



The 5th Government-Private Forum on the Cleaner Energy Future Initiative for ASEAN (CEFIA)

25 August 2023

Nusa Dua, Bali, Indonesia

INTRODUCTION

1. The 5th Government-Private Forum on the Cleaner Energy Future Initiative for ASEAN (CEFIA) was held physically, in Nusa Dua, Bali, Indonesia on 25 August 2023.
2. The Forum was hosted by the Ministry of Energy and Mineral Resources of Indonesia, as a side-event tot the ASEAN Energy Business Forum 2023, supported by Ministry of Economy, Trade and Industry, Japan and co-organised by the ASEAN Centre for Energy and Boston Consulting Group Japan.

JOINT OPPENING CEREMONY WITH JETRO “ENERGY TRANSITION IN ASEAN BY UTILISING ALL FUELS AND TECHNOLOGIES

3. **H.E., Shinichi Nakatani**, State Minister of Economy, Trade and Industry (METI) of Japan, delivered his welcoming remarks.
4. **H.E., Triharyo Indrawan Soesilo**, Special advisor to Minister of Energy and Mineral Resources for Acceleration of Infrastructure and Investment, delivered his keynote address.
5. **H.E., Masakazu Takahashi**, President Director, Japan External Trade Organisation (JETRO) Jakarta Office, delivered his opening remarks.
6. **H.E., Prof Kiyoshi Saito**, Chairman, Waseda University, and Japan Society of Refrigerating and Air Conditioning Engineers (JSRAE) delivered his (pre-recorded) keynote address.
7. **Mr. Septia Buntara Supendi**, Acting Conservation and Energy Efficiency (CEE) Department, ACE delivered his opening remarks on behalf of **Dr. Nuki Agya Utama**, Executive Director of ASEAN Centre for Energy (ACE).

AGENDA ITEM 1: INTRODUCTION TO CEFIA

8. The representative of ACE presented the “*Setting the Scene Presentation*”, which is attached as **ANNEX 1**. The Forum noted the following key highlights:

- i. ASEAN is projected to be the fifth largest economy in the world by 2050, and in line with this rapid economic growth, regional energy demand and supply is expected to triple that of 2020 levels by 2050, reaching 1,282 Mtoe and 2,647 Mtoe, respectively.
- ii. Energy efficiency measures coupled with increasing share of renewable energy (RE) are needed to achieve the regional targets and scenarios under ASEAN Plan of Action for Energy Cooperation (APAEC) Phase II: 2021 – 2025.
- iii. Energy Intensity (EI) reduction based on Total Primary Energy Supply (TPES) in 2021 is 24.5% compared to 2005, against the 32% target by 2025. Renewable Energy (RE) share in TPES in 2021 reached a total of 14.4% from the 23% target, whereas RE Share in the Total Power Installed Capacity reached 32.8%, from the 35% target, by 2025, respectively.
- iv. Most ASEAN member states have also announced carbon neutrality targets by 2050 and net zero energy targets by 2065. Indonesia, Singapore, Thailand, and Vietnam have set higher NDCs, whereas five (5) out of 10 AMS also specified their NDC energy sector for emission reduction by the scaling up of renewable energy capacity and the improvement in energy efficiency.
- v. The CEFIA Programme serves as a platform to showcase best practices, challenges, and solutions, create a workplace for public-private to initiate projects, set databank and catalyst for ideas and support, and linchpin to advance decarbonization technology deployment through public-private partnership, especially related to energy efficiency and renewable energy.

9. The representative of METI Japan presented the “*Overview of CEFIA and Report for Fiscal Year 2022*”, which is attached as **ANNEX 2**. The Forum noted the following key highlights:

- i. The 4th CEFIA Forum was held on 16 February 2023 in Cebu, Philippines, attended by 76 on-site triple helix participants, and hosted by the Department of Energy of the Philippines.
- ii. Current EE&C related CEFIA flagship projects include: (i) Zero Energy Building, to promote and develop Net-ZEB, (ii) RENKEI, to disseminate control optimisation (RENKEI) to reduce energy consumption throughout utility plants and manufacturing plants through IoT, (iii) SteelEcosol, to diagnose and

introduce best available energy-saving technologies (BAT) to the steel industries, (iv) Finance, to mobilise finance to facilitate energy transition and decarbonization in ASEAN, (v) Healthy and Energy Efficient AC System for ASEAN Market, and (vi) CO2 Neutral Energy and Carbon Sink Using Local Biomass.

