

MINUTES of the 10th Tripartite Roundtable on Environmental Business

Date: September 26th, 2025

Location: Hilton Yantai Golden Coast Hotel, Yantai, China

Theme: Towards Carbon Neutrality: Actively Responding to Climate Change and Promoting Green and Low-carbon Transformation

Participants: Delegates from the People's Republic of China, Japan and the Republic of Korea

[SESSION 1: Opening]

Mr. Wang Zuguang, Deputy Director, Division of Technology Exchange, Foreign Environmental Cooperation Center, Ministry of Ecology and Environment (China), the Chair of Session1 started the 10th TREB.

Ms. Li Xia, Deputy Director General, Foreign Environmental Cooperation Center, Ministry of Ecology and Environment (China), made an opening remark welcoming all delegations. She emphasized the importance of open-minded discussions to promote technology transformation and upgrading of the environmental protection industry in the Northeast Asia region, shifting from end-of-pipe treatment to a green, low-carbon, and full-chain development approach. She also introduced the potential of the “3+X” model, which envisions cooperation not only among Tripartite countries, but also with other countries, fostering a regional network of green and low-carbon industrial technology partnerships and achieving multi-dimensional and multi-perspective

connectivity across a broader region.

Mr. Sun Ruichuan, President, Yantai Environmental Protection Industry Association (China), mentioned that Yantai has undertaken a series of strategic collaborations with Japan and ROK, focusing on regional environmental challenges and green energy deployment. He looked forward to the three countries working hand in hand to forge an even closer “green partnership” and further advance green economic and social development.

Mr. Cheong Myeong Kyoo, Director, Global Green Project Team, Ministry of Environment (ROK), gave a brief summary of the 9th TREB meeting. Since 2015, the three countries have held roundtables in which representatives of the government and private sector gather to share their experiences and discuss cooperation plans. The 9th TREB was held on September 27, 2024, under the theme of “Efforts among the three countries' governments and industries for carbon neutrality”. In the first topic of “Policies and Technologies for Green Hydrogen”, ROK gave a presentation on “Government Policy and Industry Status of Hydrogen Distribution in Korea”. China presented on “Exploration and Practice of Hydrogen Energy Development and Technology Innovation”, and finally, Japan presented on “Introduction of Initiatives to Create a Green Hydrogen Supply Chain”. The second topic was “Circular economy practice cases for Carbon Neutrality”. China presented on “95+ Heat Recovery Industrial Energy Saving and Emission Reduction Technology Applications”. Japan presented on “The Fifth Fundamental Plan for Establishing a Sound Material-Cycle Society and Practical Case Studies in Japan”, and finally, ROK presented on “Circular Economy Achieved by Digital Technology and AI”. The third topic was “Policies and Practice Cases for Transformation in the green Industry”. Japan presented on “Initiatives and PoC for “Visualization” of Supply Chain CO₂ Emissions through Inter-Company Data Linkage Using Digital Technology”. ROK presented on “DX Based Net-Zero Solutions for Industry”, and finally,

China presented on “Digital Transformation Practices of Major Science and Innovation Carriers in Green Industry”.

[SESSION 2: Green Finance Helps Achieve Carbon Neutrality Goals]

Ms. Ishii Yuri, Assistant Director, Minister’s Secretariat Environment and Economy Division, Ministry of the Environment (Japan), the Chair of Session 2, started the session with an introduction of the topic and presenters for the session.

Mr. Lee Oksu, Director of Sustainability & Climate Center, Kim & Chang (ROK), delivered a presentation on “Financing the Green Transition through Taxonomy”. Since the inauguration of the Trump administration, global sustainable finance has slowed, while investments in climate technologies and the energy transition sector have continued to expand with strong momentum. Global funds are expanding climate tech investment, with the power sector accounting for the largest share and other segments showing diversification across mobility and industrial technologies. Finance should guide industries toward carbon neutrality by expanding support for zero- and low-carbon activities while limiting or excluding financing for carbon-intensive and anti-climate activities. As disclosure regulations on sustainable finance take effect, stakeholders are increasingly raising concerns about the environmental integrity of green financial products offered by financial institutions. Guidelines related to green finance have been continually elaborated, and under the new government's policy, the role of financial institutions in transition finance is expected to be emphasized. The ROK government has decided to adopt the IFRS (International Financial Report Standard) sustainability disclosure standards, with the climate disclosure framework structured around four key elements, such as governance, risk and opportunity management, strategy, metrics and targets. The climate disclosure standard requires companies subject to disclosure to

report information on three climate-related management activities, such as current state analysis, strategy formulation and targets setting, strategy implementation and progress monitoring. ROK first established a taxonomy system in 2021 to define green and transitional economic activities, and it is carrying out revisions in 2025 to reflect changes in domestic and international conditions. This taxonomy system divides economic activities into green and transition sections, presenting activities related to greenhouse gas reduction targets-such as LNG and nuclear power as transition activities. To promote green finance, the government introduced Green Bond Guidelines reflecting its Green Taxonomy and is implementing systems such as external reviewer registration and interest subsidy support. Among the six environmental objectives, most green bonds have been issued for greenhouse gas reduction, with eco-friendly transportation, renewable energy, and energy efficiency accounting for the largest shares. At the end of last year, the government established Green Loan Management Guidelines applying the Green Taxonomy to lending, and in 2025 major banks are working to classify green loans. Under the new government's climate and energy policy direction, demand for green finance is expected to grow, both to strengthen the carbon competitiveness of industry and to support an energy transition centered on renewable energy.

