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Preface

In this issue, in addition to the two feature articles from the July and August issues, other recent news in the third quarter of 2020 is included. In the area of air quality, the draft amendments of *Noise Control Zone Delineation Operation Standards* have come into effect. Furthermore, laughing gas will be regulated at the end of October 2020, which attracted public attention. Progress has also been made in the 2020 Taiwan AI Water Alarm Network and Green Traveling with Water Refill Map regarding water quality.

EIA

Improvement of EIA System in Taiwan

To implement its "sustainable generation" policy, the EPA strives to improve Taiwan's Environmental Impact Assessment (EIA) system in four areas: an exit mechanism for approved EIA cases, old EIA case processing guidelines, ensuring timely EIA reviews, and improving EIA supervision for better efficiency in law enforcement. All of the above are expected to open up a new chapter for the EIA system, which has been in operation for over three decades in Taiwan.

Aiming at the long-term benefits of national development and to ensure that equal importance is placed on both environmental protection and economic development, the *Environmental Impact Assessment Act* (環境影響評估法), promulgated in 1994, mandates that environmental considerations be included during the planning stage of projects, and prohibits violators from continuing their activities. The goal is to achieve sustainable development.

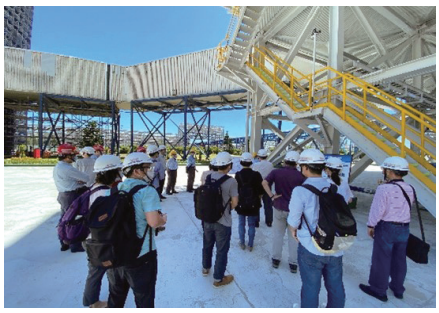
To this end, establishing a precise and efficient EIA system is the principal means to reach a "sustainable generation", one of the EPA's six policy focuses. Enhancing the functions of screening development activities and the credibility of EIA reviews are essential for an efficient EIA system. Measures that have been implemented or are currently being promoted by the EPA are as follows:

1. Exit mechanism for approved EIA cases

(1) Developers can submit exit requests: On 2 July 2015, the EPA issued a statement specifying that developers can apply for the annulment of EIA review conclusions according to the *Administrative Procedure Act* (行政程序法).

(2) Provisions for invalidation of administrative actions stated in review conclusions. According to

In This Issue

In 2019, the EPA implemented many project inspections including the Sixth Naphtha Cracker Project, and organized expert meetings (photo on the left), and onsite inspections (photo on the right)

Article 93 of the *Administrative Procedure Act*, the review conclusions shall include the following provisions: "if the development activities of the case have not started within 10 years after the announcement of the review conclusion, the review conclusion shall become null; the developer can extend the validity of the review conclusion once if the case is approved by the industry competent authority and passed on to the EPA; the extended period shall not be over five years." On 22 May 2019, the EPA sent a mandate concerning this regulation to Taiwan's local governments.

2. Old EIA case processing guidelines

(1) Strengthening inventory and control: For controversial large-scale projects that have obtained permits but have not initiated development activities for over three years, the competent authorities can, if they deem necessary and based on Article 16-1 of the *Environmental Impact Assessment Act* , request the developers to submit analyses of differences in environmental conditions and reviews of response measure reports.

(2) Measures based on Articles 18 and 23 of the *Environmental Impact Assessment Act*: For EIA-approved projects, competent authorities can, based on the regulations, require developers to submit environmental impact survey reports and response measures if there are environmental impacts that have not been predicted during the EIA or that have newly appeared. Such requests can be brought up multiple times depending on the particular environmental problems and until such problems are properly handled. Developers not complying with such requests are subject to penalties according to the *Environmental Impact Assessment Act*.

For controversial large-scale projects with no development activities for over ten years, the competent authorities can issue requests requiring developers to conduct environmental surveys in advance. They can, according to the *Environmental Impact Assessment Act*, further ask developers to submit environmental impact survey reports and response measures.

(3) After inventorying, 67 cases were listed as old EIA cases, which were subsequently audited in two phases in 2019. In the first phase, 19 projects that had been suspended (including controversial ones) were audited. In the second phase, 48 projects that had passed the EIA reviews but had not initiated development activities for over ten years and had not obtained permits from the industry competent authorities were audited. The audit results were:

A. Operations resumed: Five projects in total. The competent authorities continued to carry out EIA inspections.

B. Development activities discontinued: 13 projects in total. The developers had been urged to apply for review conclusion annulment as soon as possible. Also, the EPA conducted EIA inspections from time to time in order to urge developers to file applications to be taken off the EIA list. To date, the EPA has announced that review conclusions of two cases have been annulled.

