経済産業省

MOUs towards 3rd AZEC Ministerial Meeting

October 2025

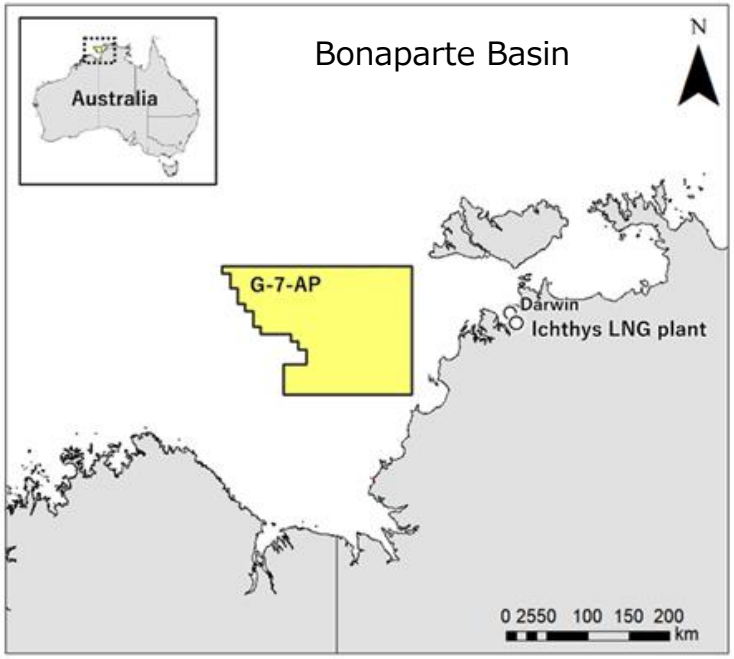
Agency for Natural Resources and Energy

Joint study between INPEX Browse E&P Pty Ltd. and Chubu Electric Power Co., Inc. toward the realization of CCS in the Northern Territory of Australia

Cooperation outline : The parties will study the optimal value chain for cross-border CO_2 transport and storage from Nagoya Port to the Bonaparte Basin, including an integrated schedule aligned with relevant legal and regulatory procedures.

Objective & Significance of This Study : This initiative aims to the decarbonization of both regions by developing a large-scale and economically viable ship-based CCS value chain in a comprehensive manner.

<Project Overview>



<Scope of study>

- Optimize CO_2 transport methods across the entire value chain
- Develop an integrated value chain schedule for the value chain, aligned with relevant legal and regulatory procedures in Japan and Australia
- Identify key challenges and explore collaboration opportunities with relevant organizations toward the realization of a commercial CCS project, and associated activities

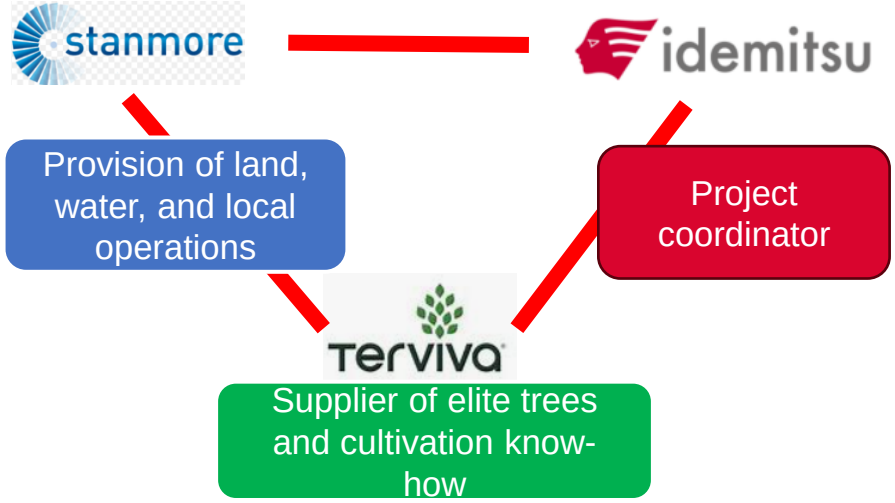
Trial plantation of non-edible oilseed tree crop Pongamia in Queensland, Australia

Outline of cooperation : The trial plantation will be conducted in collaboration with Terviva, which has 15 years of research achievements and cultivation capabilities with Pongamia, which is a potential feedstock for SAF, on a buffer area of a coal mine of Stanmore Resources.