Mr. Shao Kunkun, General Manager, IEM Qianting Holdings Co., Ltd. (China), delivered a presentation on “Technology Transfer and Investment Incubation in Green and Low-Carbon Fields”. Founded on July 31, 2017, as the legal entity of the operation and incubation investment of the base platform, IEM Qianting Holdings Co., Ltd. is responsible for the operation and management of the headquarters platform of the IEM Base and the investment and service of the ecological chain company. It has incubated 61 ecological chain enterprises, including 15 enterprises founded by international students, 5 sino-foreign joint ventures and cooperative enterprises, and 4 central enterprises and state-owned enterprises with mixed reform companies. The main business area covers:

traditional water supply, comprehensive water environment management, key technologies of zero-waste cities, soil remediation technology and equipment, hydrogen production equipment, CCUS technology and equipment, etc.. In the new stage of "International + Domestic" double cycle cooperation, the company focuses on customized cultivation of specialized and new enterprises to promote new quality productivity development. It has built an internal ecological chain based on the sharing mechanism. Its unique services include international green technology transfer and transformation, innovative technology investment and technology achievement evaluation, development and transformation of new technologies and equipment in the green industry, and green industry innovation and entrepreneurship and competitiveness. Its core services include technical feasibility study, scientific and technological achievement evaluation, prototype development, production of engineering prototypes, small batch prototyping, pilot testing of performance, application in engineering scenarios, commercial feasibility evaluation, industrialization planning, equity structure design, joint venture establishment, introduction of strategic investors, human resource development, implementation of demonstration projects, super team training camp.

Ms. II Sachie, Sustainability Chief Strategist, Sustainable Business Promotion Department, Mizuho Financial Group, Inc. (Japan), delivered a presentation on “The Role of Green Finance in Achieving Carbon Neutrality”. On February 18, 2025, the Japanese government approved the “GX2040 Vision”. It aligns with the reduction plan targets, the Plan for Global Warming Countermeasures, and the Seventh Strategic Energy Plan. The GX2040 Vision announced a roadmap centered on "decarbonization", "stable energy supply" and "enhancing industrial competitiveness". Sustainable finance refers to financial activities that promote the transition to new industrial and social structures and build a sustainable society. Sustainable finance broadly falls into the following categories: Labeled Finance based on global standards; finance that contributes

to ESG and SDGs even without having a label; and the integration of ESG factors into the investment decision-making process (a type of unlabeled finance). Achieving carbon neutrality requires both steady transition and industrial transformation in longer term. Realizing the industrial restructuring required for carbon neutrality will generate enormous funding needs for new technology development, industry restructuring, capital investment, and more. Green finance (transition finance) is crucial to meet these funding needs. For new businesses such as GX, policy measures need to be tailored to specific stages of innovation. To expand the GX economy, financial institutions must pursue sustainable finance, while businesses need to grow GX-related operations and demand for green products. To achieve this, financial institutions must establish an enabling environment for financing, while businesses must ensure project viability (government support is needed for both). Currently, securing off-taker demand is the challenge for both financial institutions and businesses. Reducing GHG emissions requires actions across the entire supply chain, necessitating the promotion of decarbonization management throughout the entire value chain, including small and medium-sized enterprises. The Ministry of the Environment is implementing initiatives to promote decarbonization across the entire value chain, create demand for green products, and provide community-wide support for decarbonization management. In addition to providing steady transition support, Mizuho aims to contribute to enhancing clients' corporate value and growth by envisioning the future from a medium- to long-term perspective with 4 main focus areas. Mizuho is promoting initiatives toward its goal of 100 trillion yen in sustainable finance by 2030.

These presentations were followed by interactive Q&A:

1) Question from a Japanese delegate: ROK has made significant progress in green finance. We would like to know more detailed explanations on how it was managed and practiced domestically. We understand that it involves detailed

classifications under the taxonomy, but we are also interested in how the system addresses the burdens on companies and the management capacity of the administering bodies (e.g., through the use of AI). We would appreciate it if you could share insights on how these aspects are being handled.

Answer: Based on green finance framework, ROK is currently undertaking several initiatives. For instance, during the classification process, there are six categories, five of which have just been introduced in the PPT(slides). These categories encompass sustainable development and solutions to environmental pollution, among other aspects, totaling six major classifications. The government has already taken relevant measures in this regard. Furthermore, these initiatives have undergone evaluations in terms of research and development, investment, and other collaborative areas. The government has also proposed six related initiatives, such as the development of green energy and carbon reduction efforts. In fact, numerous proposals concerning climate warming mitigation, carbon reduction, and technological advancements have been put forward. For example, the Ministry of Science and ICT has provided support for research and development. These technologies can also receive government approval and certification. In the process of industrial development and other efforts aimed at reducing carbon emissions and alleviating global warming, the country has also conducted relevant classifications and provided corresponding criteria for the types of investments that should be made in these classifications, such as greenhouse gas reduction and how to achieve green certification during the production process, as well as how the government approves these standards. ROK has indeed established such criteria. Additionally, under carbon reduction and carbon trading rights policies, initiatives are being proposed on how to establish these standards, such as how to classify the top 20% and the rest, and how to formulate corresponding policies. After reviewing the results, the country hopes to alleviate some burdens. This year, industrial classification and system

related to green categorization will also be practiced.

2) Question from a ROK delegate: In Japan, which industries are generally major carbon emitters? Industries such as steel and petroleum are considered pillar industries. Now, when it comes to providing financial or funding support, does Japan also offer corresponding financial assistance to large enterprises? As previously mentioned, most of these high carbon-emitting industries are dominated by large corporations, and the same situation applies in South Korea, where large enterprises contribute significantly to carbon emissions. Under the framework of green finance or overall green financing, such as the GX (Green Transformation) initiative, with the 2040 target leaving a deep impression on me, one of the goals is to strengthen corporate competitiveness, which is also included in the GX4 2040 vision. Therefore, does Japan also provide financial support to large enterprises in the context of green finance?

