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**SUMMARY RECORD**

**THE 6TH GOVERNMENT-PRIVATE FORUM** **ON THE CLEANER ENERGY FUTURE INITIATIVE FOR ASEAN (CEFIA)**

**23 JULY 2024**

**THE SUKOSOL BANGKOK HOTEL, BANGKOK, THAILAND**

**INTRODUCTION**

1. The 6th Government-Private Forum on the Cleaner Energy Future Initiative for ASEAN (CEFIA) was held physically, in Bangkok, Thailand, on 23 July 2024, hosted by the Department of Alternative Energy Development and Efficiency (DEDE) of Thailand, in cooperation with the Ministry of Economy, Trade and Industry (METI), Government of Japan, and co-organised by the ASEAN Centre for Energy (ACE) and Boston Consulting Group (BCG) of Japan.
2. The Forum aimed to bring together the ASEAN+3 government officials, international organisations, and private companies to share updates on key activities and discuss future initiatives toward cleaner energy and decarbonisation technology to achieve the regional target of the ASEAN Plan of Action for Energy Cooperation (APAEC) Phase II: 2021 – 2025.
3. The Forum was attended by representatives from eight (8) ASEAN Member States, namely, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, and Thailand, Japan, and the Republic of Korea. The Forum was attended by a total of 73 participants. The list of participants is attached as ***ANNEX 01***.
4. The Forum adopted the agenda, which is attached as ***ANNEX 02***, and elected ACE to be the rapporteur.

**OPENING REMARKS**

1. **Mr. Wattanapong Kurovat**, Director General, DEDE of Thailand as Host Country, delivered his welcoming remarks. He emphasised the Forum's role in advancing energy transition and fostering deeper cooperation amidst challenges. He highlighted the focus on future activities essential for achieving a decarbonised energy system and encouraged building on past achievements to pave the way for a sustainable, greener energy future. He valued the insights and contributions of all participants and looked forward to fruitful discussions, welcoming everyone to the 6th CEFIA Forum.
2. **Mr. Kazuchika Iwata**, State Minister of Economy, Trade, and Industry (METI) of Japan, delivered his opening remarks. He emphasised the global challenge of climate change and Japan's commitment to realistic, responsive actions for decarbonisation and economic growth. Mr. Iwata praised the CEFIA initiative and outlined plans to accelerate efforts over the next decade, including zero-emission reduction initiatives and cross-border infrastructure for carbon dioxide emission reduction. Mr. Iwata concluded by announcing the next 7th CEFIA Forum will be held in Japan in 2025, featuring a site visit to showcase Japanese technology, and expressed hope for enhanced cooperation.
3. **Dr. Nuki Agya Utama**, Executive Director, ASEAN Centre for Energy, delivered his welcoming remarks. He emphasised CEFIA's role as a catalyst for change, fostering public-private cooperation to deploy cleaner energy technologies. He highlighted CEFIA’s contributions to achieving APAEC goals and enhancing collaboration with the private sectors and financial institutions through CEFIA's strategic projects focused on advances in clean-tech innovation and future decarbonisation plans. He concluded by expressing appreciation for the support and contributions, aiming for strengthened partnerships and a sustainable energy future in ASEAN.

**SESSION I: SETTING SCENE AND INTRODUCTION TO CEFIA**

**1.1 Updates and Achievements of APAEC Phase II: 2021 - 2025**

1. The representative of ACE presented the *“Updates and Achievements of the APAEC Phase II: 2021-2025”,* which is attached as ***ANNEX 03.*** The Forum noted the following key highlights:
   1. The APAEC Phase II: 2021-2025 aims to reduce energy intensity by 32% by 2025, particularly in the transport and industry sectors through the Energy Efficiency and Conservation programme area, also targets a 23% share of renewable energy in the Total Primary Energy Supply (TPES) mix and a 35% share in ASEAN's installed power capacity by 2025 through the Renewable Energy programme area.
   2. The status of Energy Intensity (EI) reduction target in 2022 reached 27.0% based on 2005 level. Assuming that the APAEC (Regional) Targets Scenario (APS) trend from the 7th ASEAN Energy Outlook (AEO7) continues, the EI reduction in 2025 will be 32.1% exceeding the 2025 EI target by 0.1%. With only a few years remaining until 2025, energy efficiency (EE) measures should be maintained to achieve the target.
   3. The updated Renewable Energy (RE) share in TPES reached 16.2% in 2022. With national policies (ATS), the RE share is projected to reach 17.5% in 2025, 5.5%-point gap of the aspirational target. Meanwhile, the RE updated share in installed capacity in 2022 reached 33.4%, decreased 0.2%-point from 2021. Continuing national efforts (ATS) would lead to the achievement of the regional target, 37.9% of RE by 2025. In the long term, a maximum of 63.2% RE share can be achieved in 2050.
   4. The mid-term review of APAEC Phase II indicated that implementation is on track, with a performance score of 4.3 out of 5. Future directions towards APAEC 2026-2035 include integrating cross-sectoral issues, focusing on greater connectivity and integration, and using the ASEAN Energy Outlook as a reference. Key focus areas towards 2026-2035 include energy security and resiliency, just and sustainable energy transition, and addressing cross-sectoral issues such as supply chains, circular economy, financing, and climate change.
2. The Forum suggested focusing CEFIA’s public-private sector collaboration activities on capacity building, best practices sharing, pilot projects, technology transfer, and policy framework assessment and development.
3. The Forum suggested future areas of exploration for CEFIA could include electric vehicles, fuel economy, green financing, hydrogen fuel ammonia, technology deployment incentives, blended finance mechanisms, grid interconnections, and building energy codes, among others.

