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Feature Article

Taiwan's Marine Pollution Prevention and Control

As an island located among major shipping lanes in the western Pacific, marine pollution prevention is of particular significance to Taiwan. The EPA utilizes the latest technology to monitor and respond to marine pollution in times of emergency to protect ocean water quality. Ocean waste management is becoming increasingly important as the overall environment deteriorates, thus the central and local governments along with grassroot organizations are joining together to clean up waste, aiming to jointly work towards a plastic-free marine environment and preserve the marine ecosystem.

Analysis from the International Maritime Organization (IMO) shows that 44% of marine pollution comes from the land, 33% from atmospheric transmission, 12% from vessels, 10% from ocean dumping, and 1% from ocean construction. The EPA has been conducting marine pollution prevention and control by planning, guiding, supervising, and implementing various strategies and measures. Furthermore, the *Marine Pollution Control Act* (海洋污染防治法) was

formulated based on the international Convention on the Law of the Sea, and announced on 1 November 2000. The Act was then revised on 4 June 2014. The authorities responsible for its implementation are the EPA in the central government and city/county/municipal governments at local levels. The Coast Guard is in charge of cracking down on illegal activities, collecting relevant evidence, and referring the violations.

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Marine pollution control via monitoring and law enforcement

The EPA strives to increase the effectiveness of emergency response measures against major oil pollution incidents in marine environments. Based on the *Major Marine Pollution Incident Emergency Response Plan* (重大海洋油污染緊急應變計畫) approved by the Executive Yuan, responses fall into three main categories, as follows:

A. Scientifically monitoring marine pollution

To protect the marine environment, the EPA has been promoting pollution controls as well as strengthening the legal framework. Various technologies are skillfully used to effectively monitor all types of pollution sources to help reduce pollution at its sources and to inspect for illegal activities. These technologies include remote satellite sensing, unmanned aerial systems (UAS), oil spill detecting radar monitoring vehicles, and oil and chemical pollution dispersion simulation models.

B. Response to marine pollution incidents

The EPA regularly enhances its response capacities to oil pollution incidents by better utilizing technology, integrating resources via information systems, and

advising local governments on being better equipped and prepared. Once a pollution incident occurs, the EPA supervises and coordinates responsible central and local authorities under the *Major Marine Pollution Incident Emergency Response Plan*. This ensures that response measures are thoroughly carried out at all levels and emergencies are properly handled.

The characteristics and quantities of the oil need to be taken into account during oil spill incidents in the ocean. Spill locations, the surrounding marine environment, and oceanic and meteorological conditions must be considered to evaluate the scales of potentially impacted areas and further determine how the marine environment and ecosystem may be affected.

C. Marine waste cleanup and plastic-free ocean campaign

Marine waste mostly comes from solid garbage disposed on land and coastal areas, and greatly impact the seabed ecosystem. Thus, the EPA formulated the *Floating Trash Disposal Program* (海漂垃圾處理方案) to implement at-source controls of marine waste and to organize beach and ocean cleanups.

The research conducted by the Society of Wilderness on the components of ocean waste in



▲ An unmanned aerial system monitors an oil spill where the TS Taipei ran aground in 2016.

2015 showed that plastic waste comprises 90% of it. To reduce plastic waste in the oceans, in 2016 the EPA tightened relevant policies by limiting and reducing the use of plastics at their sources. On 13 February 2018, the *Action Plan of Marine Debris Governance in Taiwan* (臺灣海洋廢棄物治理行動方案) was announced by the EPA, accompanied by representatives from NGOs concerned about marine environmental preservation, the National Museum of Marine Science & Technology, and others from academia. The details include a total ban by 2030 on single-use plastics such as shopping bags, utensils, beverage containers, and straws. The Action Program is also working on banning plastic straws starting in 2019, to make Taiwan the first country to limit the use of plastic straws.

