Major Environmental Policies

September 2021

1. Prevention and Management of Soil and Groundwater Pollution

With ongoing development and economic change, Taiwanese are facing more serious environmental loads. Insufficient waste treatment facilities and lack of final treatment plants contribute to soil and groundwater pollution derived from arbitrary disposal of hazardous industrial wastes. To solve this problem the government and the public urgently need to work together. This article summarizes the achievements of recent local groundwater pollution prevention work and ongoing major tasks in 2021.

In accordance with the National Environmental Protection Plan, groundwater remediation work aims to improve the groundwater protection system, and strengthen and improve groundwater quality monitoring. In accordance with the *Soil and Groundwater Pollution Remediation Act* (土壤及地下水污染整治法), the main focus at present is to regulate the remediation and control of areas with contaminated groundwater. Recent outcomes of groundwater management are as follows:

I. Recent Achievements

1. Groundwater management measures

The EPA conducted regular groundwater quality monitoring by tracking background quality of groundwater at 455 local groundwater monitoring wells. To date in 2021, an average of 90.8% of the monitoring samples met Category 2 groundwater pollution monitoring standards. Items such as total hardness, total dissolved solids, chloride salts, nitrate nitrogen, sulfates, total organic carbon, total phenols, fluoride salts, arsenic, cadmium, chromium, copper, lead, zinc, mercury, nickel, and volatile organic compounds did not exceed monitoring standards. More than 85% of the monitoring samples met Category 2 groundwater pollution monitoring standards. However, qualification rates for some items were lower: ammonia nitrogen was 42.2%, iron was 74.4%, and manganese was 58.4%.

Prevention of groundwater pollution in industrial zones:

According to statistics for the period 2017 to the end of August 2020, 164 industrial zones nationwide have been compiled and declared. The latest industrial-zone “light signal” color-code classification included five red lights, 13 orange lights, 27 yellow lights, and 121 green lights. The proportion of “green light” industrial zones has gradually increased from 69% to 74%; in other words, industrial zones classified as red, orange or yellow light zones have improved year by year, with the total proportion falling from 31% to 26%.

2. Farmland pollution prevention measures

The EPA established potential farmland pollution zones and planned preventive actions as follows:

(1) Medium and High Potential Zones

A. Information is being integrated on farmland pollution and potential pollution sources to provide feedback for early warning models and to strengthen early warning operations.

B. Soils are being intelligently monitored in pollution hotspots through IoT (the Internet of Things), monitoring real-time water quality; sample testing sediments in irrigation ditches; systematically monitoring places where pollution accumulates in irrigation committee districts; using scientific instruments such as resin capsules, water quality sensors, and automated water quality monitoring sampling and analysis instruments.

C. Developing tools to quantitatively measure irrigation water pollution on farmland so as to strengthen preventive measures.