Answer: In fact, Japan also makes investment decisions based on different circumstances. We do not refrain from financing or investing in a company simply because they belonging hard to abate sectors, nor because it burdens our financial emissions. Instead, we focus on our engagement with clients to support commercialization of new technologies in hard to abate sectors, thereby reducing the emissions in our society and increase our investment returns. Additionally, regarding GX technologies, such as hydrogen and ammonia, we pay close attention to their profitability and potential for future development. Moreover, we believe in the importance of sharing wisdom and knowledge among China, Korea and Japan, as we face common and global challenges. Furthermore, when it comes to financing and investment, we must carefully predict costs and potential risks before proceeding. The performance of GX enterprises serves as our criterion for evaluation.

Additional question from ROK to Japan: Will large enterprises and small-to-medium-sized enterprises be treated differently during the investment process?

Answer: They are treated entirely differently. When it comes to financing, our approach for large enterprises and small-to-medium-sized enterprises (SMEs) is different. This includes considering factors such as industry scale and future development prospects, as well as risk profiles that differ significantly between the two. We evaluate each case on an individual basis. We recognize that not only large enterprises but also mid-sized and small-to-medium-sized enterprises constitute a significant portion of our client base. We handle large enterprises and SMEs separately, with different departments making judgments. However, we do not base our investment and financing decisions solely on the size of the enterprise, whether it is a large corporation or a mid-sized one, or its annual revenue or e-commerce performance. Instead, we assess their specific performance, future vision, and considerations regarding carbon dioxide emissions and green initiatives.

[SESSION 3: Circular Economy Practice Cases for Carbon Neutrality]

Mr. Min Jaehong, Vice President, Korea Environmental Industry Association (ROK), the Chair of Session 3, started the session with an introduction of the topics and presenters for the session.

Mr. Kaneda Akira, General Manager, Planning Division, Sustainability Department, Mitsubishi Materials Corporation (Japan), made a presentation on "Resource Recycling and Carbon Neutrality Initiatives". Copper scrap, copper-bearing residue, and E-scrap are recyclable raw materials. Scrap containing metals such as gold, silver and copper is processed through the pyrometallurgical copper smelting process. Au, Ag, Pt, Pd, and other metals are absorbed into anode copper, concentrated into copper electrolytic slime in the electrolytic process, and recovered in the precious metal process. Discarded circuit boards from electronic devices such as home appliances and personal

computers contain high concentrations of valuable metals such as copper and precious metals and serve as a new raw materials for smelting. Mitsubishi Materials has adopted the Mitsubishi Continuous Copper Process for copper processing. Features of the process are three stationary furnaces connected by launders, top-blow smelting by lance, and lime ferrite slag developed for C furnace. The challenge to decarbonization by recycling using Mitsubishi Continuous Process was introduced. (1) Fossil fuel substitution with E-Scrap. E-Scrap contains plastics and generates heat when combusted. With a plastic content of 30%, 2.9 tons of E-Scrap is equivalent to 1 ton of coal in energy value. The processing of E-Scrap not only recovers metal resources but also substitutes for and reduces the use of fossil fuels. (2) Reducing CO₂ emissions throughout the life cycle of copper by recycling E-Scrap. To increase copper production by 100 tons, recycling E-scrap would reduce CO₂ emissions by 282 tons compared to using natural resources. (3) Recycling of copper scrap. The CFP (carbon footprint) of electrolytic copper derived from copper scrap, fed into C furnace, is approximately 20% of the CFP derived from copper concentrate. Increasing the volume of copper scrap processed enables us to reduce the GHG emissions by approximately 80% compared to producing electrolytic copper from copper concentrate. Company-wide initiatives to achieve carbon neutrality in FY2046 contain (1) fuel conversion from heavy oil to LNG, electrification of facilities, (2) introduction of photovoltaic power generation facilities, replacement with high-efficiency facilities, switching to electricity derived from renewable energy, internal use of non-fossil fuel certificates for the company's renewable energy, consideration of the use of the Corporate Power Purchase Agreement (CPPA), (3) development of CCUS (Carbon dioxide Capture, Utilization and Storage) and other technologies that contribute to CO₂ reduction, (4) implementation of ICP (Internal carbon pricing) to steadily implement initiatives to reduce GHG emissions.

Mrs. Lee Yujin, Head of Sustainability Department, LG Chemical (ROK),

made a presentation on "Transforming Waste into Value: LG Chem's Circular Business Innovation". LG Chem operates a diversified business including petrochemicals, advanced materials, and life sciences. LG Chem's new growth engine focuses on sustainable business with eco-friendly materials, towards a global leader in battery materials, and world-class innovative drug development. Its sustainability goals are carbon-neutral growth by 2030 & net-zero by 2050, renewable energy 100% by 2050, transition towards circular economy, zero waste to landfill, ethical and sustainable supply chain. By turning waste into new feedstock, the company realized a circular economy for petrochemicals. Their certified sustainable products meet the global standards like UL ECV (Environmental Claim Validation), GRS (Global Recycle Standard), ISCC+ (International Sustainability and Carbon Certification), and LCA (Life Cycle Assessment) Calculation. For LG Chem, securing feedstock is a key to success in circular economy, establishing a closed-loop ensures materials and value recovery, supportive policy and regulation are essential to drive market growth.