C. Operations continued: 45 projects in total (including 13 projects whose operations were suspended). The developers deemed it necessary to continue development operations after review. EIA inspections will be conducted once a year to assess the development activities. Additional measures include:

(A) For the 13 projects whose operations were suspended, if the operations are resumed, the developers are required to regularly submit environmental impact survey reports in accordance with Article 18 of the *Environmental Impact Assessment Act*.

(B) For the eight projects that had passed the EIA for 10 to 15 years but had not obtained permits from the relevant industry competent authorities, should operations take place in the future, developers may be required to submit environmental impact survey reports based on environmental conditions in accordance with Article 18 of the *Environmental Impact Assessment Act*. Such environmental conditions include environmental impacts that have newly appeared or were not predicted due to insufficient assessment or investigation, such as air or water pollution or unforeseen impacts to the ecosystem.

(C) There were a total of 24 projects that had passed their EIAs but for over 15 years had not obtained any permits from competent authorities. The current environmental conditions surrounding these development sites might be different from those that were present when the original environmental impact surveys were conducted. If the developers resume or start operations in the future, they are to refer to the statement issued by the EPA on 22 May 2019, which states that review conclusions become ineffective for EIA-approved projects that have not begun operations for over ten years. The developers will then be ordered to regularly submit environmental impact survey reports in accordance with Article 18 of the *Environmental Impact Assessment Act*.

D. Developers dissolved: a total of four projects.

3. Ensuring timely EIA reviews

(1) The principle that the project groups shall hold a maximum of three preliminary review meetings to enhance rectification quality and review efficiency was implemented.

(2) Opinion-gathering meetings and onsite observations were carried out. The EIA committee's project groups went to development sites to conduct onsite observations and hold meetings to fully gather opinions from local residents and civic organizations. The responses of the developers to these opinions were listed and supervised by the EPA.

(3) The *2018-2019 EIA Technology Consulting Organizations Evaluation Plan* was implemented to establish an objective and differentiating EIA survey system, enhancing the quality of EIA documents.

4. Improving EIA supervision to increase efficiency in law enforcement

During 2019, the EPA conducted EIA inspections by listing EIA cases in different inspection categories, setting up a reporting system, implementing project inspection committees, and organizing expert meetings. Besides employing sounding rockets and other technology for air quality assessment, the EPA held seminars on EIA regulations and operations to inspect and urge developers to adhere to their EIA commitments, and improve professional capabilities and two-way communications. The purpose was to enhance the overall EIA system, and urge developers to properly carry out what is stated in the EIA documents and review conclusions, elevating efficiency in EIA inspections and law enforcement.

Air Quality

Maximum Fine for Tampering with Monitoring Data Increased to NT$20 Million

On 10 June 2020, the EPA announced the revised and renamed *Fine Determination Criteria for Stationary Sources in Private and Public Premises that Violate the Air Pollution Control Act* (公私場所固定污染源違反空氣污染防制法應處罰鍰額度裁罰準則). Depending on the severity of the impacts, penalties are raised for future *Air Pollution Control Act* violators involved in the following acts: emitting hazardous air pollutants, intensifying air pollution during air quality deterioration periods or in regions with poor air quality, and other malevolent acts such as nighttime violations, weekend and holiday emissions exceeding limits, rerouting and illegal discharges, and providing false information.

The *Fine Determination Criteria* is the basis that local environmental authorities use to determine the amount of fines. The amendment was based on the revised *Air Pollution Control Act* (空氣污染

防制法) announced on 1 August 2018, which greatly increased the maximum fine for severe violations, such as tampering with monitoring data, from NT$1 million to NT$20 million. In addition to administrative penalties such as fines, suspension of operations, and termination of business, illegal gains will also be confiscated, and criminal penalties are in place for some major violations. Meanwhile, the lower limit of fines is lowered for minor violations. For example, the minimum fine for open-air burning and other individual behaviors was lowered from NT$5,000 to NT$1,200. This was to ensure that penalties are proportionate to the severity of violations.

The EPA pointed out that this revision particularly targets the deliberate tampering with data of continuous emission monitoring systems (CEMS) for stationary emissions, allowing the maximum fine to be imposed in order to deter deception. There have been incidents in which enterprises tampered with CEMS data capturing programs, leading to false monitoring data being reported to competent authorities. Previously, according to the results from the fine calculation formula, competent authorities could only impose a maximum fine of NT$300,000, which was thought to be too light. From now on, competent authorities can directly impose the maximum fine of NT$20 million for such violations.