Objectives of the project : verify long-term cultivation methods for Pongamia, with the optimization of the entire supply chain, as well as the creation of carbon credits, the production of pellets from shells, and the use of pressed oilseed cake as livestock feed, among other uses beyond feedstock for SAF.

Project site Photos

Project structure



MOU for Joint Exploration towards Achieving CO_2 Emission Reduction in the Heavy Industry Sector between Kawasaki Heavy Industries and Low Emission Technology Australia (LETA)

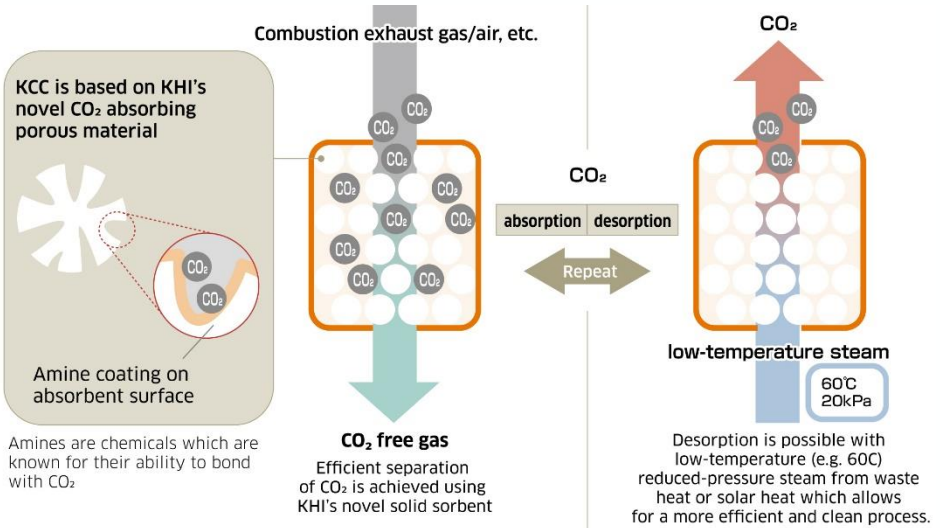
Cooperation outline : The purpose of this MOU is to collaborate on the development and deployment of Post Combustion Capture technology, especially for the heavy industry sector.

Objectives of MOU : This cooperation will pave the way for the joint development of pilot projects utilizing CO_2 capture technology, contributing to the decarbonization of the industry

URL : https://letaustralia.com.au/wp-content/uploads/241106-Media-Release-LETA-and-Kawasaki-Join-Forces-to-Accelerate-Emissions-Reduction.pdf

Signing of the MOU by LETA and KHI

Overview of CO_2 Capture Technology



Cooperation among PT PLN (Persero), Chubu Electric Power Co., Inc., and the Okinawa Electric Power Company, Incorporated. regarding the de-dieselization in Indonesia

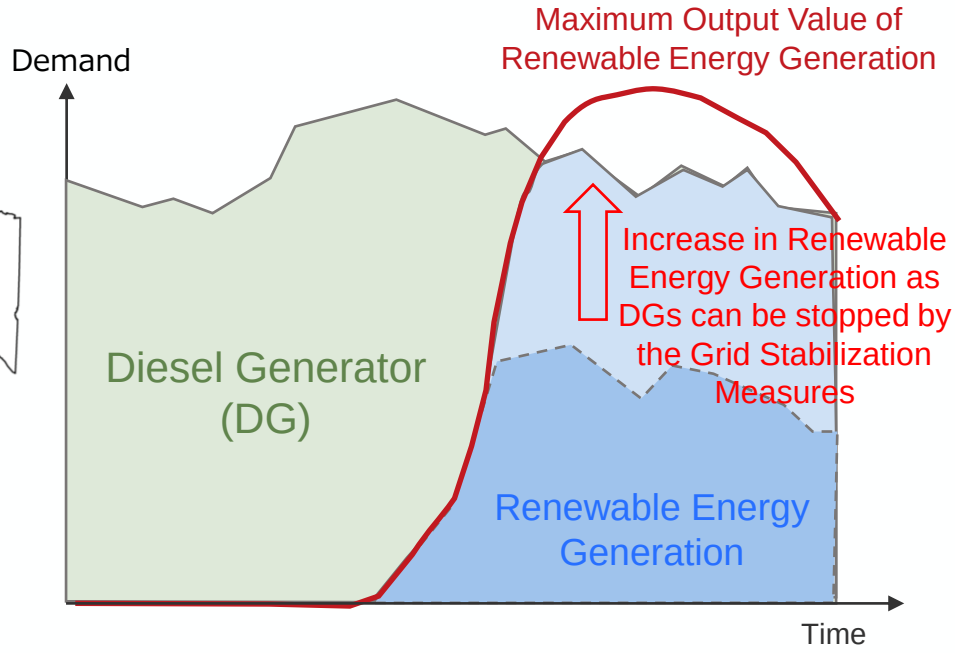
Cooperation outline : Feasibility study on de-dieselization in Indonesia through solar power generation, battery storage, and grid stabilization measures in the island regions.