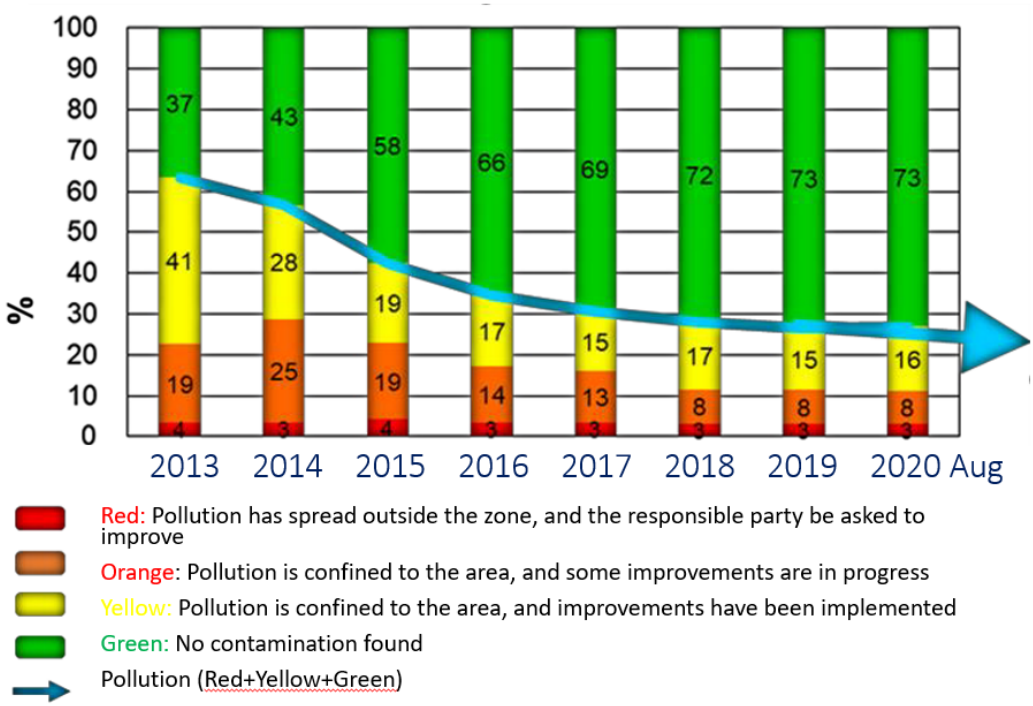


Figure: Statistics of industrial-zone "light signal" color-code classification

(2) Zones with low pollution potential

A. To regularly monitor the soil, data is being integrated on irrigation water quality, ditch sediments, and heavy metal concentrations in farmland soil.

B. Intelligent water quality monitoring is being integrated to plan the boundaries of total quantity control zones.

(3) Zero potential pollution zones

A. Establishing farmland baseline data in terms of the environment and loads to aid the assessment of suitable use of the land.

B. Rolling inspection of the pollution potential, and assess the environmental impact of

farmland in accordance with the National Spatial Planning.

3. Sediment Quality Management

In 2013, the EPA mandated the industrial authority of each water body to conduct regular sediment quality tests from water bodies in each jurisdiction at least once every five years. As of the end of August 2021, a total of 782 water bodies of sediment quality declarations had been submitted for tests.

4. Improvement of storage system classification and phased management

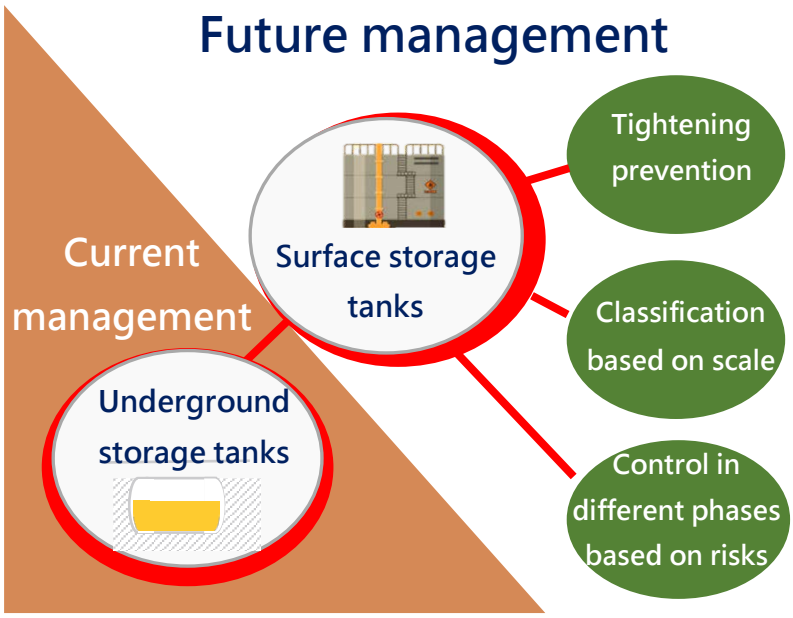
To prevent pollution in storage systems, the EPA will keep auditing results submitted by 2,700 underground storage tank operators and further investigate eight enterprises found to have abnormalities to ascertain which will be polluting or not.

On 29 December 2020, the *Regulations for Preventing Storage Tanks from Polluting Groundwater Facilities and the Installation of Monitoring Equipment* was amended and announced to strengthen the prevention and management of soil and groundwater pollution from surface tanks, which will be carried out by categories and in phases based on tank capacities and the categories of stored materials. The EPA also added 6,300 surface storage tanks under its pollution prevention management and will complete the legal compliance counseling work within two years.

II. Major Tasks between 2020 and 2021

1. Groundwater management measures

(1) Integrating local environmental groundwater data, assisting in reviewing and planning groundwater monitoring and management systems, and promoting strategies to grasp the water quality status of different aquifers in the future.



(2) Prioritizing the introduction of water quality monitoring and early warning concepts in areas with intensive human activities, such as intensive farming areas.

(3) Developing an intelligent monitoring framework for the groundwater environment in the future.

(4) Regularly updating the candidate list of groundwater concerned substances and survey priorities. The follow-up improvement of prevention management in industrial zones will include promoting early warning monitoring efficiency improvement plan and the circular correction of light signal indicators.

