Major Environmental Policies

September 2024

1. Three Carbon Fee Regulations Announced, Officially Ushering in the Carbon Pricing Era

The MOENV have completed promulgation of three sets of carbon pricing sub-laws based on the *Climate Change Response Act* (氣候變遷因應法, the *Climate Act* hereinafter) in order to establish Taiwan's own carbon pricing system and promote steady carbon reduction. The three announced regulations were the *Regulations Governing Carbon Fee Collection* (碳費收費辦法), the *Regulations for Voluntary Carbon Reduction Management Plan* (自主減量計畫管理辦法), as well as the *Designated Greenhouse Gas Reduction Goals for Entities Subject to Carbon Fees* (碳費徵收對象溫室氣體減量指定目標). This task corresponds to the dual transition to digital and green industries within the net-zero transition strategies of President Lai Ching-te, under which promotion of carbon pricing and market mechanism encourage enterprises to pursue low-carbon transitions. The implementation of the carbon fee system has marked Taiwan's official entry into the erea of carbon pricing. In the future, the government will bring in funding from both public and private sectors and make the carbon fee system the new driving force of Taiwan's green growth.

The MOENV stressed that the carbon fees are collected to accelerate and scale up the reduction efforts, with entities subject to carbon fees able to come up with their own voluntary reduction plans. Once the carbon fee system is in effect, it is estimated to achieve reduction by 37 million metric tons of CO_2e by 2030, equivalent to 14% of the total emissions in 2005. The MOENV and Ministry of Economic Affairs (MOEA) will conduct more than ten sessions of meetings There will be enough time for enterprises to prepare and develop their reduction measures up to 2030 and seek the reduction paths and technology best for themselves, thus creating opportunities for green growth through premium fee rates and relevant assistance from the MOEA.

Drafts of the three sub-laws was preannounced on 29 April 2024. Regarding this, industries and civil organizations were invited to nine meetings and a public hearing for communications. Discussed topics included deduction of collection threshold, identification of industries with high carbon leakage risks, adjustment coefficients and schedules for emissions, offsets by domestic reduction credits, base year for designated targets and establishment of benchmarks, and information disclosure of voluntary reduction plans". The MOENV made adjustments under the three sub-laws based on public opinions and suggestions. Key points of the sub-laws are as follows:

I. The *Regulations Governing Carbon Fee Collection*:

1. **Entities subject to carbon fees:** Enterprises in the electric power and fuel supply industry as well as manufacturing industry that meet qualifications of the *Enterprise Emission Sources Subject to Inventory, Registration and Inspection of Greenhouse Gas Emissions* (事業應盤查登錄及查驗溫室氣體排放量之排放源) and whose annual emissions, both directly from entire

factories (sites) and indirect from the use of electricity reach a total of 25,000 metric tons of CO_2e or more. In addition, considering fair competition within the same industry, the collection threshold of 25,000 tons of CO_2e may be deducted in principle when enterprises determine emissions to be charged for carbon fees.

2. **Fee collection period:** Starting from the next year after carbon fee rates are announced and in effect, entities subject to carbon fees are to report their GHG emissions between 1 January and 31 December of the previous year and pay carbon fees by the end of every May.

3. **Carbon fee determination:** The carbon fees payable are the "charged emissions" multiplied by the "fee rate". Practices in the EU, Korea, and Singapore (such as partial free allocation or tax exemption) are taking into consideration on calculation of the "charged emissions", and an emission adjustment mechanism is designed in the regulations to prevent carbon leakages. The MOENV pointed out that enterprises are to have voluntary reduction plans approved before applying to be identified as industry with high carbon leakage risks, for which different emission adjustment coefficients are applied in three stages. The emission adjustment schedule, on the other hand, will be announced on a later date considering the international schedules for phasing out free emission allocations, Taiwan's reduction results and industries' international competitive edges. Also, for such industries' charged emissions, the collection threshold of 25,000 metric tons of CO_2e is no longer deductible.

II. The *Designated Greenhouse Gas Reduction Goals for Entities Subject to Carbon Fees* and the *Regulations for Voluntary Carbon Reduction Management Plan:*

Article 29 of the Climate Act specifies that an entity subject to carbon fees may propose voluntary reduction plans and apply for a preferential rate once it has reduced emissions effectively and achieved the designated reduction goals set by the central competent authorities by taking reduction measure. Such measures include switch to low-carbon fuels, adoption of negative emission technologies, improvement of energy efficiency, use of renewable energy, or enhancement of manufacturing process.

1. **Designate reduction goal:** Two ways are provided to determine the designate goals; one is the industry-specific reduction rate based on the science-based targets initiative (SBTi), and the other the technical benchmark-based designated reduction rate, established according to international and domestic technical emission benchmarks and under the condition of reaching the nationally determined contributions by 2030.

2. **Voluntary reduction plan:** For the eligibility of the preferential rates, an entity subject to carbon fees needs to select the designated reduction rate from either Appendix 1 or 2 in the Designated Goals, and determine the emissions of the target year to be achieved by 2030 accordingly as the designated goal. Once the reduction paths are planned out every year leading up to 2030, including the progress of reduction measure implementation and emissions every year, the application for voluntary reduction plans may be submitted and carried out only after obtaining approvals from central competent authorities.

3. **Regular result inspections:** The central competent authorities will inspect the progress of

voluntary reduction plans every year. Enterprises need to submit the process report of the voluntary reduction plan of the previous year by the end of every April. Those meeting the set progress are eligible for the preferential rates in the current year. If found failing to execute the plan accordingly by the central competent authorities after inspection, enterprises are to return the difference of the carbon fees payable between the regular and the preferential rates for the current year and make improvements by a given deadline based on the regulations. Failure to improve by the given deadline will result in cancellation of the voluntary reduction plan.