Objectives : To promote the de-dieselization in the Indonesian island areas using Japanese grid stabilization technology.

<Project Outline>

◇Target areas
- Island areas in Indonesia
- Elimination of diesel generations with solar power generation, battery storages and grid stabilization measures

<Image of de-dieselization>



MOU between PT PLN（PERSERO）and Chubu Electric Power Grid regarding capacity building in transmission and distribution area

Cooperation outline : Both companies cooperate with capacity building as well as technological exchange regarding transmission and distribution's technology, smart grids and digital transformation.

Purpose or objectives of MOU : The goal is to advance O&M of PLN's transmission facilities and build smart grids in Indonesia's islands and areas with increasing renewable energy power.

Main Topics

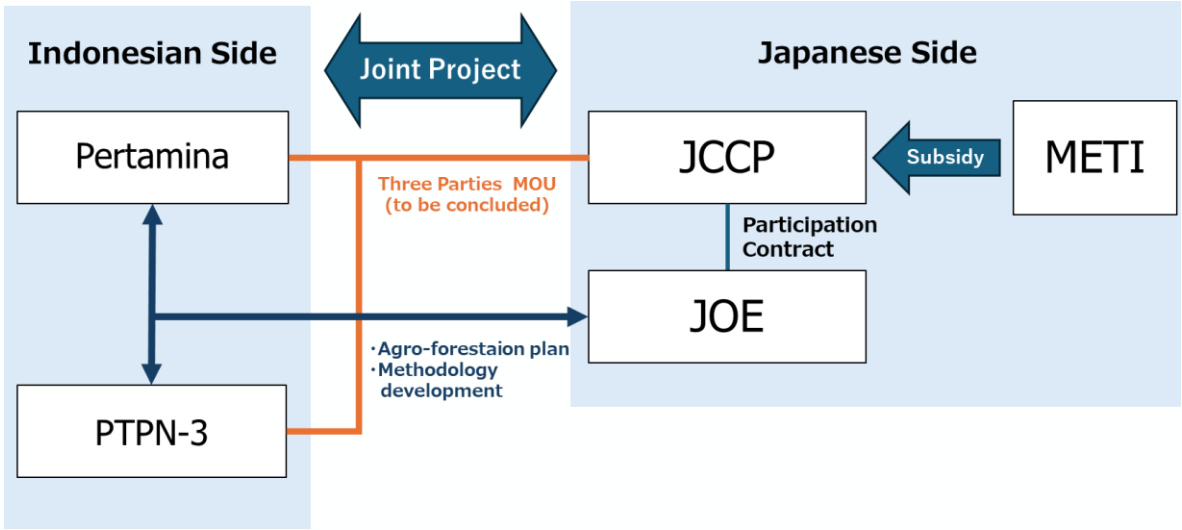
- To advance PLN's transmission facilities
  - ・Unmanned substations
  - ・Utilization of drones for transmission lines inspection
- To build smart grids
  - ・Building grids utilizing PV and batteries in islands
  - ・Measures for T&D with increasing RE power

JOINT STUDY AGREEMENT ON JOINT PROJECT "Agro-forestation of Rubber Tree for Producing Carbon Neutral Oil"

Cooperation outline : To study an agro-forestaion plan in rubber plantation and the methodology for carbon credit creation in collaboration with Pertamina and PTPN-3 (state-owned plantation company) to generate carbon credits in order to achieve carbon offset for Pertamina's petroleum products.

Purpose or objectives of MOU : Through this project, JCCP and JOE will support to the carbon neutralization of the petroleum industry in Indonesia. Also, this project will strengthen the relationship with Indonesia, and promote the carbon credit business in Indonesia, Japan and abroad.