2. Farmland pollution prevention measures

The EPA established potential farmland pollution zones and planned preventive actions as follows:

(1) Smart monitoring of farmland pollution

A. Comprehensively improving the irrigation water quality and soil's heavy metal concentrations, dividing the agricultural land in Taiwan according to the pollution potential, determining the cause of pollution, and monitoring farmland according to pollution levels.

B. Amending the principles of regular monitoring of farmland on a rolling basis and regularly monitoring farmland.

C. Cooperating with the monitoring operations of heavy metals in crops and other pollution of the Agriculture and Food Agency of the Council of Agriculture and simultaneously handling the monitoring of farmland soil.

(2) Cross-domain cooperation

A. Inter-ministerial meetings facilitate exchanges between the Council of Agriculture's data on irrigation water quality and the Ministry of Economic Affairs' data on potential factories, cooperating to promote a common operating platform and regularly tracking the progress of various tasks.

B. Through multiple data such as farmland soil, irrigation water quality, and business process, the environmental pollutants released by business operations is evaluated to assess the pollution potential of farmland, and the benefits of inter-ministerial division of labor is realized as data on pollution sources, transmission paths and farmland lead to soil pollution warnings.

3. Sediment quality management

The second round of sediment quality declarations began in 2019 and will last until 2023. As of the end of August 2021, 240 sites had been completed, and a total of 782 water body sediment quality declarations were completed in two rounds, which reached the "Taiwan Sustainable Development Goal Corresponding Indicators" and the implementation schedule set in the regular monitoring of the nation's sediment quality.

4. Improve management of storage systems by categories and batches

The EPA will continue to audit the submissions by 2,700 underground storage tank operators across the country. As of 1 January 2021, the EPA also added 6,300 surface storage tanks to be under its pollution prevention management, which will be carried out by categories and in phases based on tank capacities and the categories of stored materials. Tanks that store oil-based substances will be targeted first, gradually followed by those that store high-pollution-risk chemical substances.

2. Draft of Revised Emission Standards for Cement Industry Air Pollutants Preannounced

The EPA recently preannounced draft revision of the *Cement Industry Air Pollutant Emission Standards* (the *Standards* below) (水泥業空氣污染物排放標準). The purpose is to reduce significant emissions of air pollutants from stationary sources, maintain air quality by urging public and private premises to improve the efficiency of air pollution control equipment and facilitate recycling and environmental improvement policies.

The EPA noted that it's a global trend for the cement industry to be a center for recycling. With diversified fuels and raw materials during the production and improved pollution control technology, various countries across the world have revised emission standards for the cement industry's air pollutants. Taiwan has been promoting recycling policies in stages. The cement industry is one of the significant stationary sources, and the *Standards* have not been amended since 2003. Evidently, evaluation and revision are necessary, considering the current control status of other countries and the local cement industry's actual emissions.

This preannouncement includes stricter emission standards for nitrogen oxides (NOx) and particulate matter, newly added emission standards for sulfur oxides (SOx), and reasonable buffer periods provided to existing enterprises after the revisions. NOx emission standards will be implemented in stages, and its emission concentration will come down to no more than 300ppm starting in 2024 and 220ppm in 2026. The tightened standards will be in line with those of other countries worldwide, leading to industry transformation and improvement of control equipment efficiency via the amendments.

The main points are as follows:

1. Definitions are newly added concerning the ignition period, idle period, existing pollution source, and newly installed pollution source.

2. As seen in the revised tables, unambiguous emission concentration standards are in place concerning air pollutants from raw material mills and chilling clay machines.

3. Emissions standards for NOx and particulate matter are tightened. Those for SOx are newly added, and reasonable buffer periods are defined for existing enterprises. Also, air pollutant emission standards are added concerning rotating kilns for ignition and idle periods.