Finally, the MOENV has set the ratio at 1.2 for the deduction of reduction credits from charged emissions for entities subject to carbon fees who use voluntary reduction plans and offset projects, providing that he deduction limit for using reduction credits shall not exceed 10% of the enterprises' charged emissions. This is to encourage these entities (i.e., major emission sources) to lead those not subject to carbon fees to take reduction efforts and keep funds in Taiwan,. To recognize enterprises' early reduction efforts, it is specified that enterprises not of high carbon leakage risks and participating in the pilot reduction products are eligible for the 30% ration of deduction of reduction credits from the charged emissions for the first 3 years of the collection of carbon fees. Additionally, enterprises not of high carbon leakage risks are eligible to use foreign reduction credits approved by the central competent authorities as an extra supporting package, provided that no more than 5% is deducted from the charged emissions.

The MOENV expressed that Green Point collection will continue to expand green shopping services for Green Points and incentivize more environment-friendly actions to guide the public towards living a net-zero green life. One simple action, however small, can make a big difference in the world if multiplied. The MOENV also sincerely invites more people to join in Green Point collection, act to protect the environment and contribute to a good future for the Earth. Everyone is welcome to download the Green Points APP and become a member, to "Go with the green points and live a net

The MOENV Minister Peng Chih-Ming (middle) announced the three carbon fee sub-laws,

marking the arrival of carbon pricing era

2. MOENV Preannounces draft amendments of 2 Regulations of Continuous Emission Monitoring System for Stationary Sources to Enhance Real-Time Air Pollution Monitoring

On 21 August 2024 the MOENV preannounced the amendment drafts of the *Management Regulations for Continuous Emission Monitoring Systems (CEMS) for Air Pollutants from Stationary Sources* (固定污染源空氣污染物連續自動監測設施管理辦法) and the S*tationary Pollution Sources Required for Installation of Continuous Emission Monitoring Systems in Public and Private Venues and System Links to Competent Authorities* (公私場所應設置連續自動監測設施及與主管機關連線之固定污染源) (referred to as the CEMS-required pollution sources). Responding to recent public concerns toward air pollution issues derived from use of resource circulation fuels, such as solid recovered fuels (SRF), and thermal treatments of hazardous industrial wastes, these amendments will serve to expand control targets for real-time information of pollutant emission status, intensify controls on pollution monitoring, and properly carry out pollution preventions and controls.

The MOENV explains that the first through fifth batches of CMES-required pollution sources have been gradually announced since 1993. This time, the sixth is added to include stationery sources where resource circulation fuels are used or hazardous industrial wastes are subject to thermal treatments. The aim is to align the key strategy of resource circulation and zero waste promoted as part of international net-zero trends and also respond to possible air pollutions from converting wastes into energy. It is specified that, in addition to existing list of CEMS-monitored pollutants, large pollution sources where resource circulation fuels are used shall monitor carbon monoxide (CO) and hydrogen chloride (HCL), both with potential pollution risks, just like incinerators are required to do so. On the other hand, pollution sources adopting thermal treatments for hazardous industrial wastes are subject to control by treatment size to ensure proper pollution source management while promoting net-zero strategies. With the sixth batch of controlled subjects added, it is expected that the MOENV will keep track of more than 70% of sulfide oxides (SOx) and nitrogen oxides (NOx) emitted from nationwide stationery sources via CEMS.

The MOENV stresses that addition in the draft amendments allows city, county, and municipal competent authorities to extract collected data and handle system inspections regarding approved monitoring facilities as well as enhance existing management systems. For pollution sources with major violations of the *Air Pollution Control Act* (空氣汙染防制法), the local competent authorities may be authorized to designate such sources as a target required to be connected to CEMS so as to monitor their pollution emissions in real time. The purpose is to stay on top and ensure that those committing major violations properly prevent and control pollution in the follow-up improvement according to relevant regulations and avoid repeating violations.

3. MOENV Preannounced Draft Amendment of the *Effluent Standards*

The MOENV preannounced the amendment of the *Effluent Standards* (放流水標準) on 27 August 2024 to maintain the quality of water bodies and promote pollutant reduction and control. The

control measures are added or tightened on ammonia nitrogen, phosphorus, copper and free available residual chlorine. It is expected to increase the total control amount of ammonia nitrogen in industrial wastewater from 80% to 92%, reduce the loading on water bodies from discharge of high-concentration phosphorus, and continue to reduce the copper level in specific river basins, improving water body quality and wastewater reutilization.

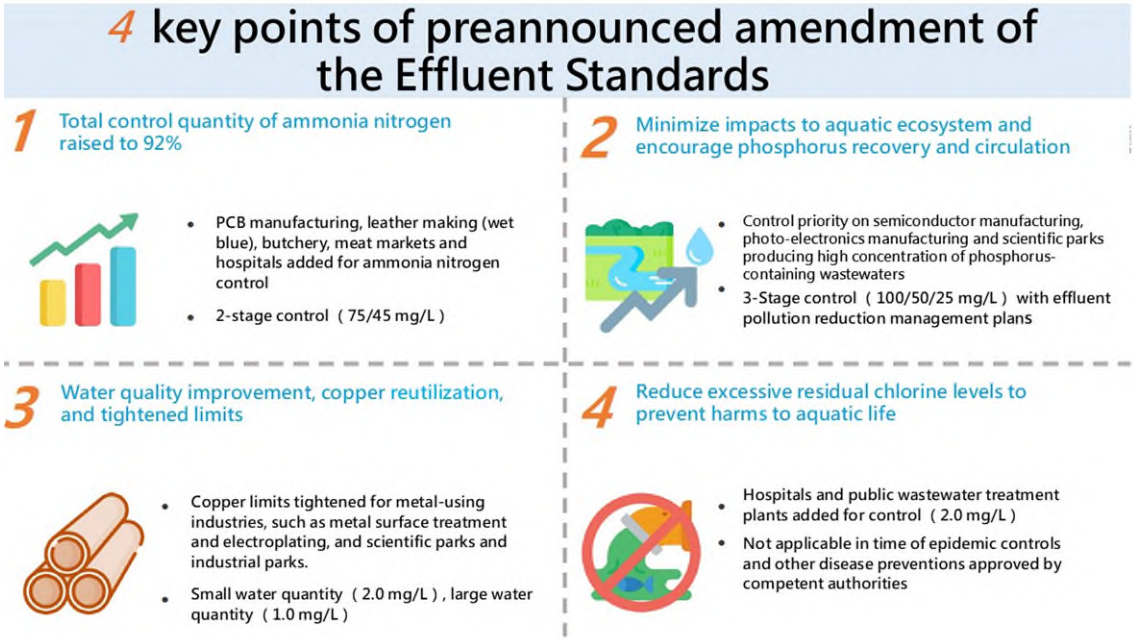
The MOENV further explains that the pollution reduction efforts have seen some solid reduction results since Effluent Standards added controls on 13 types of ammonia nitrogen targeting industries including wafer foundry and semiconductor manufacturing since 2011. However, the total emissions of ammonia nitrogen in wastewater produced by non-controlled ammonia nitrogen-generating industries, such as leather manufacturing (that of finished leather products from wet blue), printed circuit board (PCB) manufacturing, butchery, meat markets, hospitals and medical institutes, are still comparably high and hence necessary to be included under control. That is why the ammonia nitrogen control is added to the Effluent Standards in the revision this time.