The amendment also increased the penalties for violations concerning discharge of hazardous air pollutants. In addition, "impact level" was added as a factor in fine calculation, and the weights of penalty factors are to be adjusted according to the severity of the violation. Harsher penalties will be imposed in the future for refusing to cooperate with the implementation of emergency response measures during air quality deterioration periods, or operating pollution sources without first applying for permits in accordance with regulations.

In addition, newly added stipulations specify the determining factors that can be used to adjust penalties based on individual cases. Circumstances deserving heavier penalties include nighttime, weekend, or holiday violations, noncompliance with suspension or shutdown orders, and violations in regions of poor air quality. On the other hand, penalties can be lessened for procedural violations not involving pollutant discharges, or circumstances such as first violation in three years, or behavior such as cooperating during inspection, or proactively reporting and improving a problem.

Noise Control

Draft Amendments of Noise Control Zone Delineation Operation Standards Preannounced

After conducting an overall review and adjustment of noise control zone delineation guidelines of the *Noise Control Act* (噪音管制法) currently used by local governments and taking recent operating experiences and pubic opinions into account, the EPA preannounced the draft amendments of *Noise Control Zone Delineation Operation Standards* (噪音管制區劃定作業準則) to ensure peace and quiet in people's living environments. The draft amendments mostly tighten control and serve as standards for local governments to follow when delineating noise control zones. They will also help improve people's living quality.

The *Noise Control Zone Delineation Operation Standards* has remained the same with no content reviews since its promulgation on 4 September 2009. Thanks to the *National Regional Plan* (全國區域計畫) announced by the Ministry of the Interior and the *National Spatial Plan* (全國國土計畫) revised by the Executive Yuan, no areas in Taiwan now are left out of urban or regional planning. Therefore, Article 5 of the *Operation Standards* must be revised accordingly.

Moreover, to implement Article 7 of the *Noise Control Act*, competent authorities in special municipalities, counties, and cities have begun to designate all types of noise control zones, but the guidelines of the current *Operation Standards* are no longer sufficient. In some cases, a residential area was designated to more than one noise control zone, thus a review is indeed necessary to solve such an unreasonable phenomenon.

The EPA mentioned that,

even though the *Operation Standards* already provide local governments with guidelines for designating noise control zones, reevaluation and revisions are needed due to many situations that are unreasonable or have become public concerns. With the transportation infrastructure and new construction projects being completed in recent years, local governments often set different buffer distances alongside the traffic systems, split the same construction base into different noise control zones, or designate traffic land as a Class 3 noise control zone, which is used for residential and commercial purposes.

The EPA noted that ensuring a quiet living environment for people was the main focus of the revisions. In addition to clarifying the principles for delineating general noise control zones, for completed construction bases other than highways, express ways, railroads, high speed rails and other land-based traffic systems, the revised *Operation Standards* specify that local governments shall strive to treat individual construction bases as a whole when delineating noise control zones. Should a construction base simultaneously fall under different noise control zones, the zone with the stricter noise limits should be the designated zone.