Mr. Zhang Bo, Chairman of the Board, Shandong Mingsheng Environmental Protection Technology Co., Ltd. (China), delivered a presentation on "Harnessing the Power of Eco-Cycles to Turn Pollution into Resources". Currently, we are facing two seemingly contradictory pressures: one is the formidable task of emission reduction, the other is high costs, high energy consumption, and secondary pollution. Desulfurization methods are undergoing a paradigm shift from "Treating Waste as Waste" to "Turning Waste into Treasure". Ammonia-based flue gas desulfurization technology has advanced from staged dual-cycle technology to organic-compound fertilizer co-production technology. Technical advantages of ammonia-based flue gas desulfurization technology include elimination of aerosol formation and ammonia slip. Application cases include the ammonia desulfurization project (Phase II) for the cogeneration project in Shimen'ao Industrial Park of Putian city, the ammonia desulfurization project for a 300t/h boiler, and the flue gas

desulfurization project for a pulverized coal furnace.

These presentations were followed by interactive Q&A:

1) Question from a Japanese delegate: LG Chem has made significant efforts in recycling plastics and carbon reduction. I understand that there are still very few recycling technologies that can meet all three conditions — cost, off-takers, and stable large-scale processing. As an expert in plastic technologies, what kinds of technologies do you think could make those three aspects possible?

Answer: Plastic recycling has a history of six years so far, and obtaining raw materials has been the most challenging part. As we all know, the price of recycled plastic raw materials is currently 1.3 to 1.5 times higher than that of petroleum-based raw materials. In this process, plastics are not simply recycled but are processed into recycled resins for further circulation and utilization. The difference lies in that recycled resins, which circulate in the market, are not excessively expensive. This means that although there may be some defective products during the production process, all of these are included in the final product, yet the price remains relatively low. In fact, there are numerous recycling centers in different regions and cities in ROK, which implement classified management. The classification system is highly sophisticated. Therefore, starting from the government's overall waste classification initiative, a complete value chain must be established to enable large-scale recycling and utilization. Currently, the price of raw materials remains high, posing significant pressure on enterprises. We have been continuously exploring ways to control costs, but we expect that it will become even more challenging in the future. We are currently submitting numerous recommendations to the government. The rising cost of recycled or circular raw materials exerts tremendous pressure on enterprises. We hope that the government and the country can understand the difficulties faced by these enterprises. If all costs are passed on to the enterprises, these recycling

companies will not be able to sustain their operations in the long run, as costs continue to rise and product prices increase accordingly. In this case, customers would have to pay the price 1.5 times higher for recycled products. If we mix 50% recycled materials, the price would rise by 25%. However, the market's response has not been fully reflected, especially for plastic products. Currently, there is no penalty mechanism or fine for plastic waste (such as EVO fines), so customers in the market do not feel the impact. As a result, costs continue to rise, and the entire burden falls on the enterprises. Therefore, national policies or considerations must be taken into account when purchasing products.

2) Question from a Chinese delegate: Will Mitsubishi consider entering the electric vehicle (EV) battery recycling business in the future? What are your views on battery recycling? We all know that China, Japan, and ROK are vigorously promoting the development of electric vehicles. The first generation of electric vehicles introduced for transportation is approaching the end of their lifespan. If these batteries are landfilled, they will cause significant pollution. We would like to know your company's perspective on the recycling of electric vehicle batteries.

Answer: Electric vehicle batteries contain nickel, cobalt, lithium, and other elements. However, copper smelting alone is not sufficient when it comes to processing lithium-ion batteries. We are therefore conducting research on technologies to recover nickel, cobalt, and lithium from black mass.

3) Question from a ROK delegate: Mr. Akira, you mentioned earlier utilizing PCB (Printed Circuit Board) as a thermal energy source. In South Korea, its industrial applicability as an energy source is not clearly defined, and efforts are currently underway to redefine it for use as a thermal energy source. Does Japan distinguish between its recycling and re-recycling processes?

Answer: There are several issues with using waste circuit boards as fuel.

They contain flame retardants, so they don't burn easily—though once they do, they have a high calorific value. Pre-treatment such as crushing is required. They also contain halogens such as chlorine and bromine, which can cause corrosion in the equipment, so it's not easy to handle them in ordinary facilities. In the copper smelting process, however, the temperature is extremely high, and the main purpose is to recover the metals contained in the boards while also utilizing the heat. We believe that this process takes advantage of the unique benefits of copper smelting, including the ability to recover heat from the boiler.

[SESSION 4: Policies and Practice Cases for ESG]

Ms. Ishii Yuri, Assistant Director, Minister's Secretariat Environment and Economy Division, Ministry of the Environment (Japan), the Chair of Session 4, started the session with an introduction of the topic and presenters for the session.

Mr. Li Qi, Vice President of Marketing, Zhejiang Tongli New Materials Technology Co., Ltd. (China), gave a presentation on "Taizhou's Path Under Blue Circular Economy Leadership Building a Full Lifecycle Management Model for China's Plastics Industry". As a new platform company for comprehensive material research and development, Tongli Holdings focuses on "safe, environmentally friendly, comfortable, and convenient" new materials. Committed to innovative research and development of polymer materials and exploring sustainable development solutions. Engage in high-value recycling and utilization in the fields of automotive parts, electronic appliances, semiconductor devices, etc., enhance green competitiveness, and achieve both green and economic benefits. The company established a three-tier network of "vessel collection—land-based transfer—factory processing" to achieve multiple objectives, such as source reduction, high-value utilization, and poverty

alleviation through income generation. The Sustainable Product Ecodesign Regulation (SPER) came into effect on July 18, 2025, making sustainable products the norm and reducing carbon and environmental footprints. The EU requires that at least 25% of plastic in exported products must be recycled from post-consumer plastic waste. The company established a nationwide waste plastic recycling system covering key economic regions, forming three core recycling belts, and projected annual recycling capacity of 500,000 tons within five years.