The control on phosphorus, which is a nutrient salt, in Taiwan is imposed only on targets that discharge to water quality and quantity protection areas in order to mitigate the impacts on the aquatic ecosystem. The MOENV has studied relevant measures abroad and considered that industrial wastewaters with high concentration of phosphorus, discharged by certain industries, will affect water bodies or cause eutrophication. As a result, the total phosphorus control is added in the *Effluent Standards* on targets that discharge wastewater with high concentration of phosphorus and has the potential for resource circulation, such as wafer foundry and semiconductor manufacturing, photoelectric material and device manufacturing, and dedicated sewage systems in scientific parks.

The MOENV points out that they have been promoting the tightening of copper control limits in the *Effluent Standards* for metal-related industries, scientific and industrial parks, and petrochemical industrial parks of certain scale since 2017, resulting in certain reduction. Considering the low achievement rate of water quality criteria by type of water bodies in certain river basins in terms of copper, and to improve water body quality and encourage enterprises to reutilize copper, the copper control limits are tightened in the *Effluent Standards*, covering the targets mentioned above and metal-related industries originally below the scale specified above.

Also added to amendment of the Effluent Standards is the control on free residual chlorine as an attempt to keep hospitals, medical institutes and public sewage systems from adding excessive chlorine. Such practice results in excessive level of residual chlorine or production of disinfection byproducts, both harmful to aquatic organisms. The discharge shall not exceed 2 mg/L. However, the criterion may not apply in case of epidemic control or special needs for hygiene and sanitation.

The MOENV emphasizes that the amendment is based on international control trends, results of investigations on domestic industrial wastewaters, effects on water body quality, public opinions and feasible treatment technologies. A sufficient buffer period is provided. With total phosphorus control as an example, the buffer period is given with control limits in three stages, and those with technical difficulties or with constructions involved as improvement measures may propose effluent pollutant reduction management plans for an extension of implementation. In addition, the MOENV is pushing development and promotion of new wastewater treatment technologies. Those interested in resource reutilization and low-carbon technology and also qualified may apply for subsidies to become sites for demonstrational projects.



Summary of amendment of the *Effluent Standards*

4. Draft Amendment Preannounced for Stationary Sources in Public and Private Premises to Increase Air Pollutant Emission Testing Frequency Regarding Resource Circulation Fuels

The MOENV preannounced draft amendment of the Stationary Pollution Sources in Public and Private Premises Required for Regular Testing and Registration (公私場所應定期檢測及申報之固定污染源) on 14 August 2024 in order to address the recent public concerns on using solid recovered fuels (SRFs) to convert wastes into energy. The revision specifies that public and private premises using resource circulation fuels, such as SRFs and waste-derived fuels, shall perform regular tests on air pollutant emission. The pollutants to be tested are dioxin, heavy metals, particulate matters, sulfur dioxides (SOx) and nitrogen dioxide (NOx). This is to intensify efforts to ensure proper implementation of air pollution controls in public and private premises while they use resource circulation fuels.

The MOENV explains that three draft amendments were preannounced on 20 June 2024, including the *Fuels Used in Stationary Pollution Source to Comply with Co-firing Ratios and Component Standards* (公私場所固定污染源應符合混燒比例及成分標準之燃料), *Co-firing Ratios and Component Standards for Fuel Used in Stationary Pollution Sources* (公私場所固定污染源燃料混燒比例及成分標準) and *Air Pollution Emission Standards for Boilers* (鍋爐空氣污染物排放標準). Such move was in response to the possible air pollutions coming from promotion of converting wastes into fuels under the Pathway to Net-Zero Emission by 2050. The focus is to intensify air pollution controls on the use of resource circulation fuel through fuel composition classification (including three types, biofuels, SRFs and, waste derived fuels), restricted use in production process, specified air pollution control equipment and tightened air pollution emission standards. This amendment requires those using SRFs and waste derived fuels to regularly test for pollutions inside

emission pipelines, and ensure proper operation of air pollution control equipment at public and private premises, implementing proper pollution management for the use of resource circulation fuels.

The MOENV stresses that the comprehensive management of the use of resource circulation fuels has been gradually strengthened from the fuel composition at the source to fuel-using equipment and pollution control. Through tightening the pollution emission standards, enhancing regular testing and disclosing test results public inquiry, public and private premises are made sure to shoulder responsibilities for pollution controls while using resource circulation fuels, ensuring both the promotion of net-zero strategies, effective pollution controls, and safeguarding people's health all at the same time.