Central and local governments mobilized to clean up oceans

Cleanups of garbage on the ocean bottom are carried out by divers, while waste on beaches is regularly cleaned up by local governments under the EPA's supervision. In 2016, Taitung County, Kinmen County, Pingtung County, and Lienchiang County received subsidies to conduct marine waste cleanup projects. This resulted in more than 400 metric tons of garbage from the ocean bottom and beaches being collected,

including 480 metric tons of recyclable materials. In addition, 25 sessions on marine environmental education were held. The EPA hopes that with the combined efforts and resources of governments and the public, the marine environment and resources will be better protected.

The EPA continued to subsidize local governments to carry out marine waste cleanup projects in 2017. Nineteen coastal counties and cities were mobilized to organize a nationwide event on World Oceans Day on 8 June, which included waste cleanups and marine environmental education. An environmental fleet has been assembled as well. To deal with random dumping, vessels such as fishing boats, yachts, whale-watching boats, ferries, as well as the public, fishermen, and boat owners are encouraged to bring back and properly dispose of waste produced during sightseeing, leisure, and fishing activities.

As part of improving coastal and marine environments of offshore islands, the EPA also provides subsidies for relevant projects to Kinmen and Lienchiang Counties, as floating waste originating from China affects these islands. The subsidies assist them to better carry out coastal environment maintenance, floating and bottom trash cleanups, waste transfers and recycling.



▲ Marine Debris Governance Platform in Taiwan

Future plans

Taiwan is located in the midst of many international shipping lanes, with thousands of containers and vessels sailing through its waters every day. In response to this, the EPA will keep on strengthening marine pollution control measures and monitoring the marine environment according to the *Marine*

Pollution Control Act. While monitoring pollution sources with the latest technology, the EPA will also actively promote the pollution emergency response mechanism and increase the effectiveness of control measures. Other efforts will include continuous marine waste cleanups and at-source waste reduction to protect the marine environment.

Air

Subsidies for Switching to Cleaner-Fuel Boilers Expanded

On 4 May 2018, the EPA announced the amendments to the *Regulations Governing Subsidies for Modification or Replacement of Boilers* (改造或汰換鍋爐補助辦法). The purpose of the amendments is to accelerate the process of switching boiler fuels to cleaner alternatives and to reduce air pollutant emissions produced. The major points of the amendments are to expand the subsidized targets and to extend the application period to 30 June 2019.

Starting on 15 April 2017, the EPA began providing hotels; medical and health care institutions, social welfare organizations and schools with subsidies to modify or replace their oil-fired boilers with heating equipment that uses low-emission gases, solar energy or electricity.

The EPA decided to amend the regulations to further expand the enterprises eligible for the subsidy. The amendments stipulate that any private or public premises that have modified or replaced their boilers after 15 April 2017, and are now using or in the process of establishing heating equipment powered by low-emission gases, solar energy or electricity, qualify for the subsidy. A subsidy can be provided for each boiler, up to a maximum of NT\$500,000. However, the regulations do not apply to the following: factories governed by the *Factory Management Act*, electricity

enterprises governed by the *Electricity Act*, and state-owned enterprises governed by the *Administrative Law of State-Owned Enterprises*. To provide sufficient time for the conversion, the application period for the subsidy is extended to 30 June 2019.

The EPA also points out that the draft of the *Boiler Air Pollutant Emission Standards* (鍋爐空氣污染物排放標準) was preannounced on 30 January 2018, and is now undergoing the legislative procedures of discussions and public hearings. It is targeted that all boilers – regardless of fuel types or operation scale – shall meet the emission standards by 1 July 2020. Through administrative control and economic incentives, the EPA aims to diminish boiler air pollutant emissions and their impacts on air quality, as well as the number of air pollution red alert days.

Air

Phasing out Old Vehicles with Subsidies and Tighter Controls

The draft of the amendments to the *Air Pollution Control Act* (空氣污染防治法) is currently under review in the Legislative Yuan. The amendments will tighten emission standards for vehicles that have been manufactured over ten years ago and designate air quality control zones that forbid or limit specified vehicles from entering. It is hoped the phase-out of highly polluting old vehicles will be expedited through subsidies and tightened controls. The ultimate goal is to eliminate all two-stroke motorcycles and heavy-duty diesel vehicles targeted in the first and second phases of the vehicle emission standards.