**1.2 Overview of CEFIA and Report for Fiscal Year 2023**

1. The representative of METI Japan presented the *“Overview of CEFIA and Report for Fiscal Year 2023”,* which is attached as ***ANNEX 04.*** The Forum noted the following key highlights:
   1. Five CEFIA Forum have been held since 2019 with the 5th CEFIA Forum successfully held on 25 August 2023 in Bali, Indonesia, in conjunction with the ASEAN+3 Ministerial Meeting and the ASEAN Energy Business Forum (AEBF). Hosted by the Ministry of Energy and Mineral Resources (MEMR) of Indonesia, the Forum was attended by 80 participants with 23 speakers and panelists.
   2. Current EE&C related CEFIA flagship projects includes: (i) Zero Energy Building (ZEB), to promote and develop Net-ZEB, (ii) RENKEI, to disseminate control optimisation to reduce energy consumption throughout utility plants and manufacturing plants through Internet of Things (IoT), (iii) Microgrid, to introduce microgrid system combining wind turbines, solar power, and energy storage functions, (iv) SteelEcosol, to diagnose and introduce the best available energy-saving technologies (BAT) to the steel industries, (v) Biochar, to introduce the technology of storing CO2 as bio-charcoal while biomass gasification, and (vi) Air Conditioning (AC) - Excessive Cooling Protection (ECP), to disseminate AC-ECP which provides the same level of comfort even at high temperature settings.
   3. Activities for cross-cutting area includes: (i) Mobilisation of finance for energy transition and decarbonisation projects in ASEAN by ADFIAP, (ii) Visualisation of Greenhouse Gases (GHG) emission reductions in mobilising climate finance as an indicator for climate mitigation impact by Panasonic, and (iii) Cleantech innovation and entrepreneurial ecosystem for Micro, Small and Medium Enterprises (MSMEs) and start-ups through the Global Cleantech Innovation Programme (GCIP) program of UNIDO, in collaboration with ACE.
2. The Forum noted on the proposed flagship initiatives of Japan’s cutting-edge decarbonisation technologies include: (i) Hydrogen (JH2A), (ii) Ammonia (CFAA), (iii) Factory DX/GX (Mitsubishi Electric Thailand), and (iv) Activities of JETRO Bangkok.
3. The Forum agreed on Japan proposal to host the 7th CEFIA Forum for two days in February 2025, including a site-visit to showcase Japan’s decarbonising technologies.

**SESSION II: PROGRESS OF FLAGSHIP PROJECTS (FP) AND FUTURE ACTION**

**2.1 Activities of RENKEI Control: Unique and Integrated Concept on Energy Management System for ASEAN Business Establishments**

1. The representative of Japan Electronics and Information Technology Industries Association (JEITA) presented the *“Activities of RENKEI Control”,* which is attached as ***ANNEX 05*.** The Forum noted the following key highlights:
   1. “RENKEI” Control server equipment sets the optimised setpoint for the target equipment to achieve objective function. It improves energy efficiency in a short period without having to go through renewal or significant changes in existing facility. By adding a “RENKEI” control server to existing systems, the project aims to achieve a 10-15% reduction in energy consumption and CO2 emissions.
   2. Main activities of RENKEI from 2020 to 2023 included conducting capacity building for ASEAN universities, Energy Service Companies (ESCOs), and industries, through webinar and e-learning courses, research for potential CO2 emission reduction by RENKEI Control, presentations at international conferences, information sharing with ASEAN Government and ACE, demonstration feasibility study for the Malaysia District Cooling, Thailand Food Factory, and Indonesia Fertilizer Plant, and publish IEC 63376 Facility Energy Management System (FEMS) international standard.
2. The Forum noted on a plan for 2024 to conduct capacity building for energy auditor and energy manager (RENKEI Control Training Program) to help energy managers develop energy efficiency improvement plans and achieve significant energy savings.

**2.2 Activities of Zero Energy Building**

1. The representative of the Japanese Business Alliance for Smart Energy Worldwide (JASE-W) presented the *“Activities of Zero Energy Building (ZEB)”*, which is attached as ***ANNEX 06***. The Forum noted the following key highlights:
   1. JASE-W is supported by the METI of Japan and Japanese Business and Industry Association: KEIDANREN (Federation of Japanese Economic Organizations), with a mission to disseminate decarbonised technologies worldwide. Its activities focus on capacity buildings, information sharing, and project formulations.
   2. The ZEB Solution Working Group has been active since 2017, promoting ZEB in ASEAN countries. JASE-W introduced the ZEB family concept, which consists of (i) ZEB ready, with energy consumption saving of 50%, (ii) Nearly ZEB, with energy consumption saving exceeding 50% but not reaching 100%, and (iii) (net) ZEB, with energy saving of 100% or more.
   3. To disseminate the ZEB approach globally, JASE-W issued ISO TS-23764: Methodology for achieving non-residential zero-energy buildings (ZEBs) in 2021. This standard aims to improve the practicability of ZEB by promoting the ZEB family concept, which allows for a step-by-step approach to net ZEB.
   4. JASE-W has done several collaborations which includes: (i) MOU with Hanoi University of Civil Engineering, Vietnam, (ii) Workshop with MEMR, Indonesia, (iii) Seminar with DEDE, Thailand, (iv) Participation in Building Green 2024 by Philippines Green Building Council, (v) MOU with Sustainable Energy Development Authority, Malaysia, and (vi) participation in the ASEAN Sustainable Energy Week 2024 in Bangkok, Thailand, as part of its information-sharing efforts. JASE-W also publishes an annual booklet, "Japanese Smart Energy Products and Technologies”, compiling various smart energy products and technologies by Japanese companies applicable to the world.
2. The Forum noted on JASE-W’s plans for 2024, including organising workshops in Vietnam and Thailand, a seminar at Building Green 2024 in the Philippines, and new seminars in Indonesia and Malaysia.

**2.3 Energy Efficient Technologies in ASEAN Iron and Steel Industry (SteelEcosol)**

1. The representative of the Japan Iron Steel and Federation presented the *“Energy Efficient Technologies in ASEAN Iron and Steel Industry (SteelEcosol)”*, which is attached as ***ANNEX 07****.* The Forum noted the following key highlights:
   1. Steel sector is responsible for 8% of global final energy demand and 7% of energy sector CO2 emissions. BAT will play an important role in the ASEAN steel industry to reduce energy demand per steel ton. As Japan’s steelmaking process is considered the most energy-efficient in the world by deployment of BAT, the SteelEcosol aims to promote energy conservation in the ASEAN steel industry by BAT adoption and/or operational improvement.
   2. ASEAN-Japan Steel Initiative (AJSI) has started since 2014 with main activities including: (i) Steel plant diagnosis, (ii) Technologies customised list, and (iii) Public and private collaborative seminar. By 2023, AJSI has conducted steel plant diagnosis at 16 plants across six (6) AMS, namely, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Diagnosis was carried out by Japanese Experts to check operation and energy consumption status and evaluate energy efficiency level of the steel plant using ISO14404.
   3. In Fiscal Year (FY) 2023, an on-site steel plant diagnosis at the largest steel plant in ASEAN was conducted to propose measures to minimise heat loss, potentially reducing CO2 emissions by approximately 65,000 tons. Follow-up surveys assessed the status of energy use and the implementation of proposed measures, such as installing high-temperature recuperator for reheating furnaces. Moreover, the AJSI Webinar was successfully held on 6 February 2024, to provide information on government and corporate initiatives for carbon neutrality in the steel industry in Japan and ASEAN, attracting over 170 participants from eight countries.
2. The Forum noted that the proposed future activity would be to focus on reducing energy consumption and CO2 emissions in the steel industry. This includes supporting emission reduction projects through steel plant diagnoses and follow-up activities, sharing information and public-private meetings, and fostering ongoing collaboration between the AJSI with the support of CEFIA.