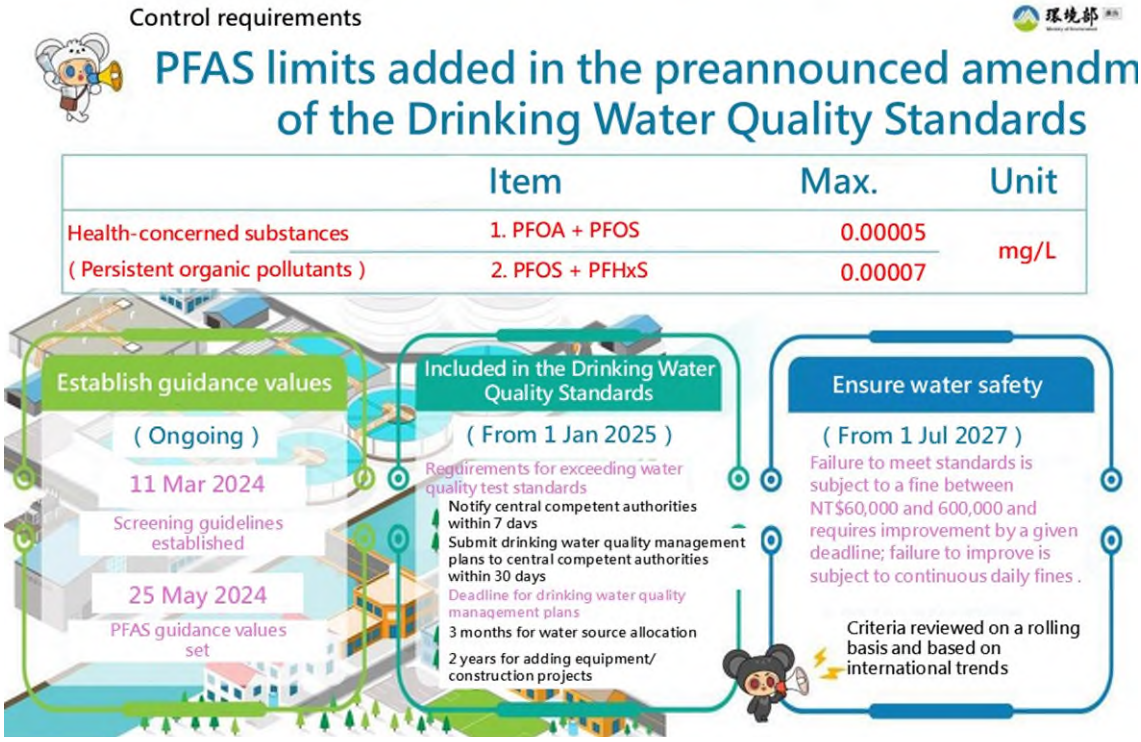
5. Amendment Preannounced for the Drinking Water Quality Standards in Line with PFAS Control Trends

Per-and polyfluoroalkyl substances (PFAS) are persistent organic pollutants that are carcinogenic and, therefore, hazardous to human health once they find the way into the drinking water supply system.

The MOENV developed the *Guidelines for Testing, Management, and Screening of Emerging Concerned Items Regarding Drinking Water Quality* (飲用水水質新興關注項目檢測管理及篩選作業指引) on 11 March 2024. Then on 24 May 2024 certain guidance values, including "perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) combined at 50ng/L" and "PFOS and perfluorohexanesulfonic acid (PFHxS) combined at 70ng/L", were introduced as reference for administrative management.

The *Drinking Water Quality Standards* (飲用水水質標準) have been introduced in response to the international control trends and to intensify management efforts. Revising Article 3-1, the amendments this time have added water quality standards for PFAS and relevant management requirements, in which those who operate water purification facilities are to intensify their voluntary testing management in two and a half years staring from 2025 and, If test results exceed the maximum allowed values, to notify the competent authorities and propose drinking water quality management plans. Implementation of the management plans are to complete within two years if requiring addition of equipment or construction projects or within 3 months if construction projects are involved.

Also starting from 1 July 2027, efforts will be made to enhance random inspections, and failure to meet the drinking water quality standards for PFAS will result in being immediately fined between NT$60,000 and 600,000 and compulsory improvement by a given deadline. Failure to improve by given deadline will be subject to further daily fines. The Standards will be reviewed in a rolling basis and subject to revisions or tightening based on international control trends, as to ensure the safety of drinking water.



Revisions of the Drinking Water Quality Standards preannounced, adding PFAS standards in Article 3-1

6. 8+N Resource Circulation Alliance Founded Toward Circular Economy Via Collaboration Between Public and Private Sectors

Eight industrial alliances related to resource circulation attended the "Public and Private Collaboration, 8+N Circulation" ceremony on 30 August 2024. Over 200 corporate and government representatives from food production, plastics, textile, health, construction, electronic products, inorganic resources, recycling industry, and other fields together formed the eight alliances under the witness of the MOENV Minister Peng Chih-Ming, Director General Lai Ying-Ying of the Resource Circulation Administration (RCA) and alliance representatives. The alliance representatives shared the purposes and missions of establishing the alliances and the expected achievements in the upcoming year and talked with Minister Peng about the alliances' actions, hoping for more effective links within resource circulation industry via collaboration between the private and private sectors. It is estimated that value of the resource circulation industry will reach up to NT$370 billion by 2030, achieving the goals of green and digital transitions and environmental sustainability.

Minister Peng pointed out that circular economy is the key in responding to climate change and achieving net-zero emission and sustainable development. According to the State of Climate Tech, climate technology funds have invested significantly in circular economy, next only to climate adaptation and transportation. In particular, Minister Peng mentioned the three major funds in Taiwan's green growth strategies. From the Green Growth Fund, the MOENV will seek the investment of NT$10 billion on reduction and circular economy to boost corporate development. Regarding the Insurance Industry Funds, the MOENV has started joining force with the Financial Supervisory Commission to channel funds from insurance companies to circular economy. And lastly for the venture capitals, the MOENV is working with Taiwan Venture Capital Association to

encourage venture capitals to support circular economy and net-zero industries. These funding sources will become the important driving force behind industry development. All relevant enterprises are urged to work with the MOENV to expand the scale of circular economy and create new industry values. Hopefully, the alliances will expand from the eight current ones to include more and cooperate to create the economic scale for the resource circulation system. It is also hoped that the alliance members will back amendment of the *Resource Circulation Promotion Act* (資源循環促進法) as civilian supporters. It is believed that more possibilities and imaginations will become practical actions after revisions.