The EPA stated that according to statistics, mobile pollution sources account for 30~37% of Taiwan's PM_{2.5} emissions. Among that, 2~2.6% of emissions come from two-stroke motorcycles, and 11.2~16.8% from heavy-duty diesel trucks, showing the need to speed up the phase-out of said vehicles. Starting in 2008, the EPA has been offering subsidies for phasing out two-stroke motorcycles. From 2010, the EPA has further subsidized the purchase of electric motorcycles. In addition, the governments of Taipei City, Taoyuan City, Taichung City, Kaohsiung City, Yilan County and Nantou County provide additional subsidies of NT\$4000-30,000 to mid- and low-income households to replace two-stroke motorcycles with new electric ones.

In addition, since August 2017 the EPA has offered subsidies for phasing out heavy-duty diesel trucks subject to the first and second phase vehicle emission standards. Data shows that the phase-out of more than 1.32 million two-stroke motorcycles and more than 6,000 of the said diesel trucks has been subsidized as of the end of March 2018. A goal has been set to phase out all the two-stroke motorcycles

and heavy-duty diesel trucks targeted by the phase 1 and 2 vehicle emission standards by the end of 2019.

Besides the subsidies above, the Legislative Yuan has passed the preliminary review of the draft amendments to the *Air Pollution Control Act* formulated by the EPA. Article 36 in the revision authorizes the EPA to tighten the original emission standards for motor vehicles that have been manufactured over ten years ago. Article 40 mandates that competent authorities at all levels may designate air pollution control zones for mobile source pollution control according to local air quality and pollution characteristics.

Once the amendments are approved, the EPA estimates that they will affect 98,000 gasoline vehicles manufactured before 1991, as well as 530,000 diesel vehicles and more than 7 million motorcycles regulated by the phase 1-4 vehicle emission standards. Taking two-stroke motorcycles for instance, stricter emission standards for vehicles manufactured more than ten years ago would lead

Table: The number of vehicles affected by tightened emission standards and the amount of pollutants reduced

Types	Tightened inspection standards for in-use vehicles	Number of vehicles affected	Reduced emissions (metric tons/year)						
			TSP	PM ₁₀	PM _{2.5}	CO	THC	NMHC	NO _x
Gasoline vehicles	Vehicles manufactured before 1991 to comply with the standards of the third phase	98,124	-	-	-	4,846	1,142	1,027	797
Diesel vehicles	The first stage: Vehicles specified in the first three phases to comply with the standards of the fourth phase	344,733	5,318	5,318	4,892	32,201	8,778	8,778	68,332
	The second stage: Vehicles specified in the first four phases to comply with the standards of the fifth phase	530,528	1,685	1,685	1,551	19,519	2,655	2,655	54,591
Motorcycles	Vehicles specified in the first four phases to comply with the standards of the fifth phase	7,013,654	-	-	-	14,211	10,475	9,482	89

to an increase of failed tests for CO emissions, rising from 14% to 45%, and an increase of failed tests for hydrocarbon emissions from 6.5% to 9.5%. Other than replacing two-stroke motorcycles faster, vehicle owners will also consequently be encouraged to properly maintain their vehicles in order to comply with the new standards. A two-year grace period will be in place before the new standards take effect.

The EPA pointed out that although competent authorities at all levels are authorized to designate air quality zones to limit or ban the entrance of certain vehicles, the zone area and the targeted vehicles must be deemed necessary. The control zones will not cover the entire country, and a grace period of three to

six months will be given to help the public adjust. Only vehicle models meeting the criteria would be allowed to enter once air quality zones are set.