**Q&A SESSION**

1. The Forum noted and considered the request to expand activities in ASEAN, focusing on capacity building for energy managers and ESCO companies (energy consultants). The goal is to achieve a 10% energy saving from existing operations, with the percentage varying by site. Feasibility studies and operational data checks are part of the approach. A suggested improvement is the implementation of a government subsidy program to support diagnosis and reporting efforts by ESCO companies and energy consultants, which would increase the number of diagnoses.
2. The Forum noted and considered JASE-W’s supports to promote ZEB in ASEAN, including consultations on technologies for renovation and equipment replacement, schemes for establishing new financial mechanisms for zero-energy buildings, and raising awareness through seminars in each ASEAN country. The seminar aimed to address the common perception that renovation costs are very expensive. In Japan, renovation costs can range from 10% to 19% of the building price.
3. The Forum noted and considered the Japan Steel Federation’s offers to support the steel plants diagnostics activities aimed at disseminating energy-saving technologies to ASEAN, including the development of technical proposals based on the current situation of the steel plant by Japanese experts. Confidentiality regarding costs, energy consumption, and operational information is guaranteed. This approach is expected to receive a highly positive feedback, fostering trust and effective collaboration.

**2.4 CO2 Neutral Energy + Carbon Sink using Local Biomass**

1. The representative of Forest Energy presented the *“CO2 Neutral Energy + Carbon Sink using Local Biomass”,* which is attached as ***ANNEX 08****.* The Forum noted the following key highlights:
   1. Forest Energy develops and operates biomass power plants in Japan, using both boiler and gasification technologies. The company uses local biomass to produce electricity and heat, achieving about 80% energy efficiency. Small biomass units can be used in net-zero buildings and combined to create larger plants.
   2. Biochar, created through pyrolysis or gasification of biomass, contains about 90% carbon. Biochar carbon removal is a cost-effective Carbon Dioxide Removal (CDR) method, with significant potential for carbon sequestration.
   3. Forest Energy is actively testing biochar for use in carbon farming and construction materials, including biochar pellets, cement, and asphalt. They are also exploring new uses for syngas, a by-product of gasification, as a partial replacement for natural gas, LPG, or diesel.
   4. Forest Energy hosted the first Biochar webinar in January 2024, sharing updates of biochar production and application with 131 participants from Indonesia, Thailand, and other Asian countries.
2. The Forum noted that the upcoming activities will involve organising a 2nd seminar in one of CEFIA’s member countries, potentially Thailand, and seek partners for co-hosting this seminar. The company aims to conduct feasibility studies in 2025/2026 to explore biochar use in various countries, partnering with local universities and research institutes to adapt biochar products to regional needs and regulations.

**2.5 Carbon Neutrality Solution: Healthy and Energy Efficient AC System for ASEAN Market**

1. The representative of Daikin Industries presented the *“Carbon Neutrality Solution: Healthy and Energy Efficient AC System for ASEAN Market”*, which is attached as ***ANNEX 09.*** The Forum noted the following key highlights:
   1. Air conditioner energy consumption has increased due to higher ventilation needs from COVID-19. In Thailand, energy bills have risen by 36% due to excessive cooling practices in offices, where AC temperatures are often set too low (e.g., 23°C).
   2. During the 4th CEFIA Forum, Daikin introduced the Healthy and Energy Efficient Air Conditioning System (HECP), which included excessive cooling protection as a carbon-neutral solution. The HECP system features three types of Energy Recovery Ventilation (ERV): (i) System C that includes a heat exchanger, (ii) System D that includes a heat exchanger and a cooling coil for humidity removal, and (iii) System E that features optimised control through software. It is reported that after verification, the HECP systems (C and D) achieved around 40% energy savings compared to the common System A in ASEAN. System D provided the highest comfort by meeting ASHRAE standard 55. Additionally, the HECP system could reduce CO2 emissions by approximately 2,700 kilopounds per year in ASEAN, equivalent to the impact of 27 thermal power generators.
   3. Daikin conducted research on building airtightness in Thailand, finding that all five sites tested had inadequate airtightness, leading to higher energy consumption. Comparatively, Daikin’s Osaka R&D office had better airtightness. Through verification of setting the air conditioner to 26℃ in Daikin R&D Building in Bangkok, Thailand, approximately 40% of energy was saved and a reduction of 34 kg-CO2 was achieved, compared to standard of 24℃.
2. The Forum noted that Daikin will expand the HECP system to Vietnam, working with Ho Chi Minh City University of Technology. The system is being tested at the Daikin Service Call Center, with verification starting July 2024.