At the same time, with the international awareness of growing plastic pollution, the United Nations is promoting the Global Plastics Treaty as an attempt to solve the problem of plastics from production, consumption to disposal, and puts more emphasis on the importance of resource circulation. The MOENV is in charge of resource circulation and zero waste under the key net-zero strategies, and continues to strengthen effective resource circulation and use aiming toward the net-zero goal by promoting diversified waste treatment methods, creating circulation parks, and formulating solutions across ministries. In addition, the MOENV is also actively promoting the new cultural movement of environmental protection with measures such as implementing resource sorting and recycling, reducing use of plastic bags and disposable utensils, using more environmentally friendly products, facilitating sustainable consumption, and pushing implementation of resource recycling in both industries and people's daily life.

Chairman Eugene Chien of the Taiwan Institute of Sustainable Energy, as well as the former Minister of Environmental Protection Administration, is also excited about the completion of the *Resource Circulation Promotion Act*. He said that it was in his term that the *Waste Disposal Act* (廢棄物清理法) was amended to specify producers' responsibilities and establish the recycling system. With other policies like the "Alien Babies" to promote citizen education, Taiwan has outperformed the world in the field of recycling. Once the resource circulation industry grows to maturity in Taiwan, it will help the world and also put Taiwan on the global stage.

The RCA Director General Lai explained that since its establishment the RCA has developed the three major circulation strategies, which are "green design and source management", "energy and resource circulation", and "waste generation-disposal balance and management". alongside its two driving pillars, "smooth circulation network" and "innovative technologies and systems" By putting priority on promotion of ten key projects, the RCA hopes to achieve zero waste and the net-zero vision so as to deal with key issues regarding the circular economy, such as legislations, product costs, technological innovations, behavioral patterns, coordination and cooperation, industry transformation, and international environment. The MOENV just celebrated its first anniversary and has gradually transformed its role from a supervisor previously to an integrator and promoter. The purpose of establishing the 8+N resource circulation alliances is to build a resource sharing platform, improve efficiency of resource matching among industries, and strengthen resource circulation among industries through collaboration of public and private sectors and cooperation across different fields. The ultimate goal is to build up industries' economic scale and maintain smooth resource circulation channels.

When it comes to founding the 8+N Resource Circulation Alliance,"8" means linking the eight alliances that have existed, and "+N" aims to grow and bring in more organizations engaging in resource circulation into the alliance, ultimately creating a network that accelerates resource

circulation transformation together from design, production, consumption, recycling to circulation. This cross-domain communication can effectively enhance innovations and values of resource circulation products and services, and encourage formation of an resource circulation industrial chain consisting of manufacturing and service-related industries in the upstream, mid-stream and downstream, which will jointly increase the market influence and increase the industry's economic scale. The alliance has been formed with the government taking the lead in promoting the linkage of various resource circulation industries through MGM (member get member), proving various subsidies and regulatory adaptation, and introducing resources and funds through public-private collaboration to expand development. Moreover, enterprises are encouraged to introduce digital technologies and tools to improve resource circulation efficiency, accelerate the development of circular economy, and expand economic scale.

The 8+N Resource Circulation Alliance will organize regular meetings or workshops to build a resource circulation platform that incorporates industries, the government, the academia, and the research community Strengths from all fields will be integrated to stay on top of trends and technological developments home and abroad and work together on promotion plans. The Alliance will provide suggestions on policies as important references for policy planning and evaluation, and jointly facilitate the amendment of the Resource Circulation Promotion Act. Hopefully, it will strengthen the effective resource circulation, increase the production values of the resource circulation industry, provide more advantages for Taiwan's resource circulation industry in the global market, and achieve the vision of zero waste and net-zero emissions.

The MOENV Minister Peng Chi-Ming, the RCA Director General Lai Ying-Ying, and alliance representatives witness founding of the 8+N Resource Circulation Alliance

Eight industrial alliances involving resource circulation and representatives from more than 200 businesses and ministries across various fields attend the founding ceremony

Alliance representatives talk to Minister Peng for more effective linkage of resource circulation industries trough collaboration between the government and private sector.

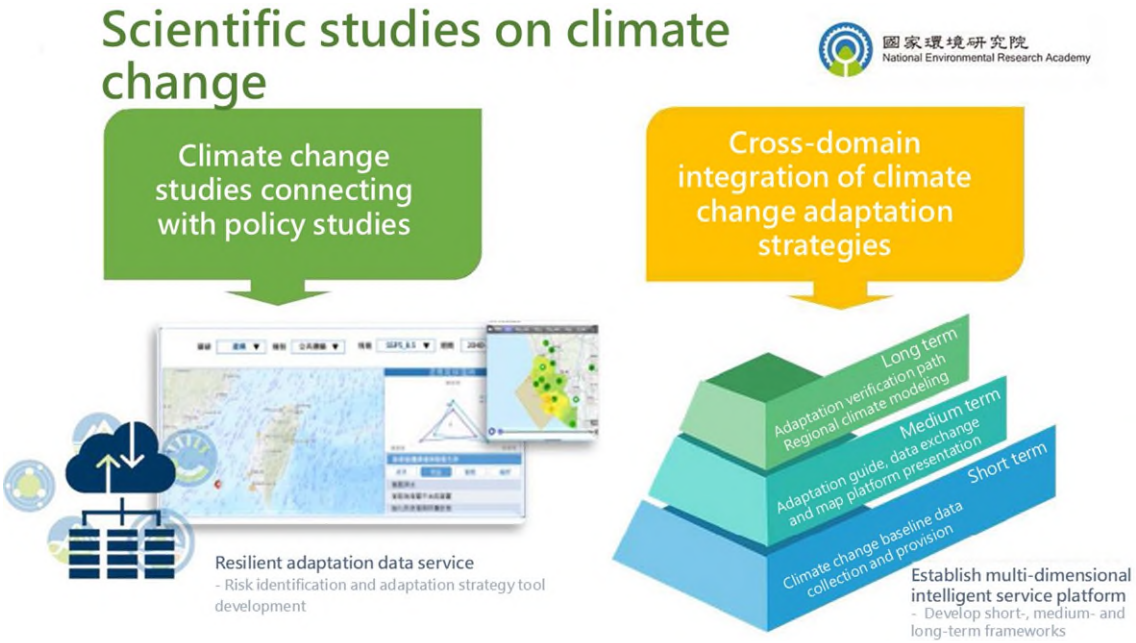
7. National Environmental Research Academy and Central Weather Administration Cooperate to Expand Climate Change Research Capacity