Although the subsidy provides an incentive for phasing out old vehicles, it is not mandatory. The EPA is considering amending related regulations to put old, highly polluting vehicles under control in order to hasten the phase-out of such vehicles. Owners are encouraged to get rid of their old vehicles soon, so as to not only be eligible to apply for a subsidy, but also to avoid the trouble of violating future emission standards and being limited from driving in certain areas.

Air

Subsidies for Phasing Out Two-Stroke Motorcycles and Purchasing New Electric Bicycles Revised

The EPA has been encouraging the public to phase out two-stroke motorcycles and purchase new electric ones. Regulations concerning subsidization were amended to address the problems reflected by the public during the implementation period. The revised *Regulations Concerning Subsidization for Phasing out Two-Stroke Motorcycles and Purchasing New Electric Two-wheel Vehicles* (淘汰二行程機車及新購電動二輪車補助辦法) were announced. In addition, no subsidies will be provided after 2020.

The EPA pointed out that two-stroke motorcycle engines are designed such that an oil-lubricant mixture enters and burns in engine cylinders during intake and exhaust of air. Visibly polluting blue/gray smoke is easily produced from incomplete combustion. A two-stroke motorcycle emits 17 to 18 times more hydrocarbons (HCs) and twice the carbon monoxide (CO) than those emitted by a four-stroke motorcycle. Emission standards for new vehicles have become stricter since 2004 to encourage manufacturers to cease production of two-stroke motorcycles. For in-use vehicles, since 2008 subsidies have been offered to encourage phase-outs. However, data showed that there were roughly 1.03 million two-stroke motorcycles nationwide as of the end of March 2018. These vehicles present a big challenge for air pollution control and hence the dire need of taking them off the roads as soon as possible.

The EPA discovered that during the implementation of subsidies for phase-outs, people tended to discard their two-stroke motorcycles with recyclers at the

end of the year. This made it difficult for recyclers to coordinate and recycle all vehicles before the year end. After review, the regulations were revised so that the year applicants would be subsidized would be based on the date of discarding. Also, the original regulation demanding vehicle inspection records for the subsidy application has been removed, because owners are less willing to get rid of old two-stroke motorcycles due to a lack of records of regular inspections.

The EPA stated that the amount for subsidies for the phase-out of two-stroke motorcycles and purchase of new electric bicycles will decrease year after year. For 2018, NT\$1,000 is provided for phase-outs only, NT\$4,000 to 6,000 for both phase-out and purchase (depending on the model of the new vehicles), and NT\$1,500 to 3,500 (depending on the vehicle models) for purchase only. Local governments will offer extra subsidies as well. The subsidies will be applicable until 2020.

Environmental Sanitation

Over 26,000 People Join Beach Cleanups to Celebrate Earth Day

Enterprises, civic groups, and government offices participated in beach cleanups starting in March in the lead up to Earth Day on April 22. There was a total of 51 beach cleanups carried out by 26,402 people volunteering their time and energy nationwide.

According to the EPA's statistics, enterprises, civic groups, and government offices across Taiwan carried out 51 beach cleanups and removed 97 metric tons of trash this spring. EPA Minister Ying-Yuan Lee led the "2018 Taoyuan City Spring Beach Cleanup" at Chuwei Fish Harbor. He sought to raise awareness about ocean pollution caused by plastic products. Minister Lee hopes both local governments and residents will strive to generate less garbage and properly sort recyclables in order to promote better resource cycling and avoid unnecessary waste. Taiwan can be even more prosperous, with a clean environment serving as a true mark of a prosperous society.

Continuing the cleanup event started in Taoyuan City's Chuwei Fish Harbor, EPA staff formed a team and joined the environmental organization, Rethink, in New Taipei City to clean the beach of Sanzhi. The beach cleanups this year were primarily led by enterprises and civic organizations as well as river patrols. This activity has become a trend in Taiwan with several organizations leading cleanup activities. The EPA appealed to different enterprises and civic groups to join the EPA's coastal cleanup and adoption program. Related information about beach cleanups nationwide can be accessed on the "We Love Taiwan Coastal Clean-up" webpage at <https://goo.gl/cep7sh>.