**2.6 Distributed by Renewable Energy**

1. The representative of Kyudenko Corporation and Furukawa Battery presented the *“Distributed Generation by Renewable Energy”*, which is attached as ***ANNEX 10.*** The Forum noted the following key highlights:
   1. Kyudenko Corporation's Energy Management System (EMS) is designed to adapt to varying electricity demands, reduces energy waste through output suppression and other methods, and integrates renewable energy sources in a complex and flexible manner, including biomass, wind, and hydroelectric power. The EMS system operates in two modes: an off-grid type, where buildings are powered solely by renewable energy, and an on-grid type, which is connected to the electrical grid. This dual functionality ensures stable operation and optimal integration of renewable energy sources.
   2. Successful implementations of Kyudenko's EMS include a project on Sumba Island in Indonesia in partnership with the Indonesian government since 2017. The project stabilised renewable energy on the micro-grid with 400 kW solar power system and 1152 kWh battery storage system. Furthermore, the project transmitted 200 kW of power to the local grid.
   3. Furukawa Battery's new product, FCP-500S and FCP-1000S, a super-mobilised lead-acid battery specifically designed for renewable energy applications. This battery boasts 6,000 charging and discharging cycles, translating to approximately 20 years of operation. While lithium-ion batteries are prevalent in the market, the lead-acid batteries offer numerous advantages, including safety, stability, ease of response, and simpler maintenance.
2. The Forum noted that the microgrid flagship project plans to hold webinars and other events in the future to explore the best solutions for integrating microgrid renewable energy systems. These initiatives aim to advance the understanding and implementation of 100% renewable energy solutions, with the ultimate goal of achieving a fully sustainable and renewable energy supply through innovative microgrid technologies.

**Q&A SESSION**

1. The Forum noted on the two key activities planned under the feasibility study by Forest Energy. The first involves using local biomass in various countries to produce biochar, with the aim of testing different types of biomasses to understand the variations in biochar quality. The second phase will explore the application of biochar in agriculture or construction materials, tailored to the interests of each country.
2. The Forum noted Daikin Industries' three-part approach to addressing the need for changing the excessive cooling culture. First, is the importance of government intervention by implementing policies that set air conditioning temperatures to a minimum of 26℃. Second, for building constructors to improve building air tightness to prevent energy loss. Third, urging the Air Conditioning Association to promote a combination of air conditioning and ventilation systems.
3. The Forum noted the detailed explanation of Kyudenko Corporation's technologies for microgrids. The use of renewable energy to maintain stable waveforms and provide redundant backups was highlighted. Additionally, the Forum noted the adaptability of the system to various environments, including extreme cold and remote islands, and emphasised the importance of operation and maintenance systems. The Forum also noted the improvements in technology, the promotion of carbon neutrality through clean energy, and the utilisation of Artificial Intelligence (AI) technology and deep data for operation management.
4. The Forum noted that storage batteries are crucial for using electricity generated by distributed power generation facilities at any time. Different types of batteries are required based on usage volume and operating conditions, making it essential to select the appropriate battery for each microgrid setup. The Forum further noted the advantages of VOL8 lead-acid batteries, which offer long life performance of up to 20 years, can be used in harsh environments with minimal maintenance, and are recyclable, thus contributing to environmentally friendly microgrid systems.

**SESSION III: EXPLORING EXISTING AND FUTURE DECARBONISATION TECHNOLOGIES IN ASEAN**

**3.1 Activities of Japan Hydrogen Association**

1. The representative of Japan Hydrogen Association (JH2A) presented the *“Activities of Japan Hydrogen Association”*, which is attached as ***ANNEX 11****.* The Forum noted the following key highlights:
   1. The Japan Hydrogen Association (JH2A) was established in 2022 with the ultimate goal of creating a sustainable environment through hydrogen initiatives. Its mission is to stimulate hydrogen demand, reduce costs, and develop financing options. Five main areas of activity were identified: commercialisation, regulatory, external relations, CO2-free hydrogen, and finance.
   2. Hydrogen supply involves both domestic production and imports, utilising low-carbon methods such as electrolysis, natural gas reforming, coal gasification, biomass reforming, and waste plastic cracking.
   3. Transport technologies for hydrogen include high-pressure hydrogen, liquefied hydrogen, and carriers like methylcyclohexane and ammonia. Hydrogen use is expanding in energy, steelmaking, and as a chemical raw material, with Japan, Korea, and the EU as importers, and ASEAN countries, the Middle East, and Australia as exporters.
   4. Committees are focusing on commercialisation (domestic supply chain and feasibility studies), regulatory issues (business promotion and regulation revision), CO2-free hydrogen (definitions, certification, and ISO discussions), finance (financing options and fund establishment), and external relations (institutional support, deregulation, and cooperation).
   5. Outreach activities include government events, school lectures, international events in Thailand and Indonesia, and signing MOUs with global hydrogen organisations, such as the Vietnam ASEAN Hydrogen Club, with plans for further expansion.

**3.2 Development of Clean Fuel Ammonia Value Chain**

1. The representative of Clean Fuel Ammonia Association (CFAA) presented the *“Development of Clean Fuel Ammonia Value Chain”*, which is attached as ***ANNEX 12***. The Forum noted the following key highlights:
   1. Ammonia is highlighted as an effective hydrogen carrier due to its cost-effectiveness, high hydrogen density, and established commercial supply and safety standards. It can be used directly in power generation, thermoelectric, and mining markets.
   2. Key technologies of ammonia utilisation in the energy market includes: (i) combustion in coal fired boilers, (ii) gas turbines, (iii) industrial furnaces, and (iv) marine diesel engine.
   3. Fuel ammonia infrastructure development in Japan includes setting up large hub terminals to import ammonia, with secondary transportation via smaller vessels and trucks to support ammonia utilisation and reduce CO2 emissions in industrial and maritime markets.
   4. The roadmap of fuel ammonia value chain estimates that ammonia demand in Japan is expected to reach 3 to 5 million tons by 2027, fulfilling about 1% of the country's electricity demand. The ammonia value chain is projected to expand to Asian power and maritime markets exceeding 100 million tons, with major suppliers including Australia, the USA, and Middle East countries, and Canada.

**3.3 e-F@ctory and SMKL (Smart Manufacturing Kaizen Level) for Digital Manufacturing, and Human Resources Development Activity in Thailand**

1. The representative of Mitsubishi Electric Factory Automation (Thailand) presented the *“Driving National Sustainability & Decarbonising for Thailand Industry and Society”*, which is attached as ***ANNEX 13***. The Forum noted the following key highlights:
   1. Mitsubishi Electric is focusing on digitalisation and decarbonisation in Thailand, with initiatives including: (i) introduction of high efficiency equipment, (ii) construction of an energy management system, (iii) improved productivity through FA-IT collaboration, and (iv) collaborative control between building equipment and production equipment.
   2. The Smart Manufacturing Kaizen Level (SMKL) framework is used to guide the decarbonisation journey of factories through 16 cells of table, helping them evaluate their current level, set short-term and long-term targets, and improve gradually.
   3. The eFactory solution includes data collection and visualisation tools to monitor productivity and carbon emissions, and is supported by an ecosystem of partners and consultants called eFactory Alliance, to provide comprehensive solutions and certifications.
   4. The GX training course is developed through collaboration with AMEICC, AOTS, and EEC to make the decarbonisation plan from analysis to grain solution.
   5. To address labor shortages, Mitsubishi Electric is promoting automation and AI technology, collaborating with vocational schools, universities, and the Thailand government to develop human resources through initiatives like the EEC Automation Park and various competitions.
   6. Educational activities and training programs, such as the TPA Robot Contest and Mitsubishi Electric FA Cup, aim to build a skilled workforce capable of implementing automation solutions and contributing to Thailand's decarbonisation goals.