- iii. Candidates for new CEFIA flagship projects include: (i) Energy Efficiency in Data Center, (ii) Smart Transport, (iii) Next Generation Solar Cell Development: Perovskite-type Solar Cell, and (iv) Hydrogen Production through Water Electrolysis Using Power from Renewables
- iv. Activities for cross-cutting area includes: (i) mobilisation of finance for energy transition and decarbonisation projects in ASEAN, (ii) Visualisation of GHG emission reductions in decarbonizing technologies/projects, and (iii) Support the cleantech innovation and entrepreneurial ecosystem for Micro, Small and Medium Enterprises (MSMEs) and start-ups through GCIP program of UNIDO, in collaboration with ACE.

AGENDA ITEM 2.1: EXPLORE EXISTING AND FUTURE DECARBONISATION TECHNOLOGIES IN ASEAN: PROGRESS OF FLAGSHIP PROJECTS AND FUTURE ACTION

10. The representative of Japan Electronics and Information Technology Industries Association (JEITA) presented the “*Activities of RENKEI Control*”, which is attached as **ANNEX 3**. The Forum noted the following key highlights:

- i. “RENKEI” Control server equipment sets the optimised setpoint for the target equipment to achieve objective function. It provides energy users with opportunities to achieve energy performance improvement without having to go through renewal or significant changes in existing facility.
- ii. Main activity of RENKEI in 2023 includes conducting capacity building for ASEAN universities and ESCOs through webinar and e-learning courses, continue to push for demonstration project through RENKEI control including the Malaysia District Cooling Plant, physical seminars with Thailand, and establish digital content and self-assessment tool for RENKEI control.

- iii. Potential contribution of RENKEI control for ASEAN. Estimation of potential CO2 emissions reduction if RENKEI Control was applied to the target industrial sectors in ASEAN countries can reach approximately 5 million ton CO2/year.
- iv. An IEC standard for factory energy management system (FEMS) will be published in September 2023, which includes monitoring, analysis, optimization and instruction.

11. 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**

4. The Forum noted the following key highlights:

- i. According to IEA World Energy Balance (2019), buildings account for 29% of the world energy consumption in 2017. This necessitates the importance of achieving ZEB to reach a decarbonised society.
- ii. Activities of JASE-W include: (i) Capacity building through seminars and workshops, information sharing via websites, seminars, exhibitions, business forums and booklets, and project formulation; (ii) International exhibitions and established working groups on specific topics like Zero Energy Building (ZEB), and (iii) business matching.
- iii. JASE-W has set up a working group for ZEB and hosts workshops and seminars for several ASEAN countries, including, Indonesia, Malaysia, Philippines, and Vietnam, and pushes for ISO global standard on ZEB. Moreover, a website to search recommendable ZEB Design guidelines, technologies, and products to achieve ZEB in many building types is available in their website.

12. The representative of the Japan Iron Steel and Federation presented the “*Activities of Energy Efficient Technologies in ASEAN Iron and Steel Industry (SteelEcosol)*”, which is attached as **ANNEX 5**. The Forum noted the following key highlights:

- i. Steel sector is responsible for 8% of global final energy demand and 7% of energy sector CO2 emissions. Best Available Technologies (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.

- ii. ASEAN-Japan Steel Initiative (AJSI) has started since 2014 with main activities including: (i) steel plant diagnosis, (ii) technologies customized list, and (iii) public and private collaborative seminar. By 2023, AJSI has conducted steel plant diagnosis at 16 EAF plants across six (6) AMS, namely, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam.
- iii. In FY 2022, an online diagnosis at a plant in Thailand was conducted to check the energy consumption status and recommend implementing BAT at individual steel mills. Moreover, the AJSI Webinar was successfully held on 14 February 2023, to disseminate Japan's BAT and climate change policies to the public and private steel-industry stakeholders in ASEAN and Japan, attended by more than 180 participants.
- iv. The proposed future activity will be to: find potential energy conservation and CO2 reduction projects through steel plant diagnosis and continue information sharing on energy conservation and decarbonisation of steel industry through seminars and dissemination of BAT.