 EPA staff team up with environmental organization Rethink for a beach cleanup event.

2018 Green Vehicles Announced

Vehicle exhaust accounts for approximately one-third of PM_{2.5} emissions in Taiwan. There are about 13 million scooters and 7.8 million cars in Taiwan. Among them, 800,000 vehicles run on diesel fuel. To reduce transportation emissions, the EPA will continue to promote the production of environmentally friendly vehicles and aim for the electrification of all cars and scooters. To serve as a purchasing guide for green vehicles, the EPA announced vehicle evaluation results for 2018.

The environmentally friendly vehicle models of 2018 were selected from a total of 248 conventional gasoline cars, 26 hybrid cars, and 97 conventional motorcycles. The selected green vehicles include two conventional gasoline cars (Honda CITY 1.5 V 1497c.c. CVT 4D and Honda FIT 1.5 S 1497c.c. CVT 5D), eight hybrid cars (e.g., TOYOTA PRIUS PHV 1798c.c. CVT 5D HYBRID), and 13 scooters (e.g., Kymco MANY 110 SE22BK 111.7c.c. CVT). Complete information on the selected vehicles is posted on the website of the Green Vehicle Guide (<https://greencar.epa.gov.tw/>). The EPA encourages the public to use the website before making purchases and contribute to air quality improvement by selecting a vehicle that is less polluting, noise-free and energy-efficient.

The green vehicle selection of 2018 was conducted by assessing and ranking the performance of all the cars/scooters sold in 2017 with a chart comprising three environmental indicators: air pollution emissions, noise, and fuel consumption. To be selected, a model must reach a score of 6 in each domain, with a total score no less than 21.

Among the 1,324,463 new vehicles (936,500 motorcycles and 387,963 cars) sold in 2017, 333,126 of them (320,925 motorcycles and 12,201 cars) were green vehicles and accounted for a quarter of the total sales. In other words, for every four new cars/scooters sold in Taiwan last year, one was environmentally friendly. Since the Green Vehicle Guide website was established in 2014, sales for green vehicles had

 Table: 2018 Models of more environmentally-friendly hygienic Hybrid (Gasoline) vehicles

Engine family	Model	Pollution level	Noise level	Energy consumption level	Total
G2ZR-FXE-17	TOYOTA PRIUS PHV 1798c.c. CVT 5D HYBRID	9	9	9	27
G2ZR-FXE-A13	LEXUS CT200H 1798c.c. CVT 5D HYBRID	9	9	9	27
G2ZR-FXE-18	TOYOTA PRIUS ALPHA 1798c.c. CVT 5D HYBRID	8	8	9	25
GUB420T35-18	VOLVO XC60 T8 1969c.c. A8 5D	7	9	9	25
G2AR-FSE-14	LEXUS GS300H 2494c.c. CVT 4D HYBRID	7	7	9	23
G2ZR-FXE-A16	TOYOTA PRIUS 1798c.c. CVT 5D HYBRID	6	8	9	23
GH4B11-14	MITSUBISHI OUTLANDER PHEV 1998c.c. A1 5D HYBRID	6	8	9	23
GHYAE1.6-17	HYUNDAI Ioniq 1580c.c. A6 4D (HYBRID)	6	7	9	22

risen from 21% to 25% in 2017. The increase in sales throughout the years shows that people in Taiwan are becoming more aware of the importance of green vehicles.

As environmental awareness rises, most car manufactures endeavor to design their cars to be as environmentally friendly as possible, in coordination with environmental policies. The green car selection of the year includes hybrid cars with engine capacity of either 1,600 c.c. or 2,400 c.c., and also conventional gasoline cars with an engine capacity of 1,500 c.c. The result of the selection indicates that hybrids tend to be more energy-efficient compared to gasoline cars. Furthermore, the result also shows that gasoline

cars that have an engine capacity of 1,500 c.c. are relatively more eco-friendly than those with other engine sizes. As for conventional motorcycles, different vehicles with engine capacity ranging from 100 c.c. to 250 c.c. were selected, which demonstrate the fact that even heavy bikes can reach the standards of green vehicles.