Tables after revisions:

Air pollutants	Pollution source	Emission discharge pipe standards	Effective periods

Particulate matter	Rotating kilns, preheaters, raw material mills, coal mills, and chilling clay machines	New pollution sources	20mg/Nm^3	From the day of announcement
		Existing pollution sources	(1)50mg/Nm^3 (2)30mg/Nm^3	1. The *Standards* (1) become effective from the day of announcement. 2. The *Standards* (2) become effective on 1 January 2024.
	Rotating kilns, preheaters, coal mills, and raw material mills	Clay chilling machines in new and existing pollution sources	For the six-minute recorded data measured daily, the accumulation of data that exceeds opacity density by 20% is not to exceed four hours.	From the day of announcement
	Clay chilling machines	New and existing pollution sources	For the six-minute recorded data measured daily, the accumulation of data that exceeds opacity density by 20% is not to exceed four hours.	From the day of announcement
	Other pollution sources	New and existing pollution sources	Less than opacity density by 10%	From the day of announcement
SOx	Rotating kilns	New pollution sources	20ppm	From the day of announcement
		Existing pollution sources	100ppm	
NOx	Rotating kilns	New pollution sources	(1)200ppm (2)350ppm	1. The *Standards* (1) become effective from the day of announcement. 2. The *Standards* (2) become effective from the day of announcement and are applied to rotating kilns

				between ignition period and idle period...
		Existing pollution sources	(1)350ppm (2)300ppm (3)220ppm (4)450ppm	1. The *Standards* (1) become effective from the day of announcement. 2. The *Standards* (2) become effective on 1 January 2024. 3. The *Standards* (3) become effective on 1 January 2026 and are applied to rotating kilns between ignition and idle periods.

3. Joint Efforts of Prosecutors, Police, and the EPA Crack Down on Tainan Crime Syndicate for Illegal Dumping

Together with the Tainan District Prosecutors Office, the Tainan City Field Division of the Ministry of Justice (MOJ) Investigation Bureau (IB), the Criminal Investigation Corps (CIC) of the Tainan City Police Department, and the Tainan Environmental Bureau, the EPA cracked down on a syndicate that dumps waste illegally and is headed by a suspect surnamed Wang. Prosecutors concluded the investigation on 4 August 2021 and indicted Wang and 52 other defendants (including juridical entities), based on the various offenses. They are charged with violating the *Waste Disposal Act* (廢棄物清理法) Article 46, the *Organized Crime Prevention Act* (組織犯罪防制條例), the *Soil and Water Conservation Act* (水土保持法), the *Criminal Code* (刑法) Article 320 paragraph 2, and the *Pharmaceutical Affairs Act* (藥事法) Article 83 paragraph 1.

Officials from the EPA's Bureau of Environmental Inspection (BEI) began assisting the environmental bureau in Tainan in May 2020 to investigate dumps of industrial waste in Longci District at a spot designated initially as a particular company's waste landfill. Later a joint investigation unit was formed with the district prosecutors, which checked all onsite traces and security cameras. Investigators found that the organization, led by the abovementioned Wang, had been illegally dumping waste for a long time. Tens of thousands of metric tons of industrial waste such as mixed plastics, masks, roof tiles, construction mixtures, plasters, sludge, and aluminum ash and dust, produced by industrial enterprises across Taiwan, were transported by the organization before being dumped or buried in seven public or privately owned pieces of land in Longci District, Guantian District, and Liouying District in Tainan City.

The EPA noted that petitions to detain 14 people were filed and approved during the prosecution. After a year and three months of tracking, evidence collection, and clarification, investigators found that the syndicate dug holes and cleared ground during the day and dumped waste at dusk or at night before covering the waste with soil. There is evidence showing up to 194 occurrences of vehicles committing illegal clearing and dumping. Prosecutors, police, and investigators conducted multiple searches, resulting in the seizure of 11 vehicles (excavators, trucks, and other vehicles used by the offenders) and NT$7 million in illegal gains.

During the prosecution, the equipment used to commit the illegal acts was auctioned off by the District Prosecutors Office for a value of NT$3.81 million. Meanwhile, the EPA and the prosecutors conducted 14 onsite excavations and investigations at the abovementioned spots. Testing of waste and soil samples revealed some of the dumped materials to be harmful industrial waste. The total petroleum hydrocarbon (TPH) index at one location exceeded soil pollution control standards. The local government will be asked to follow up in the future on pollution controls according to regulations.

4. Ammonium Nitrate and Hydrogen Fluoride Added to List of Concerned Chemical Substances

The EPA newly announced ammonium nitrate and hydrogen fluoride as harmful chemical substances of concern, tightening operations such as manufacturing, imports, sales, uses, transportation, and storage, effective immediately. Handlers are to obtain permits, report operating data, and comply with regulations relevant to accident prevention and emergency responses. Sales and trades on online shopping platforms are banned, and hydrogen fluoride-containing products sold on the market must have proper labels. Above all, the measures aim to prevent accidents and harm caused by improper use.