Regarding the improvement of Taiwan's climate change response capabilities, the National Environmental Research Academy (NERA) of the Ministry of Environment (MOENV) joined forces

with the Central Weather Administration (CWA) of the Ministry of Transportation and Communications (MOTC) to rapidly expand their capacity to conduct climate change research. A Memorandum of Understanding (MOU) between the MOENV and the CWA was signed on 14 August 2024 at the MOENV office, which will improve cooperation and enable more effective use of scientific and technical R&D resources from both sides.

The NERA indicated that the CWA is in charge of the monitoring, analysis, simulation and estimation of weather and sea conditions, which is closely related to what the NERA does in terms of climate change studies. In particular, the CWA recently put its sixth generation super computer into operation and established a GPU (graphics processing unit) computation system to accelerate the development of AI (artificial intelligence) weather forecasting applications. With this in mind, the NERA and the CWA combined existing computing resources, and plan to cooperate with domestic and foreign industries and academic research circles to actively use advanced data science and technology to develop digital systems for climate change adaptation and decision-making. The NERA has laid a solid foundation in environmental research over a long period. Combined with the CWA's rich data and experience in meteorology services, cross-domain cooperation will surely produce abundant results. The MOU sets the direction for future cooperation between the two agencies, with climate change, environmental governance, and pollution prevention among the focuses of joint research.

At present, the NERA, the CWA and other agencies are working hard on a plan to integrate cross-domain applications related to climate change adaptation and risk resilience, which is expected to facilitate work on major domestic issues such as climate change adaptation and risk resilience building. At the same time, through cooperation in climate adaptation research and service platform construction, a climate service collaboration platform will be established to provide climate science information services and practical applications that are closer to users. This will serve as the scientific basis for the national climate adaptation strategy and help transform Taiwan into a low-carbon, sustainable and climate-resilient society.



Building an intelligent service platform for climate change adaptation

The MOU signing ceremony with President Tsung-Yung Liu of the NERA (front row, 5th from left) and Administrator Cheng, Chia-Ping of the CWA (front row, 6th from left)

President Tsung-Yung Liu of NERA (left) and Administrator Cheng, Chia-Ping of CWA (right) signing the MOU

President Tsung-Yung Liu of NERA (left) and Administrator Cheng, Chia-Ping of the CWA (right) with the signed MOU

8. MOENV Cooperates with Other Ministries to Help Businesses Improve Chemical Incident Response Capabilities

The Ministry of Environment (MOENV) organized the "Seminar on Integrated Toxic and Concerned Chemical Substance Disaster Information Reporting and Prevention Mechanisms and Award Ceremony for Excellent Operations and Management Joint Defense Organizations" at the Zhongxing Campus of the Industrial Technology Research Institute (ITRI) on 6 August 2024. Experiences and views were exchanged regarding the domestic toxic incident response system and recognition given to those involved in toxic incident prevention and response. Hosted by Minister Peng Chi-Ming, the event was combined with industrial and inter-ministerial case studies and exhibitions on new disaster prevention and response technologies. Head of the Executive Yuan, Premier Cho Jung-Tai was in attendance to interact with over 500 people from industry, government, academia and research circles and review the efforts and achievements over the past year in toxic/chemical incident prevention and control by both the public and private sectors.

Premier Cho began his speech with praise for the 29 emergency response organizations that have performed outstandingly in the joint prevention and control of toxic/chemical incidents this past year and recognized their dedication to environmental incident prevention and response. He expressed his appreciation for their active cooperation with the government's incident prevention and management policies. In the aftermath of the Launchtech fire in Pingtung in September 2023, the government worked with its subordinate agencies through the "National Chemical Substance Management Board" and put available resources together to fully strive to fulfill chemical substance management policies and duties. The "Mobile Innovation AI Cabinet" also hopes to invest in more private professionals, provide more new intelligent technologies and knowledge, and work together across domains to implement independent incident prevention measures in industries. The government has established the "101 Action Strategies" to introduce AI to improve incident

prevention and response management across agencies. The aim is to innovate and formulate more pragmatic and efficient policies so that the vision of "effective management of chemical substances and building a healthy and sustainable environment" will be gradually realized in Taiwan.

Minister Peng stated that this seminar served as a platform for cross-domain exchanges and interactions, and he was very happy to see everybody assembled. As in previous years, industrial and emergency response organizations shared their experiences in toxic/chemical incident response. In addition, the Taiwan Responsible Care Association was invited to share its rich experience in joint operation and management of incident prevention organizations. The Bureau of Industrial Parks of the Ministry of Economic Affairs, the Chemicals Administration of the MOENV, the National Fire Agency of the Ministry of the Interior, and the Occupational Safety and Health Administration of the Ministry of Labor were also invited to share their experiences in "inventory, management, inspection, and training", using the Launchtech incident as a case study.

The Ministry of Economic Affairs revised the *Factory Management Act* to improve the management of hazardous goods in factories. The Ministry of the Interior revised the *Fire Services Act* to improve the commercial sector's management of goods and equipment that pose public hazards and to strengthen the reward mechanism for whistleblowers, and it introduced incident response technology to improve the safety of firefighters. The MOENV's Chemical Cloud is a cross-departmental data transfer platform for declaring chemicals, customized for departmental needs, to track and audit irregularities among manufacturers, to assist competent authorities with gathering data on operations involving hazardous goods, to help fire departments conduct training to contain chemical plumes, and to improve the overall effectiveness of incident response. The Ministry of Labor has strengthened supervision and inspection mechanisms for "priority chemicals to be managed" to ensure that government agencies have adequate information on high-risk factories for the sake of worker health and safety.