The EPA urges everyone to take advantage of the Green Vehicle Guide website (<https://greencar.epa.gov.tw/webpage/carsearch.aspx>), in order to make informed and environmentally-friendly purchases. Another alternative the EPA suggested to help with air quality protection is to take public transportation.

Air

Incentives Provided for Reporting Illegal Open-air Burning

To improve air quality, the EPA encourages the public to pay attention to their surroundings and take note of any illegal open-air burning. The EPA is now implementing the *Incentives for Reporting Illegal Open-Air Burning Pilot Plan* to promote public participation in air quality protection efforts. Until the end of June 2018, a reward of up to NT\$300 will be given to each report of illegal open burning.

Open-air burning is a common contributor of local air pollution, and can cause more fires depending on atmospheric dispersion conditions. Additionally, smoke from burning can reduce visibility and pose danger to traffic safety and public health. Research shows that byproducts of open burning (e.g. fine particulate matters, heavy metals, and dioxins) can cause allergic reactions such as irritation of the eye and respiratory system. According to the information released on the Taiwan Emission Data System (TEDS), open burning produced 3,451 metric tons of PM_{2.5} annually, constituting about 4% of the total air pollutant emissions. Statistics also show that there were about 25,000 cases of open-air burning in 2016 and 2017. It is obvious to see that open burning can have significant effects on air quality and the quality of life.

To prevent open-air burning, the EPA collaborated with the Central Weather Bureau to strengthen environmental monitoring by employing advanced satellite remote sensing technology. By enhancing Taiwan's real-time monitoring technology through the

application of satellite remote sensing, the EPA was able to detect the location of heat sources, which helped increase the efficiency of pollution investigation and law enforcement. However, satellite sensors are easily hindered by clouds and have a margin of error of one kilometer. Hence, by combining with civilian reporting, the EPA will be able to expand its monitoring range with fewer time and space restrictions.

In light of the above mentioned circumstances, the EPA is implementing the *Incentives for Reporting Illegal Open-Air Burning Pilot Plan*. The EPA encourages the general public to report any illegal open burning of straw, tree branches, or trash to local environmental protection agencies along with specific evidence that is clear and easily identifiable. EPA personnel can also investigate the sites of burning in person if deemed necessary. Each report will be rewarded with NT\$100, and an extra NT\$200 will be given if the violation is verified after investigation.

This pilot plan will last until the end of June 2018. Violations can be reported by using the EPA's app or calling 0800-066-666.



▲ Open burning of fruit tree twigs

EIA

Scope of Environmental Impact Assessments and Standards for Determining Specific Assessment Items Amended

The EPA announced the amendments to the *Standards for Determining Specific Items and Scope of Environmental Impact Assessments for Development Activities* (開發行為應實施環境影響評估細目及範圍認定標準) on 11 April 2018. The amendments include expanding the categories of development activities that require an EIA, tightening EIA scales for some development activities, reducing the scope of EIAs for some development activities, and adding some exemptions. For example, an EIA is now required for constructing buildings taller than 120 meters, while renewable power generation facilities with a capacity under 2,000 kW are not required to undergo an EIA.

There have been many concerns expressed by a wide range of organizations regarding the revisions to these standards. In response, the EPA preannounced the revisions on 27 April 2017 and held 10 public hearings over a period of two months. Adjustments were made to the draft based on concerns and questions raised by participants. The EPA preannounced revisions for a second time on 26 January 2018 to further refine the revisions. A public hearing was held on 12 February to collect more opinions. After careful consideration more

revisions were announced. The key points of the revisions are as follows:

1. Sensitive environments previously referred to as “designated land approved for re-zoning for agricultural use” has been revised to “designated areas for agricultural use”. The area for farmlands has been increased to 100,000 hectares.
2. The extension limits for applying mining rights of mining lands were approved. Development activities located in sensitive environments or beyond a certain

scope must undergo an EIA. Standards were added regarding enterprises that have mining rights which have yet to expire (within a period of ten years) and already undergone an EIA. The enterprises may apply for an extension and are therefore exempt from undergoing a second EIA. Standards for determining the need for an EIA were tightened with regards to mine prospecting, mining, and dirt removal.

