For instance, use of microbial agents in 80% of total farmlands can possibly turn the eutrophication status of Shihmen Reservoir from mesotrophic at the current moment to oligotrophic.

Responding to the call of Europe's new green policy "Farm to Fork", the EPA is striving to reduce the use of agrochemicals and antibiotics by continuing to develop green pest control technologies. The EPA will also collaborate with relevant organizations to encourage farmers to use less chemical fertilizers to reduce non-point source pollution and endeavor to establish an environment-friendly agriculture.

Chemicals

Laughing Gas to Be Listed as Concerned Substance by the End of October

To prevent teenagers from abusing laughing gas, the EPA announced on 20 July that “laughing gas” will be listed as the first “concerned chemical substance.” The EPA will work with the Ministry of Economic Affairs, the Ministry of Health and Welfare, and the National Police Agency to implement joint control. Activities that involve the manufacture, import and sale of laughing gas shall acquire prior permission, and all transactions shall be reported. In addition, online transactions of laughing gas will be banned. Relevant regulations are expected to be announced and in effect by the end of October 2020.

Nitrous oxide, also known as laughing gas, is normally used in the manufacturing of semiconductors, food production, and as an anesthetic. Due to its anesthetic and pain-relieving effects, the police have encountered several cases of substance abuse involving laughing gas among teenagers in places such as hotels and night clubs over the past few years. As directed by the Executive Yuan, to safeguard the health of adolescents, all relevant ministries are to evaluate current policies and work together to halt the misuse of laughing gas, particularly by teenagers.

The EPA pointed out that hitherto 98% of the laughing gas in Taiwan has been used for normal purposes, so the EPA will be focusing on tracking the flow and use of the other 2%. The EPA will be strengthening the management of laughing gas based on the “4 dos and 2 don’ts” principles: “do get permits, do label, do report every transaction online, do report every month, don’t sell or buy online, and don’t operate without permits.” To better track the flow of laughing gas, any activities involving laughing gas, including manufacture, import, export, sale, transport, use and storage, will require auditing and permits. The EPA also added that listing laughing gas as a concerned chemical substance will not affect the currently existing regulations that regulate its normal use. The listing is mainly to strengthen the tracking of laughing gas during the importing, manufacturing, and packaging processes, where the substance can be easily smuggled out of facilities. In addition, except for specific purposes

that are reviewed and approved, odorants must be added to laughing gas in the future to discourage its improper use.

For business operators who were already using laughing gas for industrial purposes before the announcement, regulations concerning recording, online reporting, monthly reports, and the online sales ban shall take effect immediately after the announcement. Business operators shall also acquire permits and finish labelling containers within six months of the announcement.

Laughing gas will be the first substance listed and regulated as a concerned chemical substance after the management of concerned chemical substances was covered in the *Toxic and Concerned Chemical Substances Control Act* of 16 January 2020. The EPA



▲ Laughing gas for industrial purposes should be labelled
“For industrial use only. Do not abuse.”

has formulated a series of management regulations after thorough evaluation and investigation.

After the official announcement, any illegal possession of laughing gas found in night clubs and hotels may be fined NT\$30,000 to NT\$300,000. If it causes adverse

effects on human health or death, violators may be subject to life imprisonment or more than 7 years of imprisonment and fines of up to NT\$10,000,000. To deter online transactions, people who sell laughing gas on an online trading platform may be subject to fines of between NT\$60,000 to NT\$300,000.

Chemicals

Cross-Departmental Cooperation for Strengthened Petrochemical Emergency Training

On 4 August 2020, the EPA held a ceremony for the opening of the office in charge of establishing the hazardous chemical emergency training site and for the groundbreaking of the new petrochemical disaster training facilities. The ceremony was jointly led by Yein-Rui Hsieh, Director General of the Toxic and Chemical Substances Bureau, and Wen-lung Chen, Director General of the National Fire Agency (NFA) of the Ministry of the Interior (MOI). Upon completion, the training facilities will significantly improve national preparedness for petrochemical disasters and strengthen the emergency management capacities of first responders in the petrochemical industry. To facilitate the establishment of the training site and enhance efficiency of cross-departmental cooperation, the National Fire Agency is providing the site for the training office which will be shared by employees from different departments.



▲ The groundbreaking ceremony of the new petrochemical disaster training facilities.

To increase the level of professionalism of first responders concerning petrochemical disasters and to strengthen their emergency management capabilities, the EPA and the MOI have collaborated to expand training facilities for petrochemical incidents. The MOI provided a site inside the NFA training center that spans 2.5 hectares, while the EPA invested roughly

NT\$48 million to install a leak/dispersion training simulator with equipment that replicates an operating refinery, next to the existing training facilities.

The leak/dispersion training simulator, which takes up approximately 600 square meters, will be installed inside the NFA training center located in Zhushan

Township of Nantou County. It includes four pieces of equipment that replicate processing units of a refinery with connecting pipelines. The simulator, which is estimated to be completed within 2020, is capable of mimicking malfunctions that result in scenarios such as gaseous leaks, dispersion of flammable liquids and resultant fires.

The EPA explained that since most of the raw materials used in the petrochemical industry contain substances that are highly flammable, explosive

and toxic, they can easily lead to industrial hazards such as fires, explosions or toxic gas release due to inadequate site management or improper handling. Once the leak training simulator is fully operational, it will be made available for business operators and personnel, emergency responders, and other governmental or international rescue service staff to use. The training simulator can help strengthen workplace safety and emergency response capacity, enhance disaster management, and minimize damage and casualties.

News Briefs

Amendments to the Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste Preannounced

Landfills are used in the final stage of waste disposal. To strengthen landfill management and reduce its environmental impacts to neighboring areas, the EPA has preannounced draft amendments to the *Methods and Facilities Standards for the Storage, Clearance and Disposal of Industrial Waste*.

The main focus of the amendments is to stipulate that landfill operators must monitor groundwater quality regularly and strengthen the management of the landfills after they cease to be filled. The amendments also require landfill operators to submit a restoration plan for closing the landfill, and implement landfill restoration, facility maintenance and various monitoring in accordance with the approved plan. In addition, the operators shall record the monitoring data and display the information on government websites for the purpose of data transparency.

Moreover, to simplify the manifest handling procedures for the transportation of hazardous industrial waste, provisions concerning online reporting have been added to provide enterprises more options and convenience. Regulations concerning the use of industrial waste for technological research or development purposes have also been added.

Noise Control Zone Delineation Operating Standards Amended

To safeguard public health and provide a peaceful environment, the EPA has amended the *Noise Control Zone Delineation Operating Standards* (hereinafter referred to as the Standards). The amendments added regulations governing the delineation of noise control zones for different types of land transportation systems and the requirement to follow the same standards in delineating buffer zones.

Land transportation systems can create noise that travels a long distance, sometimes even across cities, and can have serious impacts on the living conditions of nearby residents. Since the transmission path and characteristics of traffic noise are different from other general noise sources, it is necessary to set stricter standards for the delineation of traffic noise control zones. The Standards took effect on the day of the announcement. No changes need to be made to the original noise control zone delineation if it was determined before the announcement, but has not reached two years since the delineation. After two years, the local government shall review and delineate once again the noise control zones within its jurisdiction in accordance with the Standards.

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