〈Project scheme〉



Memorandum of Cooperation between PT Pupuk Indonesia (Persero) and JICA concerning partnership toward promoting Clean Ammonia Value Chain Development

Cooperation outline : 1. Through regular exchange of opinions etc., the participants are going to make continuous dialogue for further cooperation regarding the promotion of clean ammonia. 2. The Participants continue cooperate for JICA's Data collection survey for establishing a value chain for new energy (hydrogen and ammonia). Each Participant is going to obtain roadmap for Indonesia – Japan hydrogen partnership. 3. Conducting any other forms of cooperation as mutually decided by the Participants.

Purpose : The purpose of this MoC is to develop cooperation in the field of promoting hydrogen and ammonia toward decarbonization in Indonesia with the view to achieve the purpose of Article 2 of the Paris Agreement and Net Zero target by 2060 in Indonesia.

Joint Development Agreement for CCGT Project in Celukan Bawang,Bali, Indonesia

Cooperation outline : In order to contribute Net Zero target in Indonesia, PT. PLTG Celukan Bawang and Electric Power Development Co., Ltd. (J-Power) have signed Joint Development Agreement (JDA) for a gas-fired Combined Cycle Power Plant.

- **Purpose or Objective of JDA:** The project's development is intended to contribute to the energy transition and support the supply of electricity in regions of Indonesia with high electricity demand. In addition, with a view toward the future realization of a hydrogen-based society, the adoption of gas turbines capable of hydrogen combustion is under consideration.

PT. PLTG Celukan Bawang — J-Power

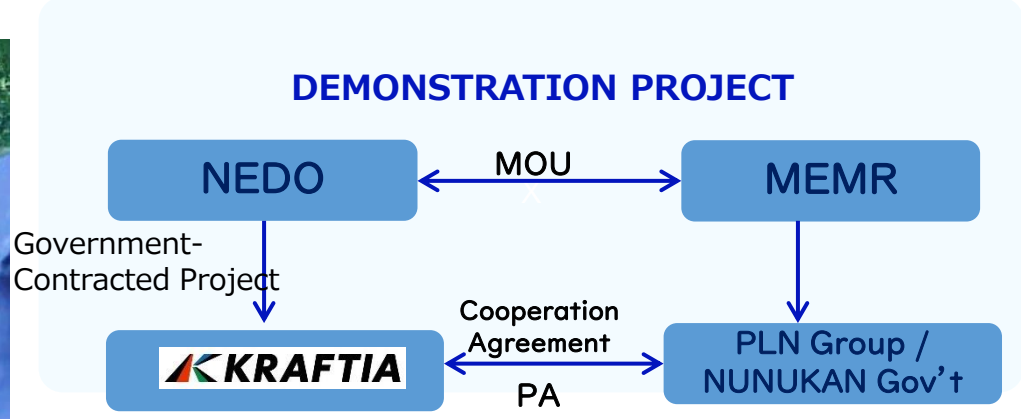
Sign JDA for Power Generation and FSRU Business

Detail Study of Joint Demonstration Project for Renewable Energy Deployment in Remote Islands in North Kalimantan (PLN Indonesia Power, KRAFTIA Corporation)

Cooperation outline : In 2023, signed a comprehensive MoU with PLN Indonesia Power on renewable energy project development. As a concrete outcome, a NEDO international demonstration project is underway in Nunukan Island, North Kalimantan, to use renewable energy as a baseload source and raise the RE share in island microgrids.In collaboration with local government, establishing a local biomass fuel supply model.

Purpose or objectives of MOU : Demonstrating stable power supply mainly from renewables in a microgrid.Potential future expansion not only across Indonesia (an island nation) but also to other regions and Japan.

Other points : Passed NEDO Stage-Gate review in June 2024; now preparing pre-demonstration study.If approved in the “feasibility evaluation,” project launch planned for FY2026 (2nd half).Demonstration scheduled for FY2026–2028 (3 years).



Demonstration Overview : Combine EFB biomass, solar, and batteries to stably supply renewable power to the microgrid. During grid outages, **channel renewable power to specific areas to test full-RE transmission**.

MOU on collaboration for de-carbonization in Cirebon 2 Thermal Power Plant

Cooperation outline : Cirebon Expansion thermal power plant, owned and operated by PT. Cirebon Energi Prasarana (“CEPR”), in which Marubeni and JERA have equity stakes, will jointly study the feasibility of optimal decarbonization solutions for the power plant with PLN, such as biomass/ammonia co-firing and CCS/CCUS utilization.

Purpose or objectives of MOU : Contribute to Indonesia's carbon neutrality by jointly examining and implementing decarbonization solutions with PLN and confirming sustainable decarbonization solutions.