3. Buildings over 120 meters are required to undergo an EIA.

4. It is added that an enterprise reusing facilities that were already approved by a competent authority for reuse, and that will not expand development to additional land, is exempt from an EIA.

5. Renewable power generation facilities under 2,000 kW in capacity are exempt from an EIA. The standards for thermal energy generators have been revised. Thermal energy units with a capacity of 10,000 kW or more will be required to undergo an EIA. The need for an EIA for generators that draw hot spring water, which is returned to underground

water sources, will be based on standards for thermal energy generation, rather than the amount of hot spring water used. For hydropower, installations that make use of existing ditches, irrigation or other waterworks and have a capacity that is below 20,000 kW are exempt from undergoing an EIA.

6. Regulations have been added requiring an EIA for the development of natural gas storage tanks.

7. Regulations for conducting an EIA for factories that have been re-purposed for non-industrial development are deleted.

8. Camping areas on sloped lands that are applying to develop or expand development on one hectare or more must undergo an EIA.

9. Development activities taking place near important wetlands, that have been permitted by competent authorities as complying with their conservation plans for important wetlands, will be exempt from undergoing an EIA.

Waste

Amendments Preannounced to Require Installation of Real-time Tracking Systems in All Waste Clearance Vehicles


The EPA preannounced amendments to the *Regulations for Waste Clearance Vehicles Equipped with Real-time Tracking Systems* (應裝置即時追蹤系統之清運機具及其規定). Thirty waste items, including sludge and plastic materials, will be among those added for further management. The EPA plans to reach its goal of installing real-time tracking systems for all clearance vehicles by 2022 in hopes of ending illegal dumping.

Presently, there are around 9,000 vehicles that have been equipped with real-time tracking systems. However, it is not uncommon for enterprises to find legal means of concealing their illegal disposal. Such companies will change their disposal vehicles to ones without a tracking system, or remove the power source for the systems, or even mask the vehicle signals while transporting waste.

As such, the EPA has made amendments that require tracking systems to be installed on clearance vehicles that ship thirty easily-dumped waste items, including

sludge, construction materials, and plastic waste. The EPA will take further steps to mandate that all clearance vehicles approved for operating shall install real-time tracking systems. There will be a four-stage process for implementing the regulations from 2019 to 2022. In addition, the EPA will utilize new technology for vehicles' crash sensors and power disruption signals in order to increase the stability and the accuracy of the tracker.



 *Vehicle Identification System for tracking waste clearance vehicles*

Recycling

Amendments to PVC Container Recycling Fee Rate Preannounced

The EPA plans to adjust the recycling fee rate for the collection and disposal of polyvinyl chloride (PVC) containers in order to reduce their impact on the environment. The EPA will use economic incentives to encourage enterprises to reduce their use of PVC containers and find replacement materials that are more beneficial for the resource cycle.

The EPA noted that Taiwan primarily utilizes incineration for trash disposal. PVC produces dioxins when incinerated because of the chloride it contains. The use of PVC containers in Taiwan has steadily decreased over the recent years. In 2017, PVC containers made up 0.29% of plastic containers used, and constituted 0.47% of the total plastic containers

recycled. To reduce the burden of PVC on the environment and on recycling and disposal systems, the EPA has adjusted the recycling and disposal fee rates for PVC containers from NT\$18.5 per kilogram to NT\$87 per kilogram to encourage businesses to choose alternative materials. New rates are expected to take effect on 1 July 2019.

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