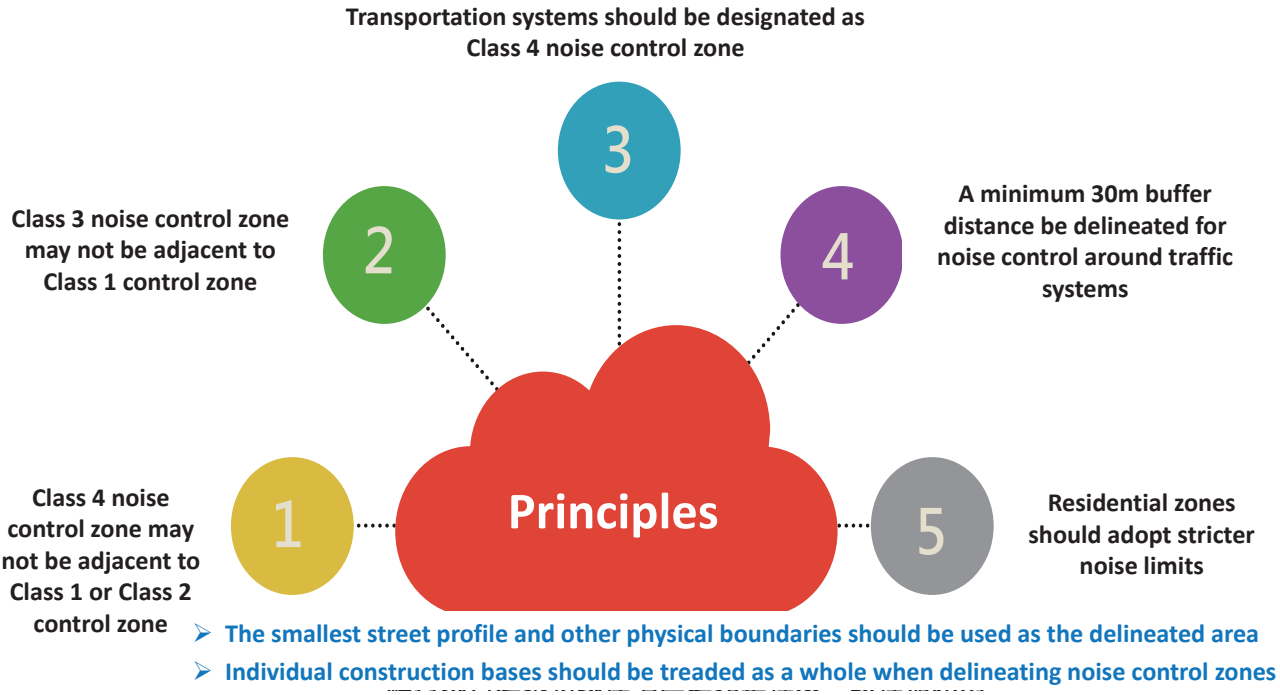


Figure: Guidelines for delineating noise control zones

Waste Management

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 milliion metric tons, 32.7% of which is general waste (9.64 million metric tons). Within the general waste, 56% was 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

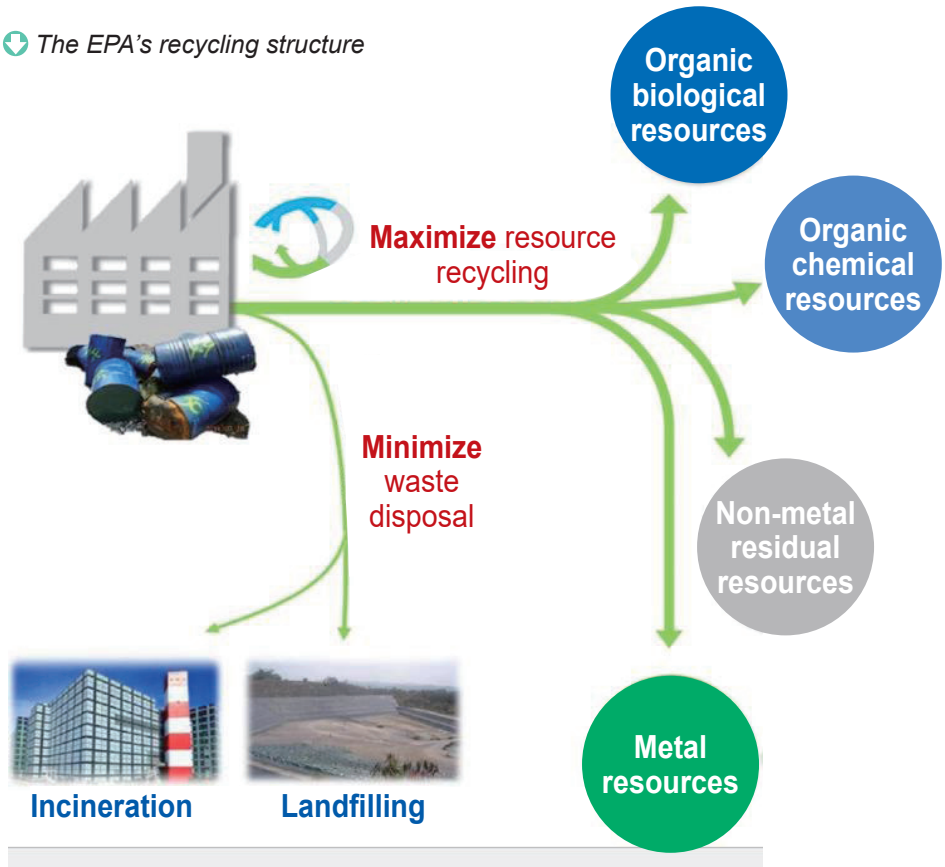
To maximize resource recycling and minimize waste disposal, the EPA has drawn up an implementation structure based on the recycling of the four focused types of resources: organic biological resources, organic chemical resources, non-metal residual resources, and metal resources.