These two substances are now announced as harmful concerned chemical substances because of their hazardous characteristics, and the EPA now has heavy penalties in place for mishandling them. Handling either substance without following the relevant regulations will result in fines between NT$30,000 and NT$300,000. Offenders may be sentenced up to seven years or even receive life sentences, along with fines of up to NT$1 million, depending on the extent to which their violations harm human health or cause death. A fine between NT$30,000 and NT$500,000 will be imposed for failing to comply with prevention and response regulations. Violators will be penalized with fines between NT$1 million to NT$5 million for not having third-party liability insurance or for failing to set up response equipment or detection and alarm facilities in accordance with regulations. The EPA pointed out that ammonium nitrate is a substance of high concern internationally. It is not only a precursor substance to the first substance listed by the EPA as a chemical of concern (nitrous oxide or laughing gas), but, for example, its improper storage was also behind the large 2020 explosion in Beirut, Lebanon. As for hydrogen fluoride, its

unsafe handling has also caused numerous casualties and deaths. For these reasons these two substances are listed for control.

The EPA said that products on the market such as cleansers for aluminum alloy, outer walls, and limescale usually contain hydrogen fluoride at a concentration of less than 10%, and may be susceptible to misuse by the public, or cause incidents due to delayed hospitalization. Hence, controls for hydrogen fluoride are to be strengthened in phases. For products with a low concentration (above 0.1% and below 10%), containers and packaging are to comply with relevant regulations and fully display product information to inform users of possible risks and ensure safe use. Meanwhile, a minimum label size has been specified for containers and packaging. For the use of higher hydrogen fluoride concentrations (over 10%), which are extremely dangerous to human health, permits must be applied for and approved. To lower risks, factories, chemical substance retail stores, and other outlets and channels selling hydrogen fluoride solvents must obtain permits before selling them.

To reduce safety and health risks arising from misuse and abuse of ammonium nitrate and hydrogen fluoride, the EPA has proposed a strategy with five requirements and two bans. Handlers are required to acquire permits, operate only after being licensed, apply proper labels, record all activities online, file monthly reports, carry out prevention and response measures, and comply with bans on online buying and selling. All operations from the start to the end of the industrial chain, including manufacturing, imports, sales, use, and storage, cannot proceed without permits. If the total amount handled exceeds the control levels, operators are to abide by accident prevention and emergency response regulations under the *Toxic and Concerned Chemical Substances Control Act* (毒性及關注化學物質管理法). These measures include submitting risk prevention and response plans, acquiring liability insurance, conducting professional training for response personnel, setting up joint prevention entities, preparing response equipment and detection and alarm facilities, and registering transport documents. These measures are aimed at improving the risk management of chemical substances by enhancing accident response, risk prevention, transportation, and safe management of the two substances.

Finally, the EPA further explained that, after ammonium nitrate was listed as a concerned chemical substance, as of 1 October 2021, enterprises are to keep online records of every operation activity and file them every month if the amounts they handle change. The purpose is to obtain storage information in real-time, strengthen response management, and further enhance management of the production sources of laughing gas.

5. Shipping Manifest Reporting Made Easier with User-friendly Tools

Regulated enterprises are required to report online the amount and flow of waste they produce to environmental bureaus. To increase the efficiency of industrial waste manifest reporting operations, since 2019 the EPA has worked with enterprises to provide four user-friendly reporting tools that now benefit more than 40,000 regulated enterprises.

After listening to the needs of enterprises, the EPA conducted reviews of the problems associated with previous reporting mechanisms, such as difficulties in managing and keeping paper manifests, time-consuming and error-prone manual reporting, and duplication with management systems of large enterprises. It then provided four user-friendly reporting tools, including:

(1) An electronic manifest APP. The real-time transmission makes management easier for enterprises.
(2) A batch manifest submission service that resolves the trouble of enterprises needing to report manifests one by one.
(3) Interface programs were developed to integrate the industrial waste reporting system with the industries' own systems. The enterprises can use the interface program to report if they have established their own waste management systems.
(4) Reporting modules formed by using historical templates or templates created by enterprises that were well rated when they were launched.

According to the EPA, these four optimizing measures are suitable for different types of enterprises. The electronic manifest APP can transmit information back in real-time, batch manifest submission saves enterprises from typing information repeatedly, interface programs are mainly used to integrate the reporting system with large-scale enterprises' own waste management systems, while manifest modules are more helpful for small-scale enterprises with fewer waste items or more fixed waste types. Regulated enterprises can choose a reporting mode that suits their needs.