For the incident prevention and response technical demonstration, the MOENV introduced AI and demonstrated its capabilities in cross-domain cooperation and its potential to improve the effectiveness of incident prevention and response. For example, the MOENV is cooperating with the Ministry of Economic Affairs and industry on the introduction of AI to improve the image recognition of real-time monitoring systems in science parks. The MOENV is also cooperating with ITRI to create virtual reality and simulation modules for emergency response personnel training, using robots equipped with detection capabilities, and AI big data analysis to quickly identify sources of pollution or other substances. The use of new technologies enables gathering of more accurate information in real time to assist decision-making and mitigate the risk of severe incidents and disasters.

The MOENV stated that the prevention of and response to toxic/chemical accidents depend on the integration of cross-departmental resources and collective efforts, and hoped that the industrial sector will continue to make good use of the power of emergency response organizations and deepen mutual assistance and cooperation, as they all jointly improve toxic/chemical incident prevention and response capacities. The MOENV will continue to introduce AI and new technologies for incident prevention and response, and further strengthen the toxic incident prevention and response system, to safeguard human well-being and the environment.

Premier Cho of the Executive Yuan and the winners of the National Emergency Response Organization In-depth Operation Award (from left to right: Director Pang Kuang-Chiang, Spokesman Chen Shih-Kai, award recipient, Minister Peng Chi-Ming, Premier Cho Jung-Tai, Magistrate Yang Wen-ke, Director Hsieh Yein-Rui, two award recipients, ITRI Executive VP Dr. Jwu-Sheng Hu)

Premier Cho delivering his keynote address

Premier Cho delivering his keynote address

Premier Cho experiences the XR chemical disaster command and response training system

Premier Cho and all seminar attendees

9. Japan, the Philippines and Taiwan Cooperate on Water and Soil Protection and Remediation Technologies

The Environmental Management Administration (EMA) of the Ministry of Environment (MOENV) organized the "International Conference on Collaborative Verification to Soil and Groundwater Protection Technology for Environmental Technology Verification (ETV) Program" on 29 August 2024 in Taipei City. The Japan Environmental Management Association for Industry (JEMAI) and the Industrial Technology Development Institute, Department of Science and Technology, Philippines (ITDI-DOST) were invited to explore an international mechanism of mutual ETV recognition and along with Taiwan deepen their cooperative relationship working with soil and groundwater protection technology in the Asia Pacific region.

The Environmental Management Administration (EMA) invited from Japan and the Philippines experts in environmental technology with many years of experience implementing Environmental Technology Verification (ETV) systems and technologies to come to Taiwan in order to launch a mutual certification system for soil and groundwater ETV in Southeast Asia. The invited professionals and scholars were joined by their domestic counterparts for in-depth interactions and discussions on ETV certification, verification and promotion. Deputy Director-General Liu Rui-Hsiang of the EMA said in his opening speech that Taiwan has accumulated rich experience and strength in research, development and practical application of soil and groundwater pollution remediation technologies. This conference was a great opportunity to help Taiwanese businesses better understand the international requirements and standards for environmental technology verification, hoping to further promote international cooperation in ETV and connect with the 12 member countries of the "Technical Working Group on Remediation for Soil and Groundwater Pollution in the Asia-Pacific Region" (ReSAG) for international mutual recognition of environmental technologies. This would contribute to Taiwan's capabilities in soil and groundwater pollution remediation technologies, and assist countries in the Asia-Pacific region with protecting and restoring soil and groundwater resources.

Dr. Kyashiro Ohno (大野香代) of Japan and Mr. Reynaldo L. Esguerra, ETV Program Director of the

Environmental and Biotechnology Group of the Industrial Technology Development Institute, Department of Science and Technology, Philippines, spoke about the current environmental technology verification systems used in their own countries and were very hopeful for a mutual recognition mechanism for ETV. The international experts shared examples of technologies that have been verified and the verification processes, while discussing how to reach a consensus and establish a platform for mutual technological recognition among countries under the framework of ISO 14034, which deals with environmental technology verification. Domestic certification/verification/testing bodies also attended the conference so that domestic businesses could understand the latest and future international trends in the field and of ISO 14034, and prepare to enter the international market in the future.

Taiwan is a leader in soil and groundwater remediation technology in the Asia-Pacific region. The conference successfully laid the foundation for cooperation between Japan, the Philippines and Taiwan in environmental technology verification, and set the ground for a number of potential cooperation opportunities, representing a firm step forward for Taiwan in promoting cooperation in international environmental technology.

Foreign guests and experts at the International Conference on the Collaborative Verification to Soil and Groundwater Protection Technology for Environmental Technology Verification (ETV) Program

10. Resource Circulation Administration to Hold Campaign to Replace Old Lighting Sources

The "Campaign to replace old with new lighting sources" started on 1 September and runs to 31 October 2024. People who "recycle light tubes/bulbs" and "buy LED light tubes/bulbs" at designated stores are eligible to register online at the event website for prizes, such as laptop

computers, cell phones and electronic vouchers.

Every home is lit up by a lighting source. However, old light tubes and bulbs, be they traditional fluorescent tubes, compact fluorescent light bulbs or the latest LEDs, have to be recycled, as they may lead to environmental pollution if not discarded properly. To encourage the recycling of light tubes and bulbs, the Resource Circulation Administration (RECA) of the Ministry of Environment (MOENV) has joined with Kuang Nan Fashion Shop, Carrefour, Test Rite Retail and Dance Light (Jan Cheng Group) for the “Campaign to replace old with new lighting sources”. About 250 stores throughout Taiwan have answered the call and are calling for all residents to replace and recycle their old, outdated lighting fixtures with LED lighting sources at stores in their neighborhood.