CIREBON POWER — POWERING THE LIFE OF INDONESIA

PLN

Joint study / verification

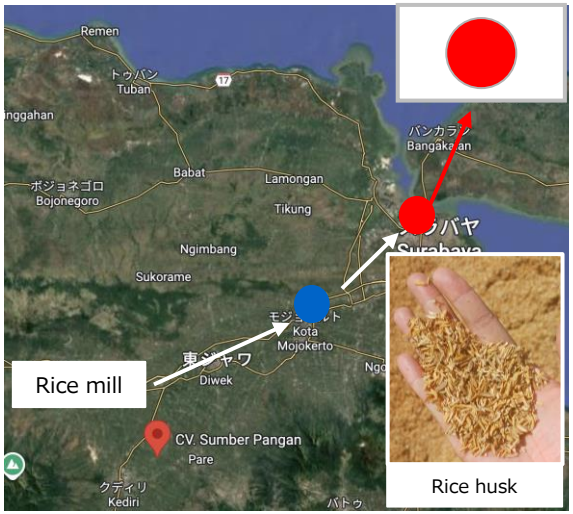
Cirebon Expansion Thermal Power Plant Decarbonization solution

Memorandum on the development and effective utilization of various types of waste generated at rice mills in Indonesia

Cooperation outline : A project to produce products using various types of waste such as rice husks generated at rice mills in Indonesia, and to supply these products domestically in Indonesia and export them to Japan.

Purpose or objectives of MOU : Indonesia, particularly east Java, produces a significant amount of rice milling residues, which can be effectively utilized to diversify biomass fuels currently used in factories in Indonesia, and imported by Japan.

<Project image>



Santomo Biomass Indonesia factory

Export port（Surabaya）

<Scheme>

CV Sumber Pangan → Supply → PT Santomo Biomass Indonesia

Supply of residues generated at rice mill

Production rice husk pellet

<Schedule>

・In February 2026, conduct rice husk procurement and manufacturing trials, and begin trial supply to Japanese-affiliated factories in East Java Province

・Starting April 2026, ordering equipment, and constructing the factory; plan to commence rice husk pellet manufacturing from October 2026

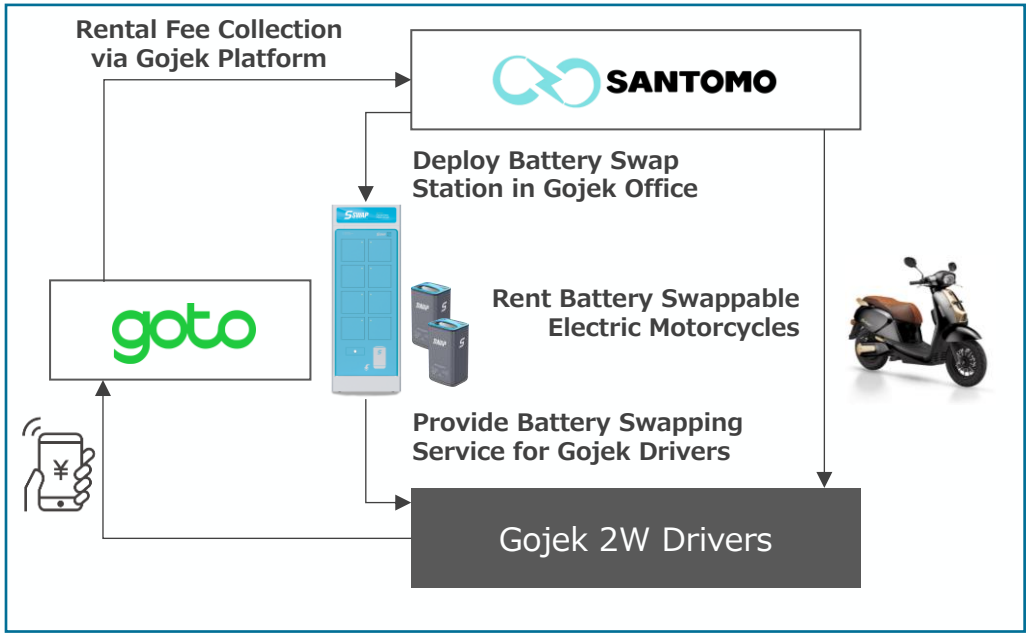
Acceleration of EV Shifting for Gojek Drivers

Cooperation outline : Acceleration of EV shift to Gojek drivers by providing electric motorcycle with battery swapping technology by PT Santomo Green Power Management and PT GoTo Gojek Tokopedia.