13. The representative of Forest Energy presented the "*CO₂ Neutral Energy + Carbon Sink using Local Biomass*", which is attached as **ANNEX 6**. The Forum noted the following key highlights:

- i. The IPCC (Sixth Assessment Report, 2022) estimated that the annual emission reduction potential of biochar would reach 1.1 billion tons (CO₂ equivalent). Biochar presents an appealing and accessible solution, but its successful implementation necessitates a profound understanding of local contexts.
- ii. Forest Energy introduces 'carbon negative' power plant through biomass (biochar) gasification combined heat power generation (CHP). To reach ZEB, the heat from solar and biomass CHP can also be utilised for both cooling and heating.
- iii. Current activities include preparing small gasification unit to match ASEAN and India conditions and preparing demo-plant for green hydrogen production.
- iv. Upcoming activities will involve organising a webinar targeted to businesses, universities and government officials interested in creating a decentralised network of "carbon negative" power plants using biochar.

14. The representative of Daikin Industries presented the “*Carbon Neutrality solution: Healthy and Energy Efficient AC system for ASEAN market*”, which is attached as **ANNEX 7**. The Forum noted the following key highlights:

- i. Air conditioners account for about 50% of the electricity used in homes and office, and emit a significant amount of CO₂ before being discarded. Achieving energy transition and carbon neutrality can therefore be realised by setting the temperature of air conditioning higher than the current setting (from about 23 °C to 26 °C).
- ii. Through verification of setting the air conditioner to 26 °C 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 °C. A verification
- iii. Future activities will include further energy saving and improvement by using ventilation, visualize energy consumption to help reduce energy at user operation, expand verification to Vietnam, work with local university to help make carbon neutrality policy, and utilise project site for recognition development against government and industry.

Q&A SESSION

15. The Meeting noted that challenges in implementing the CEFIA Flagship Project includes: (i) digitalisation and standardisation on data management, (ii) public awareness to address misconception on the high cost and difficulty of decarbonisation technologies and projects, and (iii) recognition from government. CEFIA can support in creating close relationship with ASEAN Member States to facilitate the Flagship Project activities.

16. The Meeting noted the importance of adapting the technologies to individual local context, to increase interest to ASEAN region. The Meeting also noted that Daikin Industries will work on residential applications, with replication and best practices from commercial sector.

AGENDA ITEM 2.2: EXPLORE EXISTING AND FUTURE DECARBONISATION TECHNOLOGIES IN ASEAN: NEW CUTTING-EDGE DECARBONISATION TECHNOLOGIES

17. The representative of NTT Limited presented the “*Energy Efficiency in Data Centre*”, which is attached as **ANNEX 8**. The Forum noted the following key highlights:

- i. NTT has 15 existing data centres in Asia, namely, Indonesia, Malaysia, Singapore, Thailand, Vietnam, and Hongkong. NTT aims to achieve net-zero emissions across its operations by 2030, and across its value chain by 2040. Moreover, NTT also targets 100% renewable energy in its data centers by 2030 and its offices and facilities by 2035.
- ii. To achieve these targets, NTT has taken several actions include procure high quality Renewable Energy Certificate (REC), implement intelligent energy management system, and continuous energy savings activities (i.e., liquid immersion cooling, relax temperature SLA with ASHRAE thermal guidelines, implement PPA programmes, etc.)
- iii. As a new initiative, NTT establish the 'Innovative, Optical, and Wireless Network' (IOWN) that produces low power consumption with large capacity, high quality, and low latency networks by utilising photonics technologies such as photonics-electronics convergence devices everywhere from network to terminals.

18. The representative of Zenmove presented the “*Realization of Virtually Zero CO2 Emission Mobility*”, which is attached as **ANNEX 9**. The Forum noted the following key highlights:

- i. Zenmov develop IT solutions that power the public transportation and the shared mobility by using Smart Mobility Operation Cloud (SMOC).
- ii. Key features of SMOC includes: (i) introduction of an AI-based optimal vehicle dispatch system to schedule dispatch vehicles according to travel demand, (ii) introduction of vehicle adjustment function to tackle disturbance and traffic between vehicles, and (iii) monitoring and visualising driver’s productivity and performance.
- iii. Zenmov has conducted several project in the Philippines, including the operation of line connecting the railroad station with new and old commercial areas and facilitate intra-regional transportation in Clark area.

19. The representative of Sekisui Chemical presented the “*Next Generation Solar Cell Development: Perovskite-type Solar Cell*”, which is attached as **ANNEX 10**. The Forum noted the following key highlights:

- i. The Perovskite-type solar cell is primarily made of Iodine and has several benefits including: (i) flexible, lightweight, and easy installation with only 300mm width (ii) 10 year durability when put in outdoors.

- ii. Power generation cost with installation cost (i.e. equipment cost and construction cost) is aimed at 20 Japanese Yen (USD 0.14) per kWh. As it is still in the demonstration stage with several partners, the expected market entry will be on FY2025.