The RECA pointed out that up to 97,420 tons of conventional lighting fixtures have been recycled since the 2002 announcement of a target recycling rate of more than 90%. This rate is projected to exceed 95% in 2025. With the increased energy efficiency criteria for three types of fluorescent lighting products stipulated on 1 July 2024, it is expected that conventional lighting products will be phased out, even including energy-efficient and fluorescent light tubes and bulbs commonly seen in our homes.

The RECA further described how old lighting sources are collected by recycling trucks, at recycling points (such as recyclers) and by sellers of products for recycling. Recycled lighting products materials, such as glass, iron, aluminum and plastics, are recovered by undergoing pulverization and screening. The pulverized products are then further transformed into more useful materials, thus all residents are encouraged to not discard but recycle outdated light tubes and bulbs.

The RECA explained that LED lighting sources have longer service life, save more energy and reduce more CO_2 emissions than their conventional counterparts. For example, using an LED bulb (approximately 16W per bulb) can save up to NT$100 from a power bill, compared with a compact fluorescent bulb (approximately 32W per bulb). Say 20 LED bulbs are used in a 3-bedroom unit. The savings will be approximately NT$2000 for the power bill and with 200 kg fewer CO_2 emissions per year.

The RECA hopes that this two-month campaign will encourage people to check lighting sources in their homes and, more importantly, replace and recycle old light tubes and bulbs, allowing useful resources to find their way back into circulation. The lucky winner of the "Campaign to replace old with new lighting sources" is expected to be drawn in late November. For more campaign information, please visit: https://lightreca.com.tw/.

The Resource Circulation Administration is working with retailers and product manufacturers to encourage people to replace and recycle old lighting sources, thus save energy and reduce CO2 emissions.

Plastics recovered from recycled lighting products can be made into LED streetlight casings and

3D-printed wires.

11. MOENV Showcases Successful Results of Environmental Technology R&D

The Ministry of Environment (MOENV) held the "2024 Environmental Technology Forum and Results Presentation" on 27 August in Taipei City to showcase major advancements in environmental technology in 2023. The event drew the attention and participation of many international and domestic environmental protection experts and research institutes and provided a precious opportunity for people concerned about environmental issues to share ideas and learn from one another. This opportunity overseen by the MOENV demonstrated its firm dedication to promote innovation in and applications of environmental technology.

"Facing global environmental challenges, the applications of technological innovations have become increasingly important," said Shih Wen-Chen, Deputy Minister of Environment, in his opening speech. "We hope that this event encourages interactions and cooperation across various fields to explore feasible solutions and arrive at sustainable development together." Two keynote speeches were delivered at the forum. The first was on "Net-zero life and social transition," given by Dr. Chiu Hua-Mei, Associate Professor of the Department of Sociology, National Sun Yat-Sen University, in which she shared her insights from a social science point of view and led the audience deep into how to practice a net-zero lifestyle. The second was "3D air quality experiments in Kaohsiung and Pingtung as a joint effort between NASA and the MOENV", a talk on the MOENV's inter-ministerial project in cooperation with the US space agency. The project involved experts, scholars and NASA measurement stations analyzing high pollution events in southern Taiwan, meteorological effects, airflows, topography, and the physical and chemical characteristics of poluutants and and the mechanisms through which they transform, in an effort to improve the scientific basis for control strategies.

During the forum, the MOENV presented multiple scientific research results obtained in 2023. For net-zero emissions, the Long-range Energy Alternatives Planning System (LEAP) was used in the "Integrated evaluation of reduction effects through the net-zero path", and was combined with the "Community Multi-scale Air Quality" (CMAQ) model and Environmental Benefits Mapping and Analysis Program (BenMAP) to quantitatively analyze the reduction effects of net-zero emission efforts.

In addition, a presentation was made on a simulation model for evaluating the impacts of daily behavior changes on CO_2 reduction. For example, a scenario of wider diet change was presented, showing that 40 kg of CO_2 emissions can be reduced every year if everyone starts to eat 30% less meat and replaces it with vegetable sources that provide the equivalent calories. Another survey done by a domestic research body indicated that 37.9% of citizens are willing to adopt such a diet, which they estimated to reduce emissions by 356,000 tons of CO_2 every year, equivalent to 0.14% of Taiwan's total CO_2 emissions. These data indicate that one can contribute to CO_2 reduction in daily life by changing dietary habits.

There was significant progress in resource circulation as well. By integrating data on biomaterials across multiple government agencies, the MOENV established a biomaterials database and source map, which now contributes to the effective reuse of biomaterial resources and advancement toward the goal of resource circulation and zero waste. Apart from that, the development of a method to quantify the impact of CO_2 reduction provides a convenient means to determine how

much CO_2 would be emitted in various resource circulation scenarios, thus allowing for more detailed development of CO_2 reduction strategies.

In order to promote the applications of green chemistry more actively, the MOENV developed the "Diagnosis module for safer alternatives to high-risk chemicals", based on the 12 principles of green chemistry and the best international practices for safe alternative assessment of chemical substances. The module is an integration of international risk assessment tools that businesses can use to identify at source potentially harmful substances, which will allow them to seek out technically feasible alternatives earlier. The module identifies potentially harmful properties by examining chemical structures and comparing, cross-referencing and categorizing them according to similar known structures. The application of the module will be helpful for reducing exposure to hazardous substances during industrial production processes, minimizing environmental pollution and improving basic human safety and the quality of the environment.

The MOENV noted that this forum and presentation not only showcased the R&D results of environmental technology and shared new scientific and technological knowledge, but also provided a good opportunity for those concerned about environmental issues to participate, engage and make suggestions, which in turn encourages the sharing of R&D resources, and the dissemination of and interactions regarding technical results throughout the entire environmental technology domain. The MOENV will keep working with all interested parties on promoting the development of environmental technology and remain dedicated to building a healthier, safer and more sustainable environment.

Deputy Minister Shih with the forum moderator, speakers and honored guests

Deputy Minister Shih gives her opening speech

The attendees of the forum