**3.4 Activities of JETRO Bangkok in Promoting Carbon Neutrality Business**

1. The representative JETRO Bangkok presented the *“Activities of JETRO Bangkok in Promoting Carbon Neutrality Business”*, which is attached as ***ANNEX 14***. The Forum noted the following key highlights:
   1. JETRO is a government-related organisation promoting trade and investment between Japan and other countries. JETRO Bangkok supports Japanese startups and facilitates business matching opportunities, focusing on carbon neutrality and innovation.
   2. In collaboration with EECO and BOI, JETRO Bangkok organised the “Thailand-Japan Sustainable Business Seminar & Matching Event for Carbon Neutrality” for new business opportunities and build an even and more resilient supply chain. In addition, the cooperation also issued a business catalogue that introduced 56 sustainable businesses by Japanese companies with the potential of contributing to achieving carbon neutrality globally.
   3. Upcoming activities in FY2024 includes organising events such as being the Japan Pavilion at Techsauce Global Summit, SETA, and METALEX, organise the J-Bridge Open Innovation webinar, and conduct a Pitch Event. JETRO promotes these activities through media and social media campaigns to foster business cooperation and innovation between Japan and Thailand. Additionally, JETRO Bangkok will have its 70th Anniversary Event in September.

**Q&A SESSION**

1. The Forum noted the considerations being made regarding the carbon intensity of hydrogen, emphasising that this is a significant issue both in Japan and internationally, with a current standard of 3.4 kg CO2 per kg of hydrogen. The Forum highlighted Japan's involvement in ISO discussions to standardise carbon intensity calculation methods and pointed out the challenge of certification, both domestically and for imported hydrogen. Japan is working on developing a carbon intensity certification system to address this challenge.
2. The Forum considered the necessity of feasibility studies on the utilisation of fuel ammonia in coal-fired infrastructure development, noting the challenges in advancing ammonia production and utilisation in ASEAN. Eliminating the cost difference between clean fuel and traditional fuels like gas and coal is crucial, and to achieve this, support and subsidies from both the Japanese and ASEAN governments are essential.
3. The Forum noted the explanation from Mitsubishi Electric regarding their mission and collaborations in establishing the EEC automation part in Thailand. The initiative is driven by Thailand's promotion of a new industrial area in the eastern part of the country. Mitsubishi Electric supports this by providing technology and training for engineers in automation and AI technology. They collaborate with various universities, educational institutions, and the Ministry of Higher Education in Thailand, making it a multi-organisational effort aimed at developing skilled engineers for the future of manufacturing in Thailand.
4. The Forum noted the insights from JETRO Bangkok on how Thailand companies are engaging with the carbon neutrality initiative and technology from Japanese companies. Thailand companies, like their Japanese counterparts, are focusing on reducing energy costs and exploring new technologies such as carbon credits and CCUS. An example highlighted was the collaboration between a Japanese startup and Sena Group for a carbon trading market tied to Sena's reforestation project. Such initiatives underscore the active role Thailand companies are playing in adopting cutting-edge technologies for carbon neutrality.

**SESSION IV: PROGRESS OF CROSS-CUTTING FIELD AND FUTURE ACTION**

**4.1 GHG Avoided Emissions Visualization**

1. The representative of Panasonic Holdings Corporation presented the *“GHG Avoided Emissions Visualisation”*, which is attached as ***ANNEX 15***. The Forum noted the following key highlights:
   1. Reducing risks through business activities and pursuing positive opportunities will accelerate decarbonisation of society. Corporations traditionally focused on reducing emissions within their own value chains which evaluates only the risk. However, positive opportunities such as new products and services, need more emphasis.
   2. Avoided emissions could become a new opportunity indicator. As outlined by the International Electrotechnical Commission (IEC), avoided emissions aim for real carbon neutrality in the entire supply chain. Key issues hindering the recognition of avoided emissions including doubts about greenwashing, low awareness, lack of global standards and operational guidance, and the absence of use cases and evaluation index for financial institutions.
   3. Panasonic has been working on raising awareness through international events and panel discussions, such as the Global GX x TCFD in Tokyo and COP28 in UAE. They also collaborated with various organisations and governments to promote avoided emissions.
   4. Efforts are underway to standardise avoided emissions through IEC, with plans to issue standards by early 2025. Panasonic is also working with GX League and WBCSD on operational guidance.
   5. Panasonic has disclosed calculation formulas for avoided emissions in six business areas in their Sustainability Data Book 2023. These disclosures are aligned with WBCSD and GX3 guidance. In the past year, the concept of avoided emission has been rapidly propagated to financial institutions ad an evaluation index with involvement from entities like PCAF, MSCI, GPIF, GFANZ, Goldman Sachs, and Boston Consulting Group.
   6. Panasonic's contribution to avoided emissions in ASEAN was 2.76 megatons last year, and they aim to increase this to accelerate the decarbonised society in the region. The details are available in their sustainability data book 2023.