Mr. Ohshima Kenta, General Manager, CSV Strategy Department, Kirin Holdings Co., Ltd. (Japan), delivered a presentation on “Kirin Group’s Environmental Vision and Integrated Approach to Environmental Challenges”. CSV purpose is pursuing four objectives: “Responsibility of the Group which runs alcoholic beverage business”, “Health and well-being”, “Community engagement”, and “Environment”. The brewing philosophy of “Reverence for Life” is the foundation of the Kirin Group's unique CSV management. TNFD is a global framework for companies to transparently disclose risks and opportunities related to natural capital and biodiversity. KIRIN was a pioneer in the world by disclosing using the TNFD metrics in 2022. Trial disclosure using the “LEAP approach” of the TNFD Guidance Beta v0.1 disclosed in 2022. TNFD beta v0.4 includes the results of the KIRIN scenario analysis conducted jointly with the TNFD team. KIRIN featured as a case study in the official TNFD guidance. 40% of Japan’s imported tea leaves come from Sri Lanka; 20% of those are used for KIRIN Gogo-no-Kocha. KIRIN Gogo-no-Kocha has driven growth of Sri Lanka's tea leaf exports. Climate change and natural capital are mutually interdependent. Supporting Rainforest Alliance certification for Sri Lankan tea estates conserves forests and ecosystems and supports climate adaptation. KIRIN has been supporting the sustainability and development of the Sri Lankan tea industry for a long time. KIRIN distributed pamphlets to raise awareness for local residents in water source areas (approximately 15,000

people). Enable smallholder tea farms to independently adopt and manage regenerative agriculture. Measurement and assessment across soil, biodiversity, water, crop resilience, and livelihoods. KIRIN believes that improving the working conditions of tea estate employees and enhancing their well-being will make the tea industry more attractive and lead to its development. In collaboration with the University of Tokyo, KIRIN is conducting research to identify the key components of well-being among estate employees and exploring initiatives to improve their well-being. KIRIN will also examine whether KIRIN's activities in Sri Lanka are enhancing the appeal of the tea industry and contributing to the improvement of plantation workers' well-being. Based on the results of the survey, KIRIN aims to implement necessary initiatives to improve well-being and contribute to the sustainable development of Sri Lanka's tea industry.

Mr. Kim Yeonju, Manager, Climate Change & Carbon Neutrality Project Management Department, K-water (ROK), delivered a presentation on “ESG Promotion Strategy through Hydro Energy Utilization”. Based on its capacity to execute and manage large-scale projects, K-water has grown into a comprehensive water service provider that covers the entire water cycle. In response to the deepening global water crisis, the company is leading a new era of water through mission-oriented innovation. It is establishing global leadership as the top integrated water company and taking the lead in implementing national carbon neutrality policies, such as the full-scale adoption of ESG management in March 2021 and the establishment of the 2050 Carbon Neutrality Roadmap in November 2021. Formulation of ESG Management Principles within the company-wide management strategy and the implementation of the Mid-Term ESG Promotion Strategy were carried out accordingly. Since the launch of hydroelectric power at Soyanggang Dam in 1973, as the largest renewable energy producer in the country, K-water is now operating 113 power plants and 176 generators, with a total capacity of 1,431 MW. Modernization and smart

power plants are underway due to the aging hydropower facilities. Tidal power generation is currently under review in connection with integrated water management, taking into account changing conditions such as the expansion of seawater exchange in Saemangeum (2024) and the re-establishment of the Master Plan (2025), as well as efforts to improve water quality and strengthen water management safety. In 2012, K-water launched the first commercial floating solar PV system with 100kW at Hapcheon Dam in ROK. K-water, Korea Rural Community Corporation, power generation companies, and local governments are currently operating floating solar PV systems, including 83 facilities and 555MW capacity. Since 2006, K-water has implemented hydrothermal energy systems in 32 facilities and completed the first large-scale supply to Lotte World Tower in 2014. Currently it is promoting full-scale expansion as a representative Green New Deal project aiming for carbon neutrality, including the Gangwon-do Hydrothermal Energy Cluster.

These presentations were followed by interactive Q&A:

1) Question from a Chinese delegate: Ms. Kim, you mentioned that we are utilizing new energy sources, including offshore solar power and green hydrogen. Is the electricity generated directly supplied to users, or is it integrated into the power grid? You also mentioned the PPA (Power Purchase Agreement) model, which also exists in China. How do we balance between the large national power grid and our new energy power grids? Will there be any competition? In China, for some existing electricity-consuming enterprises, they might generally continue with the traditional power grid format, while new electricity consumption scenarios might adopt new energy sources. This is a potential issue that China may face. I'm not sure if the same problem exists in South Korea.

Answer: I was referring to direct PPA, which is divided into on-site PPA and off-site PPA. So, what is on-site PPA? If there are registered enterprises in a specific area, we will supply electricity to that area, forming an on-site

PPA scenario. The majority of cases involve offices. In secondary PPA, the power-generating enterprise and the actual consuming enterprise are different. The power generated is not directly supplied to the enterprise but is instead fed into the grid. Although the contract stipulates that the enterprise will receive certification for using a certain amount of electricity, the power still has to enter the grid first. Therefore, our approach has minimal impact on the power system. Based on South Korea's experience, this is the case. However, for the national power grid, medium-sized generators with a capacity of over 20 megawatts, which are required to provide electricity promptly when necessary by the state, can sometimes impact the power system. This is the information I have. Currently, we have not yet implemented direct PPA for large-scale hydropower, but small-scale power supply is proceeding normally without any issues.