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 implemention 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 EPA's recycling structure



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 "low plastic, low carbon, and clean" environment-friendly night markets. The revamping focused on six areas: reduction of single-use products, recycling, low carbon and energy conservation, cooking smoke emission control, food-related wastewater treatment, and 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 switching 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 at large events. All these were designed to motivate the public to gradually change their habit of discarding items after a single use.

Moreover, to cut down on packaging wastes from online shopping, the EPA has been working 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 the 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 relevant 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.

Chemicals

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

To prevent adolescents from abusing laughing gas, the EPA announced on 20 July 2020 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 anasthetic. Due to its anesthetic and pain-relieving effects, the police have encountered several cases of substance abuse involving laughing gas among adolescents 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 adolescents.

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 for industrial purposes should be labelled "For industrial use only. Do not abuse."

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 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.

Environmental Management

First Livestock Farm in the Country to Complete Carbon Offset Program Registration

In addition to being made into fertilizers, pig excrement can be used to generate power that can be exchanged for carbon credits. Hanbao Livestock Farm in Fangyuan Township, Chunghwa County has about 40,000 pigs. It treats its pig excrement via anaerobic fermentation and uses the biogas produced from the treatment process to generate electricity. It also installed solar panels on the roofs of pig sheds to generate energy. The farm applied to register for the EPA's greenhouse gas (GHG) offset program. It completed registration on 20 March 2020 and became the first livestock farm in Taiwan that successfully registered for the voluntary GHG offset program. Its annual GHG reduction is expected to reach 27,541 metric tons of CO_2e, and its total carbon credits over the seven-year-long program is estimated to amount to 192,787 metric tons of CO_2e.

The EPA said that currently most of the pig excrement goes through three stages of treatment: solid-liquid separation, anaerobic fermentation, and aerobic aeration. Among these stages, aerobic aeration requires tremendous amount of electricity, and the anaerobic fermentation generates biogas which is rich in methane, a substance with a global warming potential 21 times higher than carbon dioxide. Therefore, livestock wastewater treatment processes generate massive amounts of GHG and cause severe impact on the global climate.

Hanbao Farm generates roughly 1,810 metric tons of livestock excrement every day. It collects the biogas generated from the anaerobic fermentation and removes the sulfides before using the biogas to generate electricity, reaping double carbon reduction benefits. Reduction of fugitive methane results in lower GHG emission equivalent to 23,900 metric tons of CO_2, and using the collected methane instead of fossil fuels for power generation further reduces the GHG emission equivalent to 1,930 metric tons of CO_2. The farm also installed solar panels on the expansive roofs of pig sheds to generate green energy, further cutting down emissions by 1,800 metric tons of COe.

The *Greenhouse Gas Offset Program Management Regulations* (溫室氣體抵換專案管理辦法) was formulated by the EPA to encourage enterprises to adopt reduction measures. Enterprises can apply to register for a GHG offset program with their emission reduction proposals. After the registration is approved, they can further apply for GHG reduction credits based on actual reductions. With measures like collecting biogas for energy generation and solar power in place, Hanbao Farm was able to apply to implement a GHG offset program, which was reviewed and approved. After the registration was completed, the farm has become the first livestock farm in Taiwan that has completed a GHG offset program registration, and is now qualified to apply for reduction credits.

Livestock excrement can go through anaerobic fermentation to produce digestate sediment and fluid, which can be used to fertilize farmland instead of being discharged directly into surface water bodies. Thus not only can river pollution be reduced, the digestate sediment and fluid, which are rich in nitrogen and phosphate and more soil-friendly than chemical fertilizers, can also replace chemical fertilizers and hence help to reduce soil acidification and increase production yields and quality. Every year Hanbao Farm sends its roughly 10,000 metric tons of digestate sediment and fluid via irrigation pipes to fertilize 4.17 hectares of foxtail grass farms. Foxtail grass is a main crop for herbivore livestock like cattle and sheep and is also one of the best fiber supplements for pigs. Moreover, Hanbao Farm treats its solid excrement left behind after solid and liquid separation via aerobic aeration indoors instead of by anaerobic fermentation outdoors. This also lowers the chance of methane escaping into the air and is expected to achieve an annual carbon reduction of 3,158 metric tons of CO_2e. The farm has applied for GHG offset program registration for this practice.