**4.2 Accelerating Project Formulation through Financing Flagship Project**

1. The representative of ADFIAP presented the *“Accelerate Financing of Green Initiatives – Advisory of Energy Efficiency Savings Financing Program of DBP”*, which is attached as ***ANNEX 16***. The Forum noted the following key highlights:
   1. The Association of Development Financing Institutions in Asia and the Pacific (ADFIAP) aims to advance sustainable development by incorporating Economic, Environmental, Social, and Good Governance (EESG) principles into its projects and programs. One of its flagship programs is transition finance that support the transition to a low-carbon economy including deployment of clean energy and decarbonisation technology. Solar, wind, hydro, geothermal, and other RE technology, EE technology, and green infrastructures are activities that can be financed.
   2. The Transition Finance Acceleration Lab (TFAL) is a virtual capacity-building laboratory created to provide resources and technical expertise to Financial Institutions (FIs) for financing zero-energy and green buildings. The approach is individualised, working with pilot Development Finance Institutions (DFIs) like BPMB of Malaysia and DBP of the Philippines, providing advisory and capacity training.
   3. The TFAL project approach consists of: (i) baseline assessment and diagnostics, (ii) program development, (iii) strategic marketing, (iv) client engagement, (v) monitoring and verification, and (vi) reporting.
2. The Forum noted on a way forward that includes continuing technical advisory to DBP and extending advisory services to BPMB (Malaysian Development Bank).
3. The representative of Development Bank of the Philippines presented the *“DBP’s Energy Efficiency Savings (E2SAVE) Financing Program”*, which is attached as ***ANNEX 17***. The Forum noted the following key highlights:
   1. The Development Bank of the Philippines (DBP) is the 10th largest bank in the Philippines. DBP has been supporting the Philippine National Government's development initiatives focusing on promoting growth in strategic sectors such as infrastructure, logistics, environmental responsibility, social services, community development, and support for Micro and Small and Medium Enterprises (MSMEs).
   2. DBP’s financing programs offer loans based on savings specifically for energy efficiency and renewable energy projects intended for own use. For green building infrastructure projects, DBP provides loans with terms of up to 15 years, including up to 3 years of grace period. For energy efficiency, renewable energy, and electric vehicle projects, loans are available for up to 10 years, with up to 1 year of grace period.
   3. The bank's financing program includes 100% financing for the public sector, which covers energy audits and investment grate audits, while private sector financing is capped at 80%. This program supports investments in green buildings, energy efficiency, renewable energy, and electric vehicles. ESCOs and energy service providers can access an omnibus terminal facility for two-year pipeline projects, easing the process of securing financing for these initiatives.
   4. DBP acknowledges and expresses gratitude for the support received from ADFIAP, especially regarding the TFAL and business matching efforts. Notable projects funded include a 1100kW solar rooftop installation for a grocery store and an ongoing project involving a seven-story building in Cebu.
4. The Forum noted on DBP plans to continue promoting the E2SAVE financing program to Local Government Units (LGUs) and MSMEs, highlighting the loan payment based on savings feature, advocating for sustainable and innovative financing in support of the country’s NDC, access Green Climate Fund’s concessional loan and grants for EE, Green Building (GB)/ZEB, Electric Vehicle (EVs), and continue to collaborate with partners on low carbon and transition finance.

**4.3 ASEAN Accelerator: Global Cleantech Innovation Programme (GCIP) for ASEAN**

1. The representative of ACE presented the *“Status Update of JAIF Project Proposal titled Enhancement of Clean Energy Technology Ecosystem and Its Connectivity in ASEAN (ASEAN Accelerator)”*, which is attached as ***ANNEX 18***. The Forum noted the following key highlights:
   1. The ASEAN Accelerator is a new program introduced during the 5th CEFIA Forum in Bali, designed as an implementation of the Global Cleantech Innovation Program (GCIP) specifically for ASEAN. The GCIP is developed by UNIDO with support from the Green Climate Fund (GCF) and the Global Environment Facility (GEF).
   2. The GCIP has two main objectives: to foster private sector initiatives and entrepreneurship to accelerate investment in innovative cleantech solutions, and to promote cleantech innovation and entrepreneurship in emerging and developing markets.
   3. The GCIP comprises two components: (1) supporting early-stage SMEs with innovative cleantech ideas through business accelerators to grow new startups in the energy field, and (2) strengthen cleantech innovation and entrepreneurship ecosystem by developing a robust networking and policy framework at the national level.
   4. The ASEAN Accelerator targets the 10 AMS and is a two-year program expected to start by Q4 2024. The program is funded by the Japan-ASEAN Integration Fund (JAIF) with EE&C-SSN as the project steering committee and ACE as the implementing agency.
   5. The ASEAN Accelerator aims to facilitate investment and business development through startups and entrepreneurs, enhancing the clean energy technology ecosystem in ASEAN. It includes three main outputs: (1) Capacity and technical knowledge development for enhancement of MSMSs and start-ups cleantech businesses scale; (2) Policy and institutional support strengthened and interconnected for enabling cleantech innovation and entrepreneurship in AMS; and (3) Development of linkages, networks, connectivity, and partnerships through events such as business forums in Japan, leveraging platforms like CEFIA and JETRO.
   6. The program has been developed throughout 2023 and submitted for official approval in October 2023. It has passed several approval processes and is awaiting final approval from the Committee of Permanent Representatives (CPR) of ASEAN and the Japanese government.
2. The Forum looked forward to the commencement of the Enhancement of Clean Energy Technology Ecosystem and Its Connectivity in ASEAN (ASEAN Accelerator) in Q4 2024.

**Q&A SESSION**

1. The Forum noted the importance of implementing avoided emissions into society as a means to accelerate the transition to a decarbonised society, and considered the need for incentives and policies that reflect avoided emissions to encourage behaviour changes that lead to direct emissions avoidance.
2. The Forum noted the challenges in expanding the sale of electric DBP to ASEAN. While DBP’s experience with clean energy investments has been manageable, the challenges in ASEAN include navigating internal approval processes, the limited adoption of green building financing by financial institutions, and the nascent state of the green building market.
3. The Forum considered the discussion on connecting CEFIA program with the SafeAI Initiative. The potential for collaboration includes integrating outputs from the ASEAN Accelerator Program with the SafeAI Initiative, leveraging expertise from Japanese companies for mentorship, and facilitating business matchmaking events. Such connections are seen as opportunities to enhance the impact of both programs.
4. The Forum noted the significance of ASEAN companies calculating and disclosing their redistribution contributions that help enhance their value, attract investment, and support the acceleration of a decarbonised society.