Purpose or objectives of MOU : In Indonesia, online driver platforms such as Gojek are now indispensable for daily services such as logistics, but most drivers currently use ICE motorcycles. By providing 2-wheeled EV with affordable price and battery swapping technology, parties aim to contribute to reduce carbon emission.

URL : https://san-tomo.com/posts/8s5N_gJq

Cooperation Scheme



Project Photo

Photo: Gojek drivers using electric motorcycles provided by PT SGPM

THE PILOT PROJECT FOR RESTORATION AND MANAGEMENT OF PEAT ECOSYSTEMS IN CENTRAL KALIMANTAN PROVINCE

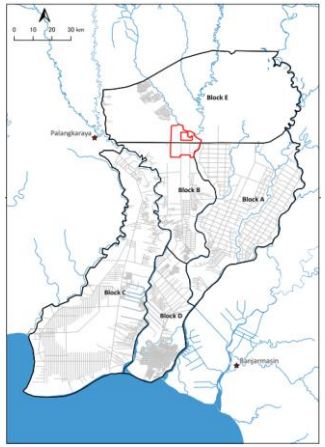
SUMITOMO FORESTRY

Cooperation outline : Indonesian Forestry Ministry and PT. Sumitomo Forestry Indonesiasigned MoU to develop sustainable model for Central Kalimantan peatland restoration.

Purpose or objectives of MOU : Mitigate fire risks, create carbon credits and establish a sustainable peatland management model to achieve economically viable afforestation.

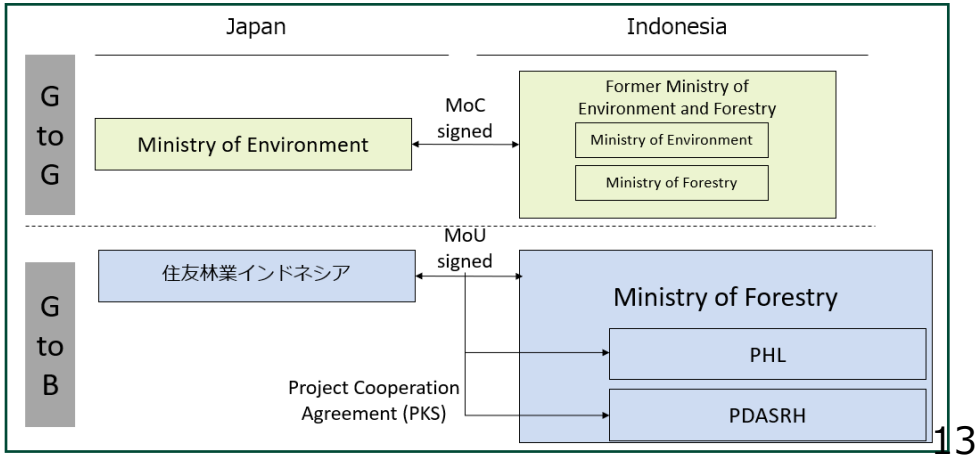
Other points : As part of this initiative, Sumitomo Forestry Indonesia will develop a JCM methodology to quantify CO_2 emission reductions, aiming for emission reductions through peatland management and the stable supply of woody biomass fuel.

<Ex Mega Rice Project site, Central Kalimantan>



<Company's demonstration site in degraded peatland>

<Business scheme>



MOU on cooperation for development of decarbonized utility supply in Deltamas City including GIIC

Cooperation outline : The parties confirm their cooperation to consider two projects aimed at promoting decarbonization of industry in Deltamas City including GIIC:

1. Development of **large-scale solar power projects** utilizing green spaces, ponds and other available areas both within and around the estate
2. Development of **bio-methane/CNG value chain**

Purpose or objectives of MOU : To promote decarbonization of electricity and gas and accelerate decarbonization of industry and industrial park, we aim to develop large-scale solar power projects by utilizing unused areas in and around the estate to address land scarcity issues, while also developing a new bio-methane/CNG value chain utilizing waste from nearby West Java region.