2) Question from a Japanese delegate: Mr. Li, from upstream to downstream, including the handling of plastics, I believe the work you've done is highly pragmatic and contributive. I have two questions. Firstly, as a representative of a private enterprise, to what extent has the government supported you, or has there been no support at all? What is the magnitude of the government's support and assistance? Secondly, as you engage in this line of work, you must certainly hope to further expand your business. What are your plans in this regard?

Answer: When we first entered this industry, we greatly hoped for government support. As our partners mentioned this morning, the initial investment in the PCR (Post-Consumer Recycled) industry is substantial. To enhance the performance of PCR materials to match or even surpass that of virgin materials, significant optimization is required, involving the addition of numerous additives and substantial investment. Economically, this is not a cost-effective endeavor initially, so we definitely needed some government support at the outset. However, for the industry to develop sustainably, it must also be profitable and operate on a market-driven basis. Therefore, our

current approach is to integrate the entire supply chain to reduce costs and ensure a certain level of profitability. Focusing solely on a single aspect would indeed make it difficult to progress. Hence, the key is to achieve economic efficiency through full supply chain integration, which represents a market-oriented operation that doesn't require additional government support. Our plan is to initially promote our solution domestically. Once our solution has been validated to operate under normal market mechanisms and can independently generate profits and operate, we hope to export our solution abroad, encouraging more countries and peers to adopt it, so that together we can address the PCR issue.

3) Question from a ROK delegate: Mr. Ohshima, recently, in the fields of natural resources and biodiversity, when engaging in such endeavors, we often discuss carbon credits and the numerical accumulation of such data with the aim of establishing a holistic mechanism for natural credit. In South Korea, various discussions on this topic are ongoing. My question pertains to the successful examples of your model implemented in Sri Lanka. Could the outcomes of such initiatives be quantified? Have there been any attempts on this? For instance, after implementing renewable energy agriculture and biodiversity restoration projects as you just mentioned, have there been any measured quantitative data or specific cases regarding the biodiversity gained or the extent of restoration achieved?

Answer: We began this initiative over 10 years ago with our partners. In that sense, we've been able to build a good relationship. We're taking a similar approach in Japan as well. For example, in wine production, we use the same approach at the raw material production sites — looking at biodiversity conditions, the impacts of climate change, and how to promote regenerative agriculture — just as we do in Sri Lanka. By accumulating data and applying the same method in different locations, we believe we can demonstrate tangible results. As for carbon credits, we have publicly stated

our policy on the types we handle. In short, rather than dealing with “gray” credits, we are working to identify and use credits that genuinely contribute to climate change mitigation at the local level.

4) Question from a Japanese delegate: Mr. Kim, when you introduced water electrolysis for hydrogen production and offshore floating power generation, you highlighted that cost is a crucial factor in producing renewable energy. If you’re going to use renewable energy, I think solar power is more efficient than hydrogen. How does the company—or Mr. Kim personally—view this?

Answer: The commercial viability and industrial development of hydrogen energy still face significant challenges. As a national institution, we will take the lead in conducting research and empirical analyses. We believe this will undoubtedly contribute to the advancement of hydrogen energy. Therefore, even if it lacks immediate economic benefits or profitability, we will still make efforts with government support and other resources as a public institution. Moreover, not just our institution, but I believe that national agencies, institutions, or associations in Japan, and similarly in China, should also make investments and conduct research in this field, even in the absence of immediate profitability.

5) Question from a Chinese delegate: Mr. Ohshima, you just mentioned tea products and beverages related to tea farmers. Currently, in China, farmers have a substantial surplus of grains, fruits, and other agricultural produce, with relatively short production cycles. Is there a way to introduce your mature processing techniques and technologies to China for the deep processing of these agricultural products, including fruits? Are you willing to invest or seek partnerships here to develop this sector?

Answer: Actually, regarding agricultural products, it's quite regrettable that we may not have particularly mature technologies for long-term preservation. However, we excel in logistics and work closely with our

suppliers to maintain the freshness of our raw materials. On the other hand, our business operations in China primarily focus on the beer sector, along with a portion of the beverage industry. We hope to establish a mutually beneficial relationship between our two countries and between our company and Chinese enterprises.

6) Question from Chinese delegate: Mr. Ohshima, I noticed that your company has collaborated with local farmers in Sri Lanka, including promoting environmental protection within farming communities. I'm curious about the local farmers' reactions. The reason I ask this is that many Chinese companies are now expanding overseas. When going abroad, the first step is to engage with local officials and farmers. From what I understand, farming communities in most countries tend to be quite conservative and sometimes reluctant to communicate with outsiders. I'd like to know how they responded to your environmental protection initiatives and whether you have any suggestions on how to communicate and collaborate with local indigenous populations as a foreign enterprise.

Answer: Actually, at the very beginning, we believed that communication was crucial. We encountered rejections, but over the years, we persisted with a long-term approach to win their trust and understanding. Moreover, we didn't act alone. We collaborated with third-party certification bodies, the local government in Sri Lanka, and both large-scale and small-scale tea farmers. Only in this way could we achieve better engagement with the local residents.

[SESSION 5, Exploring Pathways for International Cooperation on Green and Low-Carbon Technologies]

Mr. Wang Zuguang, Deputy Director, Division of Technology Exchange,

Foreign Environmental Cooperation Center, Ministry of Ecology and Environment (China), the Chair of Session 5, started the session with an introduction of the topic and presenters for the session.