**SESSION V: ASEAN BEST PRACTICES AND CHALLENGES ON FINANCIAL INSTRUMENTS AND DE-RISKING MECHANISMS**

**5.1 Regional Context and Initiatives on Financial Instruments and De-Risking Mechanisms**

1. The representative of ACE presented the *“Regional Context and Initiatives on Financial Instruments and De-Risking Mechanisms”*, which is attached as ***ANNEX 19***. The Forum noted the following key highlights:
   1. The focus of the ASEAN Plan of Action for Energy Cooperation (APAEC) Phase II:2021-2025 Energy Efficiency and Conservation Programme Area is to reduce energy intensity by 32% by 2025. The programme area has five outcome-based strategies (OBS), with OBS 2 emphasising the participation of private sectors and financial institutions.
   2. Key achievement of OBS 2 includes: (i) ASEAN Energy Awards, (ii) ASEAN Energy Business Forum (AEBF), (iii) Cleaner Energy Future Initiative for ASEAN (CEFIA), and (iv) Development of Sustainable ASEAN Energy Management Certification Scheme (SAEMAS).
   3. Regional initative to support financial instruments and de-risking mechanisms include: (i) Asia Low-Carbon Building Transition (AsbuilT) program, (ii) Promoting Energy Efficiency in Buildings in ASEAN (PEEB-ASEAN), (iii) Green Climate Fund (GCF).

**5.2 Panel Discussion and Q&A Session**

1. The Panel Session was moderated by Dr. Zulfikar Yurnaidi, Head of Energy Modelling and Policy Planning (MPP) and Energy Efficiency and Conservation (CEE) Departments at ACE, with four panellists from Energy Commission Malaysia, DEDE of Thailand, ADFIAP, and METI.
2. The Forum inquired on the financial instruments or risk mechanisms currently being implemented in the respective countries, and how government regulations support these financial instruments or risk mechanisms in those policies:
   1. Malaysia employs the Energy Audit Conditional Grant (EACG) to support energy audits in the commercial and industrial sectors, providing up to RM100,000 for industries and RM60,000 for commercial entities. This grant, continued from the 11th Malaysia Plan into the 12th Plan (2021-2025), helps identify areas for reducing energy consumption. Additionally, the Sustainability Achieved via Energy Efficiency (SAVE) program offers rebates for purchasing energy-efficient appliances, contributing to 110 gigawatt-hours of energy savings and reducing CO2 emissions by 76,000 tons. The supported material is attached as ***ANNEX 20***.
   2. Thailand is developing an Energy Efficiency Platform to improve financing for energy efficiency and renewable energy projects by connecting project data with potential investors. The country also utilises a Feed-in Tariff (FiT) system for renewable energy, which includes fixed, variable, and premium rates to ensure financial viability and attract investment. This system is designed to support various renewable energy projects and adapt to inflation and feedstock cost variations. The supported material is attached as ***ANNEX 21***.
   3. ASEAN Development Financing Institution Association (ADFIAP) identifies challenges in green financing such as limited capacity, inadequate financing resources, and lack of government incentives. They address these issues by providing training and customised services to financial institutions, facilitating blended financing, and advocating for policy support. They also work on market development to build project pipelines and enhance the readiness of the green finance market, including creating platforms for collaboration between financial institutions and project developers. The supported material is attached as ***ANNEX 22***.
   4. Japan's transition finance policy includes issuing transition bonds and implementing carbon pricing to support the gradual decarbonisation of hard-to-abate industries. The Green Transformation Economy Transition Bond, totalling 20 trillion yen over the next decade, funds technological development and scaling. Japan will also introduce an emissions trading system starting in 2026, with pilot programs in place and carbon pricing phased in to avoid competitiveness issues. This approach aims to mobilise significant investment and could offer valuable lessons for ASEAN countries, where diverse energy needs and regional conditions make transition finance crucial. The supported material is attached as ***ANNEX 23***.
3. The Forum considered the implementation of carbon pricing or similar initiatives in ASEAN countries and the importance of communicating and identifying common challenges with Japan. Workshops or discussions could help in finding best practices suitable for ASEAN countries.
4. The Forum considered the support from the Finance Acceleration Laboratory, a financial institution, to support transition finance which focuses on supporting renewable energies and technologies within the ASEAN context. This includes flagship projects like green buildings and ZEB.
5. The Forum noted that in Malaysia, audit grants are monitored for three years through application reviews, with oversight provided by Sustainable Energy Development Authority (SEDA), the Energy Commission, and the Executive Ministry, focusing on energy savings.
6. The Forum considered a need to develop a specific database of financial instruments for energy efficiency across ASEAN. While workshops and events are held for knowledge sharing, there is currently limited input for such a database.
7. The Forum noted the importance of financial instruments for SMEs, who often struggle to obtain bank loans, emphasising the need for tailored financial tools to support these vulnerable groups. While energy service companies and credit guarantees exist, additional measures and partnerships are crucial for further assistance.
8. The Forum noted that Malaysia has a range of financing options, but they are not widely promoted. To encourage their use, effective promotion and market support are crucial. Japan's technological expertise could play a significant role in developing innovative financing solutions.
9. The Forum noted that CEFIA Initiatives can be leveraged to facilitate knowledge sharing and support for transition finance to achieve decarbonisation goals. Japan's experience in issuing transition bonds can provide valuable insights into identifying suitable technologies and securing necessary transitions. Sharing these experiences can help other countries enhance and implement their own transition finance strategies.

**SESSION VI: FURTHER ACTIVITIES OF CEFIA**

**6.1 Development and Recommendations of APAEC Post-2025**

1. The representative of ACE presented the *“Development and Recommendations of APAEC Post-2025”*, which is attached as ***ANNEX 24****.* The Forum noted the following key highlights:
   1. The APAEC Phase II: 2021-2025 mid-term review rating of 4.3 out of 5, highlighting a 27% reduction in energy intensity and a 16.2% renewable energy share in total primary energy supply by 2022.
   2. The strategic direction for APAEC 2026-2030, which aligns with regional and global frameworks, includes the ASEAN Community Vision 2025, ASEAN Economic Community Strategy Plan 2025-2036, UN DSGs, and Paris Agreement, focusing on energy security and resiliency, just and sustainable energy transition, and cross-sectoral issues.
   3. The APAEC Drafting Committee (ADC) is tasked to develop and formulate the next cycle of APAEC post 2025 consisting of representatives from 10 AMS and Timor-Leste as observer, each SEBs and SSNs, ACE, and ASEC. The REPP-SSN Chairman assumes the position as the chair of the ADC. Key milestones include several ADC meetings, consultation meetings with renewable energy, nuclear, regional energy policy and planning groups, and ASEAN forum on coal. The final APAEC document will be endorsed in September 2025 during the 14th AMEM in Malaysia.
   4. In conjunction with the 42nd SOME Meeting and dialogue sessions with DP/IOs, the highlights from the 3rd ADC puts emphasis on capacity building for key energy stakeholders, long-term financing mechanisms for renewable energy, strengthening cross-sectoral collaborations, bilateral and multilateral technology exchanges, and exploring new and emerging technologies like hydrogen and fuel ammonia.