① Decarbonization of electricity: large-scale solar power projects

Unused land in/around the estate

Utilizing unused area such as green areas, under power lines and ponds

Large-scale solar power

Large-scale solar power projects that preserve function of green areas

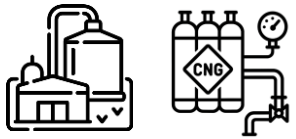
② Decarbonization of gas: bio-methane/CNG

Biomethane feedstock sourcing

Sourcing feedstock such as agricultural and livestock waste etc. from nearby West Java

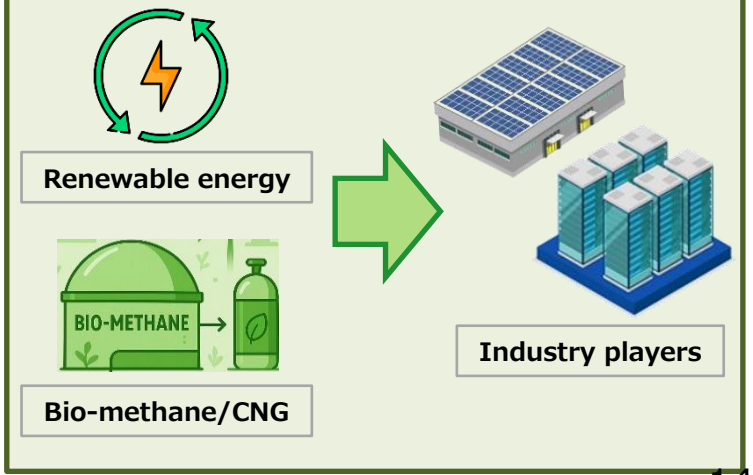
Production of bio-methane/CNG

Producing bio-methane through waste fermentation, with optional conversion to bio-CNG



Decarbonization of industry and industrial park

Promoting decarbonization of industry and industrial park through supply of renewable energy and bio-methane/CNG



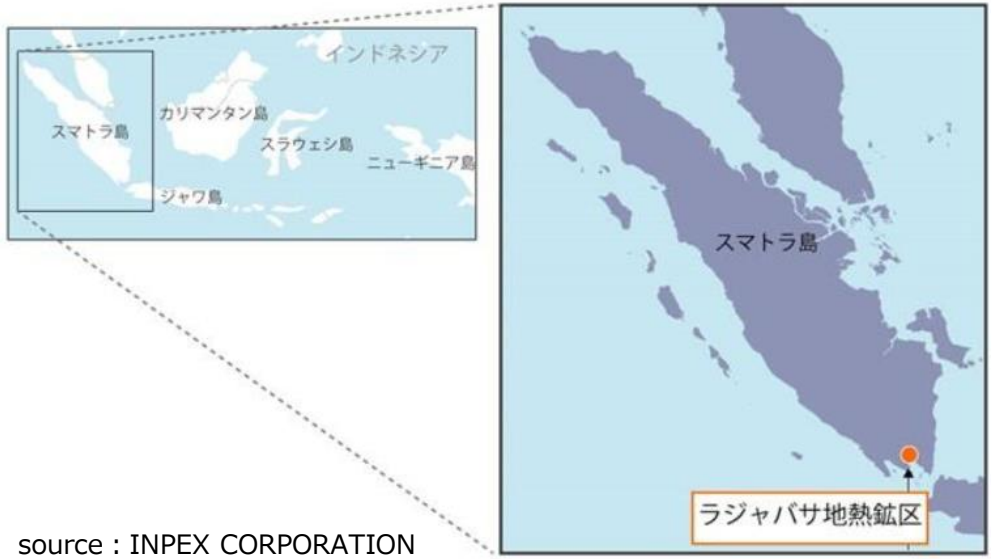
MOU regarding various studies towards the realization of the Rajabasa Geothermal Power Project

Cooperation outline : To study various measures (economics improvement, geothermal risk mitigants, etc.) for realization of the project, being developed by Sumitomo Corporation, INPEX CORPORATION, and PT Supreme Energy.

Purpose or objectives of MOU : Geothermal power is a stable, renewable energy source that is unaffected by time, weather or season. Promoting the development of this project can contribute to Indonesia's energy transition.