Mr. Jackie Jang, General Manager, Wind Power Business Team, Hyosung Heavy Industries (ROK), delivered a presentation on “Offshore Wind, Beyond the Risk, Driving New Growth”. The Korean offshore environment includes abundant sea areas, a peninsula with three sides bordered by the sea, low wind speed, and varying water depth and seabed conditions. Offshore wind power projects are facing challenges like a prolonged development period and increased Capex. There will be attempts to scale up offshore wind farms to reduce Capex, but it remains uncertain whether this can be achieved quickly in terms of technology and finance. Government subsidies of renewable energy sources, consideration of the specificity of the energy industry, criteria for suitable countries for international cooperation with ROK, and application and introduction of new technology and equipment will change risks into opportunities.

Mr. Xu Liangfeng, Technical Manager, Zhejiang Guoquan Ecological Environment Co., Ltd. (China), delivered a presentation on “Application of Immobilized Carrier Targeted Microbial Technology in Aquatic Ecological Restoration”. After years of application, immobilized carrier targeted Microbial technology has demonstrated the following advantages: zero residual sludge, natural odor control, long-term carrier usability, energy efficiency, chemical-free operation, and customized solutions. Immobilized carrier targeted microorganisms need to find the right enzyme, the right microorganism, the right gene, and provide microbes with a secure “castle” to inhabit. The company’s core equipments are offshore targeted solid microbial cultivation and dosing systems, underwater targeted solid microbial release units, and ecological construction pilot vessels. Its engineering applications are integrated technology systems for

three-dimensional water ecological restoration, and provide technical advantages, like wide applicability, rapid treatment effectiveness, effective sediment digestion, no secondary pollution, and flexible application and simple operation.

Mr. Tada Mitsuru, Deputy General Manager, Overseas Business Operation Division, Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd. (Japan), delivered a presentation on “Transforming Waste to Energy for Decarbonization”. Mitsubishi Heavy Industries (MHI) group declared Mission Net Zero and has ambition to achieve carbon neutrality by 2040. In many countries, landfill is still most typical option for waste disposal. Methane from landfill site has a significant negative impact on climate change. Waste-to-Energy (WtE) can contribute to decarbonization, such as avoid methane emission, generate clean energy, and approx 50-60% of CO₂ is biogenic carbon. MHI has owned and operated the most advanced WtE plant in Singapore which can generate 136 MWh of clean energy. If TuasOne WtE plant were under operation in Indonesia, approx. 1,900,000 ton of GHG emission could be reduced annually which is 85% reduction from direct landfill. MHI Group has demonstrated the trial for separation, capture and effective use of CO₂ from WtE plant in Japan. Collaboration with Yokohama city and Tokyo gas. Waste-to-Energy is the proven and feasible option for decarbonization, especially for all countries where the government has a strong intention to solve the direct landfill issues.

1) Question from a ROK delegate: Mr. Tada, just now, it was mentioned that waste incineration is indeed an effective and simple measure, but it still produces some final by-products, such as fly ash, which is classified as hazardous waste. Could you share some of the mainstream and economically viable fly ash treatment technologies currently used in Japan?

Answer: Indeed, there is no doubt that this issue can be effectively resolved.

Thanks to technological advancements in Japan, as well as in China and

South Korea, the treatment of fly ash and waste-to-energy generation has reached a very high level of maturity, placing them at the forefront globally. These technologies excel in environmental protection and air quality control. For instance, Tokyo, Japan, has 20 such waste-to-energy power plants, many of which are located within residential areas. I believe we need not worry about the environmental performance; issues like fly ash and other waste can be effectively addressed through technology.

2) Question from a Chinese delegate: How does the cost competitiveness of electricity generated through incineration compare to that obtained through other methods? Or does the government provide any supportive policies to enable enterprises to effectively utilize this technology?

Answer: Waste-to-energy generation is not economically viable on its own, as coal-fired power plants are more efficient. Its main purpose is waste disposal rather than electricity generation, so costs are higher and efficiency lower compared with conventional power plants. In countries where waste-to-energy is common, such as Japan, South Korea, and China, governments cover waste disposal costs through taxes, effectively providing a subsidy. In countries where it is less developed — for example, Indonesia, the Philippines, Vietnam, and Malaysia — so-called PPP projects often leave the private sector to handle everything, making them commercially unviable, overly risky, and unattractive for private investment.

3) Question from a ROK delegate: Also to Japan, regarding the Tuas area in Singapore, which you just mentioned as an example, Singapore has similar operations possibly carried out by state-owned companies that hold a significant market share and also collaborate with China. From Mitsubishi's perspective, when entering the Singapore market, did you encounter any barriers to entry, or how did the government facilitate your entry? Did you enter through a bidding process? Could you provide specific details?

Answer: Regarding our project, we entered through a bidding process. As you mentioned, several large Singaporean enterprises, as well as Chinese companies, participated in the collaboration. We maintain a healthy competitive relationship with each other, which is inevitable. However, as we previously discussed regarding Tuas, we have been involved for 25 years. Our bidding package encompasses both construction and operation, not just the construction of infrastructure but also includes aspects like power generation efficiency and operational efficiency. Therefore, our initial investment might be larger, but overall cost reduction can be achieved. One of Mitsubishi Heavy Industries' strengths lies in our ability to generate electricity efficiently and operate with high efficiency, giving us an edge over our competitors. Nevertheless, when entering a market in any country, we cannot go it alone. We have never considered entering a market solely for our own profit. Instead, we hope to collaborate with strong local enterprises, as well as with our long-trusted partners from China and South Korea, to form a joint force and enter third-country markets together. This is our fundamental approach. Of course, the trilateral cooperation among China, Japan, and South Korea will take various forms, and we hope to further promote the widespread adoption of this technology.