**6.2 Open Discussion with ASEAN Member States**

1. The discussion session was moderated by Mr. Norihiro Kimura, Senior Negotiator for Climate Change, Global Environment Affairs Office, METI.
2. The Forum noted each AMS's suggestion on CEFIA's past and future activities, particularly the flagship projects and cross-cutting initiatives.
   1. **Brunei Darussalam** expressed appreciation for ASEAN's collaborative efforts, especially in net-zero buildings and energy efficiency projects. The country is actively promoting rooftop solar and energy-efficient structures. Brunei Darussalam also expressed interest in net-zero industrial clusters and the potential of avoided emissions to attract foreign investment. Additionally, Brunei Darussalam highlighted the need for transition financing and technical standards.
   2. **Cambodia** plans to significantly increase its renewable energy capacity, especially solar power, by 2030. Cambodia is particularly interested in solar energy projects, including solar storage and pumped storage systems. To support these goals, Cambodia suggested future collaborations focus on business matchmaking, capacity building, and information sharing.
   3. **Indonesia** highlighted its commitment to increase its emission reduction target to 32% by 2030. The government is actively promoting energy efficiency through regulations and developing a carbon trading market. Indonesia expressed interest in discussing decarbonisation technologies, green hydrogen, clean fuel ammonia, sustainable transportation, and carbon exchange knowledge sharing. Indonesia also emphasised CEFIA's role in fostering public-private partnerships, capacity building, and de-risking decarbonisation projects to support its clean energy transition.
   4. **Lao PDR** highlighted its diverse energy mix, including hydro, wind, solar, and biomass. Lao PDR aims to expand renewable energy and improve efficiency through projects like microgrids and mini-hydro installations. Lao PDR emphasised the need for capacity building, technical and financial support, and the development of policy guidelines for hydrogen and carbon credits. Lao PDR expressed interest in collaborating on energy efficiency programs and infrastructure development, including support for local stakeholders.
   5. **Malaysia** expressed enthusiasm for CEFIA’s initiatives, including RENKEI Control, Zero Energy Building, and SteelEcosol. Malaysia recently enacted the Energy Efficiency and Conservation Act, focusing on both electrical and thermal energy, with assistance from Japan for the thermal module and capacity building. Malaysia proposed broader knowledge sharing among ASEAN countries and Japan regarding the implementation and regulation of such acts. They highlighted the importance of learning from others' experiences to effectively apply their new legislation.
   6. **Myanmar** highlighted the need for projects related to zero energy buildings and energy efficiency technologies, particularly for the iron and steel industry, as the country plans to enhance its steel production capabilities. Myanmar mentioned challenges with infrastructure, human resources, and financial constraints. Myanmar seeks support in addressing these issues and improving energy efficiency in their industrial sector.
   7. **Philippines** expressed appreciation for the event and CEFIA’s initiatives. For future CEFIA flagship projects, the Philippines suggested prioritising renewable energy projects, particularly in off-grid areas, also the potential of energy-efficient technologies in the iron and steel industry, a significant electricity consumer. They also underscored the need for programs to address the financial hurdles faced by green energy initiatives, emphasising the importance of financial support for the sector.
   8. **Thailand** expressed appreciation for CEFIA's flagship projects and their alignment with the ASEAN Plan of Action for Energy Cooperation (APAEC). They suggested quantifying the financial benefits of energy efficiency and renewable energy projects, including their economic value in terms of job creation, greenhouse gas reduction, and improved air quality. This quantification could help strengthen the investment case for these projects.
3. The Forum recommended enhancing collaboration, training, technology transfer, and monitoring for CEFIA. Stronger regional partnerships, private sector involvement, and capacity building are crucial for effective implementation and sustainability of initiatives.
4. The Forum endorsed the proposed projects for the next CEFIA plan, which focus on promoting renewable energy, enhancing grid efficiency, improving energy efficiency, exploring emerging clean technologies, and addressing climate change impacts. These projects aim to attract investments, ensure grid stability, reduce energy consumption, and develop sustainable energy solutions.
5. AMS appreciated CEFIA's contributions in providing comprehensive support for cleaner energy solutions in ASEAN, including technical assistance, training, policy development, research, collaboration, and financial aid.

**CLOSING CEREMONY**

1. **Mr. Kimura Norihiro**, Senior Negotiator for Climate Change, Global Environmental Affairs Office, Minister of Economy, Trade and Industry, Japan, delivered his closing remarks. He highlighted the importance of partnership and collaboration with ASEAN in building a sustainable energy system for the region. He stressed the importance of continuing the dialogue on financing, capacity building, and market development for energy transition. He looked forward to the next CEFIA Forum in Japan next year
2. **Mr. Christopher Zamora,** Senior Manager of ACE, on behalf of **Dr. Nuki Agya Utama,** Executive Director of ACE delivered his closing remarks. He highlighted the Forum's discussions on decarbonisation technologies and emphasised the importance of collaboration in achieving cleaner energy goals in ASEAN. The shared knowledge and innovative ideas will serve as a solid foundation for future actions, aiming to enhance energy efficiency and cleaner energy solutions in the region​.
3. **Dr. Apiradee Thammanomai**, Director of Strategy and Planning Division, Thailand as Host Country, delivered her closing remarks. She emphasised that the discussions and shared insights from ASEAN governments, international organisations, academia, and private companies have been instrumental in advancing the collective efforts toward a decarbonised energy system in the ASEAN region. She highlighted the significance of the progress made in the Forum and the future activities that have been identified as key to achieving cleaner, sustainable energy in the region.

**ACKNOWLEDGEMENT**

1. The Forum expressed its sincerest thanks and appreciation to DEDE, METI, ACE, and BCG of Japan for the assistance provided as well as excellent arrangements made for the Forum.

\*\*\*\*\*\*\*\*End of Summary Record\*\*\*\*\*\*\*\*