20. The representative of Hitachi Zosen Corporation presented the “*Hydrogen Production through Water Electrolysis Using Power from Renewables*”, which is attached as **ANNEX 11**. The Forum noted the following key highlights:

- i. Hitachi Zosen engage in several carbon neutral solutions, including, water electrolyser and CO2 recycling which forms hydrogen production.
- ii. Japan (METI and NEDO) is exploring the Joint Credit Mechanism with Lao PDR, with support from Hitachi Zosen on PEM electrolyzer and hydrogen boiler system.

Q&A SESSION

21. The Meeting noted that it is impossible to achieve Net Zero only by energy efficiency. There needs to be a balance between energy efficiency and renewable energy.

22. The Meeting noted that involvement of government is crucial, especially in supporting companies and academe to develop innovative technologies through knowledge, enforcement, and fiscal incentives.

AGENDA ITEM 3: FINANCE, FRAMEWORK AND MECHANISM WHICH SUPPORT DECARBONISATION TECHNOLOGIES

23. The representative of ADFIAP presented the “*Accelerating Project Formulation through Financing Flagship Project*”, which is attached as **ANNEX 12**. The Forum noted the following key highlights:

- i. CEFIA-ADFIAP partnership includes achieving ASEAN wide collaboration on cleaner energy finance, identify and address challenges in financing green building and low-carbon technology, and engage with public-private sectors to help transform the green building market.
- ii. Transition finance refers to financing and investments in initiatives that support the transition to a low-carbon economy. Solar, wind, hydro, geothermal, and other RE technology, EE technology, carbon capture/reduction technology and green infrastructure can be financed.

- iii. ADFIAP is developing the Transition Finance Acceleration Lab (TFAL), a virtual capacity building laboratory to provide resources and lend technical expertise necessary to help financial institutions adopt programs to finance Zero Energy Buildings (ZEB)/green building.
24. The representative of Panasonic Holdings Corporation presented the “*Visualisation of CO2 Emission*”, which is attached as **ANNEX 13**. The Forum noted the following key highlights:
- i. The concept of avoided emissions is not widely known as there are no global and industry standards, which in turn, cannot be used as an evaluation index for financial institutions.
 - ii. Panasonic Group has work towards increasing awareness of ‘avoided emissions’ concept through dissemination activities at G7 Conference, COP27 Pavilion Seminar, and through guidance publications.
25. The representative of ACE presented the “*Global Cleantech Innovation Programme (GCIP)*”, which is attached as **ANNEX 14**. The Forum noted the following key highlights:
- i. The GCIP promotes cleantech innovation and entrepreneurship in emerging markets and developing economies to address climate and environmental challenges.
 - ii. ACE and GCIP is co-developing a two-year programme called “Accelerator” to contextualise and adopt the GCIP to ASEAN needs, to be submitted to Japan-ASEAN Integration Fund (JAIF).
 - iii. Activities of the “Accelerator” will include: (i) development of methodologies, tools, training systems, guidebooks for Accelerator Program, to be run for MSMEs and start-ups in the AMS, (ii) Strengthening enabling environment for cleantech innovation and entrepreneurship in the AMS through policy analysis, capacity building and knowledge sharing, and (iii) Enhancement of linkages, networks and connectivity within and beyond the AMS including Japan for further growth of cleantech business in the region.

Q&A SESSION

26. The Meeting noted the challenges in setting up financing for climate-related projects, includes access to standards, data science, and global practices. The Meeting also noted that regulatory framework evolution, incentives, and subsidies impact the financial viability of green projects.

27. The Meeting noted that financial institutions require specialised expertise and training for lending officers to evaluate technical projects effectively. Technological risks, interoperability issues, and system upgrades pose challenges for financial institutions in pricing risk accurately.
28. The Meeting noted that green projects may involve higher upfront costs and long payback periods, affecting bank liquidity and exposure to single borrowers.
29. The Meeting noted that standards could assist financial institutions in evaluating projects and efforts to calculate reduction contributions can enhance ASEAN companies' competitiveness through policy changes and consumer behaviour shifts.
30. The Meeting noted that quantifying avoided emissions is crucial for realising a decarbonised society.
31. The Meeting noted that challenges in fostering energy-related SMEs and startups in ASEAN include low entrepreneurship ratios and capacity limitations. Government and CEFIA initiative support can upgrade entrepreneurial and technical capacity and provide infrastructure and financing for projects.
32. The Meeting noted that digital technologies have aided young entrepreneurs, however, framework policies and programs are still needed to develop their potential into actual industries.