Taking a large-scale tech company as an example, integrating its own management system with the EPA's innovative function has saved 90% of the time required to fill out manifests in reporting data and clearance dispatch information, and simultaneously reduced errors caused by manual filling. Using the manifest APP after clearances has also saved 90% of the time spent for manifest filing. This big company expressed that the streamlined reporting procedure has made waste flow management more time-efficient, accurate and environmentally-friendly, and helped it become a responsible purchaser in the supply chain. In addition, regulated enterprises adopting user-friendly reporting tools are expected to save six million paper manifests every year in the future.

The EPA's promotion of user-friendly reporting services has effectively raised reporting efficiency. Since September 2019, enterprises that use the shipping manifest APP have reported more than 20,000 manifests through electronic

manifests. According to the feedback of the 40 enterprises that used batch reporting, reporting efficiency was increased approximately 80%, and the reporting error rate dropped to 0.1%. In addition, 65 enterprises have adopted the automated interface method for reporting. A total of near 150,000 manifests have been reported through combined batch reporting and interface reporting methods. Enterprises are encouraged to participate and use the dedicated information line, 0800-059777, if they are interested to know more about user-friendly reporting tools. Specialists will be at their service (Industrial Waste Report and Management System https://waste.epa.gov.tw/prog/NewsZone/news_browse.asp?nid=).

6. Promoting "Donation Instead of Joss Paper" for Eco-friendly Worship

As Zhongyuan Festival approached, the EPA and local governments took the initiative to promote eco-friendly worship. In 2020, "donation instead of joss paper" was promoted across the country with a collection of more than NT$65 million in donations, approximately seven times the amount in 2017. And after Tainan City, Pingtung County and other local governments successively launched eco-friendly joss paper burners. The amount of joss paper burned in centralized burners in 2020 increased significantly to 1.7 times the amount in 2017, cutting 61 metric tons of $PM_{2.5}$ emission, equivalent to emissions of 0.7 coal-fired power generator.

The EPA stated that during the *pudu* (literally "universal crossing" in Chinese) period, households and religious organizations often burn joss paper and incense and set off firecrackers as part of the custom. Since these actions often affect people's living environments, the EPA and all local governments have been actively promoting eco-friendly worship that takes both the folk culture and the environment into account. For example, using large denominations of joss paper and providing collection and transportation for centralized burning of joss paper, replacing the burning of joss paper with donations or with white rice offerings, or participating in *pudu* online.

As the public becomes more environmentally conscious, more and more people are putting eco-friendly worship into practice. Nine counties and cities across the country have promoted "donation instead of joss paper" and the amount of donations collected is increasing yearly. In addition, after Tainan City and Pingtung County launched their eco-friendly burners in 2019 and 2020 respectively, more than 20,000 metric tons of joss paper in Taiwan were sent to incinerators, joss paper burners, or dedicated burners equipped with pollution control equipment in 2020. Moreover, the EPA formulated the *Operating Guidelines for the Review and Subsidy for Joss Paper Burner Establishment Projects* in May 2021 and expects to allocate NT$10 billion by the end of 2022 to subsidize local governments to set up eco-friendly joss paper burners.

The EPA noted that to ameliorate the pollutant emission generated from folklore worship, many counties and cities have adopted creative ways to promote eco-friendly worship, providing diverse outlets for people to be environmentally

responsible. For example, New Taipei City and Nantou County have promoted online *pudu* by having people sign up to worship together online and designating locations for centralized collection of joss paper. Keelung City, Hsinchu City and Chiayi County have promoted centralized burning of joss paper combined with burner purifying ceremonies taking into account the *pudu* ceremonial culture. Taoyuan City has allowed people who adopt eco-friendly worship to participate in lottery activities. Yunlin County works with hypermarkets to encourage eco-friendly worship. Taichung City has invited professional baseball players to support eco-friendly *pudu* offering ceremonies. Kaohsiung City and Tainan City have worked in conjunction with social welfare organizations to promote “donation instead of joss paper.”

7. Regulations to Be Revised to Incorporate Carbon Tariff Response Measures

To accelerate carbon reduction, the EPA is revising the *Greenhouse Gas Reduction and Management Act* and had frequent discussions with relevant ministries, non-governmental organizations and industries. After summarizing the suggestions from all sectors, the revision bill was renamed *Climate Change Response Act* to expand policy coverage. In addition, in view of the fact that international carbon reduction regulations are being set up with economic and trade issues in consideration, in particular, the European Union (EU) is about to implement the Carbon Border Adjustment Mechanism (CBAM), the EPA is monitoring these trends closely and will come up with response measures when the need arises. For example, the collection of carbon fees and the product carbon content calculation and regulation methods have been included as key points of this revision.