4) Question from a Chinese delegate: Mr. Tada, regarding biomass or waste incineration power generation, where heat is generated through the simple combustion of biomass in fans and then utilized for thermal power generation, I believe this technological process still requires further improvement and advancement. For instance, by applying pressure or increasing temperature, referred to as high-pressure furnaces in the case of high temperature and pressure. Currently, the thermal efficiency of such furnaces is not very high. Moreover, under many conditions, combustible materials can produce significant side effects, resulting in high costs. I'm curious about your next steps—do you have any newer ideas or better ways to break through these bottlenecks? What

measures do you plan to take in this regard?

Answer: Both China and South Korea have our respective cooperative enterprises, and we have excellent partners who also possess many advanced technologies. For instance, when we employ new technologies and conduct empirical experiments or promote industrialization, we bring Japanese technologies to other countries while also collaborating with technologies from those countries in Japan. For example, we conduct large-scale empirical experiments in China and then bring these technologies back to Japan for industrialization and marketization, or even introduce them to third countries. Our system, initiatives, and framework for this are relatively well-established, and we maintain strong industry-academia collaborations with top universities in both China and Japan. Of course, representatives from various enterprises here today may become our great partners in the future. Naturally, if any of you possess excellent ideas or technologies, we are very eager to share and collaborate with you.

A follow-up question to Question 4: Regarding waste incineration, I believe it may currently be a necessary choice. This is because most of the garbage being incinerated consists of household kitchen waste, which is difficult to effectively classify. The recyclable and valuable waste has already been sorted out. Apart from some household waste, particularly restaurant waste in the catering sector, which is challenging to classify further, incineration is currently the best available option. Failing to incinerate such waste would actually be against the law. While some may argue that incineration is outdated, it is, in fact, the most suitable approach at present. After incineration, although some harmful gases are produced, most of them are effectively adsorbed by activated carbon and then disposed of through relatively mature methods like landfilling. From an economic perspective, this approach is currently the most feasible option. That's roughly the current situation.

Answer: I believe that not incinerating plastic waste will become a major global trend. Of course, what troubles us the most is establishing a

reasonable and ideal system for the recycling and reuse of plastics. We have been continuously pondering and exploring ways to enhance its scale, enabling further recycling and reuse without resorting to incineration.

5) Question from a Chinese delegate: Mr. Jang, you just mentioned wind turbine blades in your PPT. Since they can currently be regarded as a new type or potential solid waste, does South Korea have any relevant policies or specific measures in place for the recycling and resource utilization of wind turbine blades? Another question is, are there any standards or algorithms for calculating the carbon footprint of wind turbine blades?

Answer: Currently, South Korea does not manufacture wind turbine blades domestically and instead imports them from overseas turbine manufacturers, primarily from China. Additionally, regarding the recyclability of wind turbine blades, the government is paying particular attention to how to recycle them. As I mentioned earlier, most of the wind turbine blades are imported from China, where they are produced. With the increasing use and expansion of wind turbine blades, their carbon consumption is also continuously rising. Therefore, China, Japan, and South Korea are collaborating on relevant initiatives in this area.

[SESSION 6, Closing Session]

The closing session was made by the chair, **Mr. Wang Zuguang, Deputy Director, Division of Technology Exchange, Foreign Environmental Cooperation Center, Ministry of Ecology and Environment (China).**

Mr. Hirao Yoshihide, Director, Minister's Secretariat Environment and Economy Division, Ministry of the Environment (Japan), introduced the 11th TREB that would be hosted by Japan in 2026. Regarding the theme of the TREB11, it will be proposed by Japan, and they will share the suggestion by

email to China and ROK.

Mr. Cheong Myeong Kyoo, Director, Global Green Project Team, Ministry of Environment (ROK), made a closing address. He expressed his sincere gratitude to all the staff members who had worked tirelessly to organize this conference, as well as to the distinguished guests and entrepreneurs in attendance. He found both the presentations and the Q&A sessions truly outstanding and touch upon broad issues, many of which have touched aspects that of concerns. The entire Northeast Asia region is facing climate crises. He hoped that these three countries should work closely in the future to jointly address and actively cooperate on these challenges. Finally, he wished every delegate good health and all the best in their endeavors.

Mr. Hirao Yoshihide, Director, Minister's Secretariat Environment and Economy Division, Ministry of the Environment (Japan), made a closing address. He expressed his heartfelt gratitude to the Chinese side for the thoughtful arrangements and warm hospitality. He highlighted that discussions had been profound, extensive, and carried significant meaning. He observed that all delegates had gained new insights and engaged in deep contemplation. He hoped that the three countries would stand shoulder to shoulder and continue moving forward together, and Japan would successfully host the next year's conference and forge even stronger partnerships. Finally, he extended a special thanks to interpreters.

Mr. Wang Zuguang, Deputy Director, Division of Technology Exchange, Foreign Environmental Cooperation Center, Ministry of Ecology and Environment (China), made a closing address. He observed that all participants had engaged in thorough exchanges and discussions, yielding very fruitful outcomes. He expressed that China would be willing to actively promote green and low-carbon development alongside Japan and South Korea, leverage the

Roundtable to share successful experiences in environmental cooperation, building ecological civilization, and green development concepts with more partners, and contribute to regional sustainable development. He hoped that through this platform, good practices could lead to practical cooperation. Finally, He expressed gratitude to representatives from Japan and South Korea for their active assistance and support in this conference, and also extended sincere thanks to Department of Ecology and Environment of Shandong Province and Yantai Ecological Environment Bureau for their strong support, as well as to the Yantai Environmental Protection Industry Association and relevant enterprises for their enthusiastic participation.

At the end of session 6, TREB10 Commemorative photographs were taken during the photo session.