AGENDA ITEM 4: PANEL DISCUSSION ON ASEAN BEST PRACTICES AND INITIATIVES ON SMART AND INTEGRATED DIGITAL ENERGY MANAGEMENT IN INDUSTRIAL, COMMERCIAL, AND BUILDING SECTORS

33. The Panel Session was moderated by Mr. Qatro Romandhi, Deputy Director of Energy Conservation Directorate, Ministry of Energy and Mineral Resources of Indonesia, and panellists from Energy Commission Malaysia, Indonesia State Electricity Company (PT. PLN Indonesia), ADFIAP, JASE-W, METI of Japan, and ACE.
34. The Meeting inquired on how the AMS government support the deployment of smart and integrated digital energy management through policy frameworks and regulations, and what are the challenges:
 - i. At the regional level, Programme Area No 4 on EE&C under APAEC Phase II: 2021-2025 has signified the importance of the adoption of digital energy management system. At the national level, most AMS have put digital and also energy management systems in their prioritised strategies to achieve the energy efficiency goals (i.e., Malaysia standard 1525, Singapore Green Mark 2021)

- ii. Regional activities and support includes: (i) modalities on harmonisation of standard on cooling and lighting products as stepping stone to standardise digital energy management systems that is now currently gaining a spotlight, (ii) offering financial support through the ACE – Korea Development Bank-Green Climate Fund Programme to mobilise granting mechanism to really be improve the credit confidence of investment on all sectors, including industrial sectors and technology digitalization, and (iii) enhance training and capacity building through the ASEAN Energy Management Training and Certification Scheme (AEMAS).
- iii. Energy Commission Malaysia has utilised the analog system to monitor the energy initiatives in Malaysia using Excel, spread information to the licensees, enable monitoring systems on what licensee need to do or propose to do. From the data gathered, the system generates the energy potential, energy saving potentials, as collateral to meet with Ministry of Finance to discuss and determine the fiscal incentives required.
- iv. PT. PLN Indonesia has developed software management called 'Nemesis' for digital coal management application to create the optimum coal mix for production. Moreover, during the process stage in the turbine, boiler, several a digital management process called Reliability, Efficiency, and Optimization Center isalso implemented as a real-time parameter of the power plant efficiency.
- v. METI Japan has implemented regulations and incentives on energy demand response to solve the problems of RE intermittency. Japan has also engaged in bilateral cooperation with several AMS to hold workshops on energy demand response.

35. The Meeting inquired on how have companies in Japan and ASEAN countries preceded the deployment of smart and integrated digital energy management, and what are the challenges?

- i. Challenges include expanding and applying harmonised standardisations for digital energy management system, obtaining data collection, enhancing public-private partnership to offset the high initial cost of the digital technology in the building and also industrial sector.
- ii. Private sector should hurdle the institutional readiness of regulatory framework, consumer market, and financial sector. In this regard, regulatory sandboxes and pilot demonstration project is critical in order to give experimental time for

digital technology to adapt with the regulation and also the development of the market. Moreover, CEFIA can adapt to only be a business-driven dissemination, but also to provide more specific capacity building and dissemination on digital technology.

- iii. Government may wish to set mandatory regulatory framework, coupled with set of guidelines to comply with the regulation.
- iv. The role of academe should be increased at the early stage to introduce youth on importance of digital energy management system.

36. The Meeting inquired what kind of public-private partnerships are needed to accelerate this deployment of smart and integrated digital energy management, and the role of CEFIA.

- i. CEFIA could become a catalyst to disseminate new decarbonisation technologies and products, including smart cities project.
- ii. CEFIA could serve as a platform to facilitate multi-stakeholder (public-private-partnership) and inter-ministerial communication and/or negotiation.
- iii. Public-private partnership may focus on risk sharing and blended financing.

CLOSING CEREMONY

37. **Mr. Qatro Romandhi**, Deputy Director of Energy Conservation Directorate, Ministry of Energy and Mineral Resources of Indonesia, delivered his closing remarks.

38. **Mr. Kimura Norihiro**, Senior Negotiator for Climate Change, Global Environmental Affairs Office, Minister of Economy, Trade and Industry, Japan, delivered his closing remarks.

39. **Mr. Christopher Zamora**, Senior Manager of ACE, on behalf of **Dr. Nuki Agya Utama**, Executive Director of ASEAN Centre for Energy (ACE) delivered his closing remarks.

---- end ----