On 22 April, Earth Day, President Tsai declared that “transitioning to net zero by 2050 is a target of the whole world. It is also a target of Taiwan.” Premier Su of the Executive Yuan also reminded everyone at an Executive Yuan meeting on the same day that "greater determination and resolve are needed to speed up and aim for 2050 net zero carbon emissions."

To achieve the target of transitioning to net zero, the Executive Yuan has held many “net zero emissions pathway assessment working group” meetings, inviting Academia Sinica and the Industrial Technology Research Institute to provide professional advice. Cross-ministerial technical evaluations based on the four major work circles of "decarbonized energy", "industry and energy efficiency", "green transportation and electrification of transportation vehicles" and "carbon negative technologies" were conducted. Pathways were also developed on the basis of short-, medium- and long-term energy and industrial policy planning for 2030, 2040 and 2050, respectively.

In addition, the EPA has been collaborating with relevant ministries to communicate with members of the public on Vision 2050, discussing key issues such as agricultural and forestry carbon sinks, net zero construction, green transportation, low-carbon industries, and economic tools. Cross-field social dialogues are also promoted to

encourage participation from all sectors and investment in the research and development of innovative technologies.

According to the EPA, the EU is still reviewing the CBAM bill after it was proposed on 14 July of this year. Some implementation details and calculation methods are still to be formulated. In addition to the EU, the United States, Japan and Canada have also successively announced plans to implement a similar kind of carbon border adjusting mechanism. When the EPA held the meeting with representatives from the Ministry of Economic Affairs, Chinese National Federation of Industries, Taiwan Steel and Iron Industries Association, Taiwan Cement Manufacturers' Association, and Petrochemical Industry Association of Taiwan on 2 July of this year, the industrial representatives also recommended revising regulations. In addition to strengthening carbon reduction management in domestic industries, they thought fair competition for products between countries should also be considered and the government should evaluate applying corresponding carbon emission control measures on imported products.

The EPA stated that it is crucial to revise the *Greenhouse Gas Reduction and Management Act* at this moment. Not only is it to be in line with the international community, it is also to guide policies towards accelerating and intensifying carbon reduction efforts, and to help industries invest in low carbon technologies and economic development so as to lead the country towards sustainable development. In light of the urgency for the whole world to reduce carbon and the export-oriented nature of Taiwan's economy, the EPA will continue to study and discuss with various agencies and help domestic industries respond appropriately to maintain international competitiveness.

8. Incinerator Bottom Ash Recycling Improves as Recycling Rate Reaches 93%

Recycled aggregates are produced from incinerator bottom ash (IBA). When household wastes or wastes of similar nature are incinerated at high temperatures, the organic content is removed and inorganic residues with constituents of similar strengths as natural minerals remain. The residues are then crushed and screened to remove impurities to produce recycled aggregates, which have been used extensively in Japan, Europe and the United States in construction projects, replacing natural aggregates. Currently approximately 800,000 metric tons of recycled aggregates are produced yearly from domestic incinerators' bottom ash. The overall recycling rate has reached 93%.

The EPA stated that to ensure that local governments strictly control the quality of recycled aggregates and prioritize their use in public construction projects, the source, use and destination of every batch of recycled aggregates shall be registered online with quality test reports attached for public viewing. In addition, the EPA has subsidized or assisted local governments in setting up six public recycled aggregates plants in recent years with the prospect to gradually optimize processing facilities

and raw material quality. It is expected that the aggregates produced by all public processors will amount to 57% of the total production in Taiwan in 2022, which will be more than the amount produced by all private recycling organizations. They are to be used by each county or city in public construction projects within their administrative districts. The EPA also requires local governments to establish cross-departmental implementation teams that are presided by top county or city officials to coordinate the departments in inventorying the needs of public construction projects within their districts and prioritizing the use of recycled aggregates.

According to the EPA, the processing of IBA recycled aggregates involves multiple quality checking procedures and must comply with strict control standards and regulations to ensure quality. When recycled aggregates are to be used in a construction project, multiple conditions such as the applicability and rationality are reviewed in the project's design and planning stage before handing them over to the project operator. They can be further processed based on the needs of the project and made into materials of diverse uses. There were concerns raised by the public and environmental groups about a case where recycled aggregates were used on agricultural and pastoral land last year. In reality, those aggregates were used as the base layer of mushroom huts, not affecting any part of planting. Since these aggregates were construction materials that did not affect the quality of agricultural production, the use was compliant with the regulations.