Environmental Monitoring

Central and Local Governments Jointly Launch 2020 Taiwan AI Water Alarm Network

The "2020 Taiwan AI Water Alarm Network" launch event was held in Hsinchu City on 17 August 2020, featuring the official announcement of five types of water quality sensor components and three kinds of (fixed, mobile and handheld) water quality sensors. During the event, the EPA gave 400 sensors to 13 different city/county governments to jointly establish the water quality sensing IoT (Internet of Things) network in Taiwan.

To overcome limitations of the traditional manual sampling method, the AI water alarm network deploys water quality sensors that monitor the pH value, conductivity, temperature and dissolved oxygen level in rivers or other water bodies every minute. The sensors are combined with a GPS system and artificial intelligence (AI) to monitor changes in water quality at different times and places. Through

the network, the EPA aims to reach the goals of smart environmental enforcement, promoting environmental education, and stimulating IoT applications across different industries.

During the trial period of the past four months, the water alarm network detected 17 cases of abnormal activities in three different cities/counties. Two of the cases are under investigation by district prosecutor offices and their illegal gains are being confiscated. This shows how water quality sensors can be very useful for cracking down on unscrupulous enterprises and detecting pollution. The EPA has been working with 13 cities/counties to install water quality sensors in areas that are frequently reported or crowded with regulated factories, so as to expand the applications of IoT in law enforcement and implement 24-hour continuous monitoring. The network can detect targeted pollution and intelligently dispatch personnel to investigate and deal with it.

The EPA pointed out that in addition to smart environmental inspections, with the era of 5G upon us, the sensors can also be used by academia to promote environmental education, research water body ecology or assist with other courses. The handheld water quality sensors developed by the EPA are inexpensive to manufacture, easy to use, and can be connected to mobile devices. They can also become useful tools to encourage river patrol squad members to participate in patrols, inspections, pollution reporting and debris cleaning, thus further enabling joint cooperation between government and the public for protection of water bodies.

The EPA launched the "2020 Taiwan AI Water Alarm Network" in Hsinchu on 17 August 2020

Water Quality EPA Promotes Green Traveling with Water Refill Map

To encourage citizens to reduce plastic use while traveling and support sustainable tourism, the EPA held the "Bring Your Own Water Bottle to Penghu Fireworks Festival – Travel Green on Gaillardia Island" press conference on 24 August 2020 at Penghu County Government Hall. During the press conference, the EPA recommended that travelers take advantage of the drinking fountains and smart recycling bins on the island as a way to go green while travelling. Travelers were also advised to bring their own toiletries and reusable tableware, and travel in the most environmentally friendly way to protect the natural resources on the outlying island.

The EPA has been implementing the Plastic-Free and Low-Carbon Island Demonstration Project on Xiaoliuqiu, Pingtung County since 2018, and it has produced significant results. With tourists bringing their own water bottles, and assuming each bottle has a 600 ml capacity, roughly 400,000 plastic bottles have been prevented from being wasted over the past two years. Duplicating the experience of implementing the drinking fountain project in Xiaoliuqiu, the EPA cooperated with Penghu County Government this year to install 15 drinking fountains at 13 sightseeing spots. It also worked with private companies to include the locations of these drinking fountains in the Water Refill Map app to provide tourists with a convenient way to stay hydrated during travel.

Marine debris near Penghu County has always been an issue of public concern. Thanks to all the beach cleanups the Penghu County Government has held, the beauty of Penghu coastlines has been well kept. In addition to the subsidies provided to the Penghu County Government for the installation of 15 drinking fountains this year, the EPA also subsidized the installation of five smart recycling bins to offer more recycling channels for tourists to discard their plastic bottles and cups. These policies are to encourage tourists to practice the "eat local, play local and protect local" green lifestyle principles while travelling. Penghu attracts a large number of tourists with its naturally blessed basalt landscape and everchanging international festivals. Hence, the EPA stresses that Penghu's rare environmental makeup and natural resources should be properly protected by everyone.

To encourage the public to take advantage of the drinking fountains, the EPA has launched the "Island jumping with your water bottles" promotion program this year. Travelers can use their cellphones to scan a QR code while visiting Xiaoliuqiu and Penghu and find the drinking fountains onsite. They will receive 1,000 green points with the use of each fountain and can receive up to 25,000 points.

The EPA cooperated with the Penghu County Government this year to install 15 drinking fountains at 13 sightseeing spots.

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