There were also doubts raised by environmental groups about the differences between the domestic quality standards and those of advanced countries. The EPA stated that with reference to the latest standards of Japan and European countries, the government has reviewed the quality standards and the leaching control methods for IBA recycled aggregates and has placed restrictions on their usage locations and purposes. The latest version of the *Management Regulations on the Recycling of Incinerator Bottom Ash* was promulgated on 1 January 2021 using the *Recycled Aggregate Leaching Procedure* (NIEA R222) as the leaching testing method. In addition, with reference to domestic groundwater pollution control standards and regulations, a usage location classification management system was set up making the management regulations the most stringent to date.

9. Single-use Tableware Reduction and Innovative Circular Business Models to Be Further Promoted

During the pandemic, the use of all types of single-use tableware has increased. According to the EPA's statistics, the amount of single-use tableware recycled, including waste plastic boxes and waste plastic plates, was 7,263 metric tons in May and July 2021, a 3.3% increase compared to the same period in 2020 (7,028 metric tons). The subsidy fee rate was NT$9.5/kg. All these waste tableware have been properly processed by 11 domestic processors that are capable of processing these types of waste plastics. Additionally, there are three domestic processors that are capable of processing waste paper tableware. Statistics show that 41,762 metric tons of waste paper tableware were recycled in May and July 2021, 3.3%

more than the same period in 2020 (40,520metric tons).

According to the EPA regulations, government agencies, school cafeterias, department stores, shopping centers, hypermarkets, and food and beverage businesses with a storefront shall not use plastic disposable tableware. If businesses, affected by the pandemic, have the need to use disposable tableware, they can apply to the local environmental authority for their use. Once approved, they can use it for 90 days, but they must also strengthen the recycling of it. A total of 171 businesses in 13 counties and cities have applied.

In addition, during the pandemic, the number of food deliveries has also increased. Since 2020, the EPA has been cooperating with food delivery platforms, tableware rental companies and environmental bureaus in a pilot project on environment-friendly deliveries using environment-friendly tableware for catering and then recycling the tableware for reuse. The project will continue to be run and promoted.

In addition to strengthening the recycling of all types of tableware, the EPA, after the pandemic subsides, will continue to encourage members of the public to carry their own tableware and businesses to provide tableware rental services through regulatory controls, economic incentives and innovative circular business models to reduce the use of disposable tableware. It looks forward to promoting reusable container rental service models in the post-pandemic era to halt the increased use of single-use tableware, so as to reduce the consumption of raw material and water and greenhouse gas emissions associated with tableware production.

10. Disposal of Food Waste as Pigswill Suspended to Prevent Spread of African Swine Flu

On 30 August, the Central Emergency Operation Center for African swine flu announced a temporary ban on food waste entering pig farms: from 1 to 30 September, pig farms shall not use food waste as pigswill. To make sure domestic food waste clearance and disposal operations are not affected by the ban, the EPA preemptively held meetings every day (including holidays) from 26 August with the environmental bureaus of 22 counties and cities to discuss how to improve food waste disposal response measures to ensure regular people, restaurants, government agencies, food waste clearance enterprises and pig farms using food waste as pigswill are minimally affected.

The EPA stated that counties and cities collect food waste via methods adjusted according to local conditions. People are requested to dispose of their food waste according to the methods prescribed by the counties or cities they live in. Restaurants, government agencies, schools, hotels, and community complexes are requested to hand over food waste to the initially commissioned pig farms or food waste clearance enterprises, transporting it to designated locations for free processing. Suppose any pig farms no longer help with the clearance. In that case, people are urged to contact the offices designated by counties and cities to have

cleaning squads assist with or commission legal clearance enterprises for the clearance. All environmental agencies will mobilize and do their best to assist with food waste clearance and disposal.

If relevant entities have questions concerning food waste clearance and disposal, they are welcome to contact the designated line set up by environmental agencies that provide consultation services for people, clearance enterprises, and food waste generating sources, or they can visit the EPA's website https://wcds.epa.gov.tw and search for the lists of legal clearance enterprises.

In response to the change in food waste disposal method, regulated enterprises that shall report their waste flow online under Article 31 of the *Waste Disposal Act* are exempt from reporting on food waste as of 30 August. The reporting shall be done instead by food waste clearance enterprises through paper documents. The reporting mechanism is thus streamlined since regulated enterprises now only need to confirm with signatures and seals.

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