URL : Assets | Supreme Energy

<Project Site>



source : INPEX CORPORATION

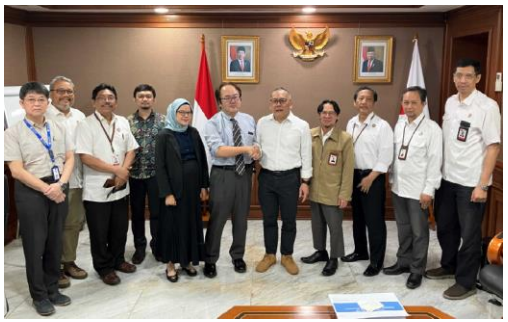
<Jetty>

MOU concerning Research and Innovation collaboration in low carbon technology and manufacturing

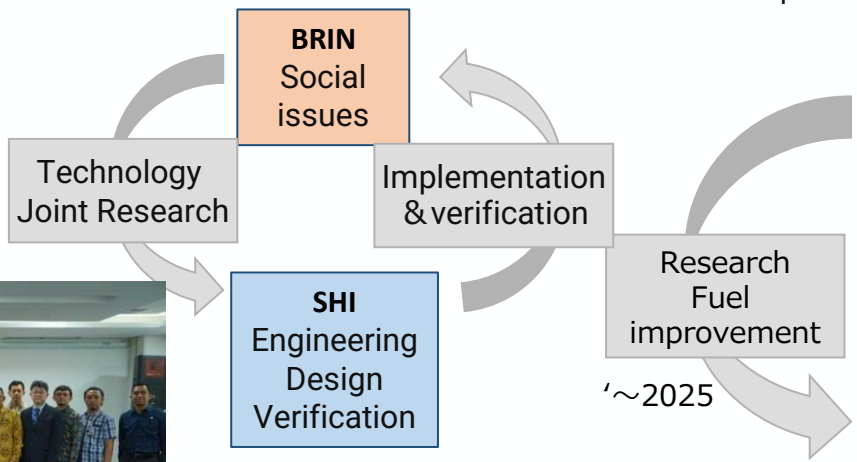
Cooperation outline : Joint research and development of low-carbon technologies and manufacturing in sectors such as power generation, wastewater treatment, and food processing etc.

Purpose or objectives of MOU : In collaboration with BRIN, we aim to create feasible decarbonization scenarios at the industrial level, including transitions, identify challenges, and build and deploy solution technologies.

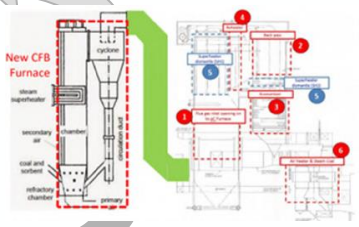
Other points : As the first initiative, the development of technology to utilize palm oil residues (EFB), a representative example of unused biomass. Detailed exchanges of opinions have begun in fields such as wastewater treatment, food processing, and renewable energy utilization.



＜ Scheme ＞



＜ example: Coal-fired power fuel conversion ＞



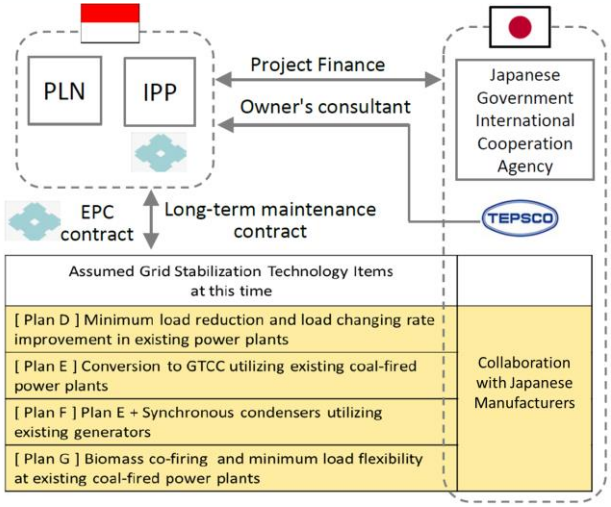
Indonesia / Java-Madura-Bali (“Jamali”) Electricity Grid Impact Study and Creation of Short-Mid Term Decarbonization Master Plan

Cooperation outline : In order to achieve Net Zero Emission in 2060, Indonesia targets to cover more than half of the total electricity capacity by renewable energy (RE). However, the power system will become unstable when the proportion of RE increases. This study by Tokyo Electric Power Services Co., Ltd. and Sumitomo Corporation will identify the challenges to expand RE introduction to the Jamali Grid, and propose measures for grid stabilization by the “utilization of existing power generation facilities” and its implementation priority to PLN (state electricity company).

Purpose or objectives of MOU : (1) Formulation of a plan to promote the introduction of RE in Indonesia, (2) Reflect the contents of the proposal in RUPTL (PLN Electricity Supply Business Plan).

Other points : The MOU was executed in January 2025. Through this study, a Master Plan for the next 10 years will be created. Plan to finalize the study by January 2026.

<Image of Future Commercialization>



<Study Organization>

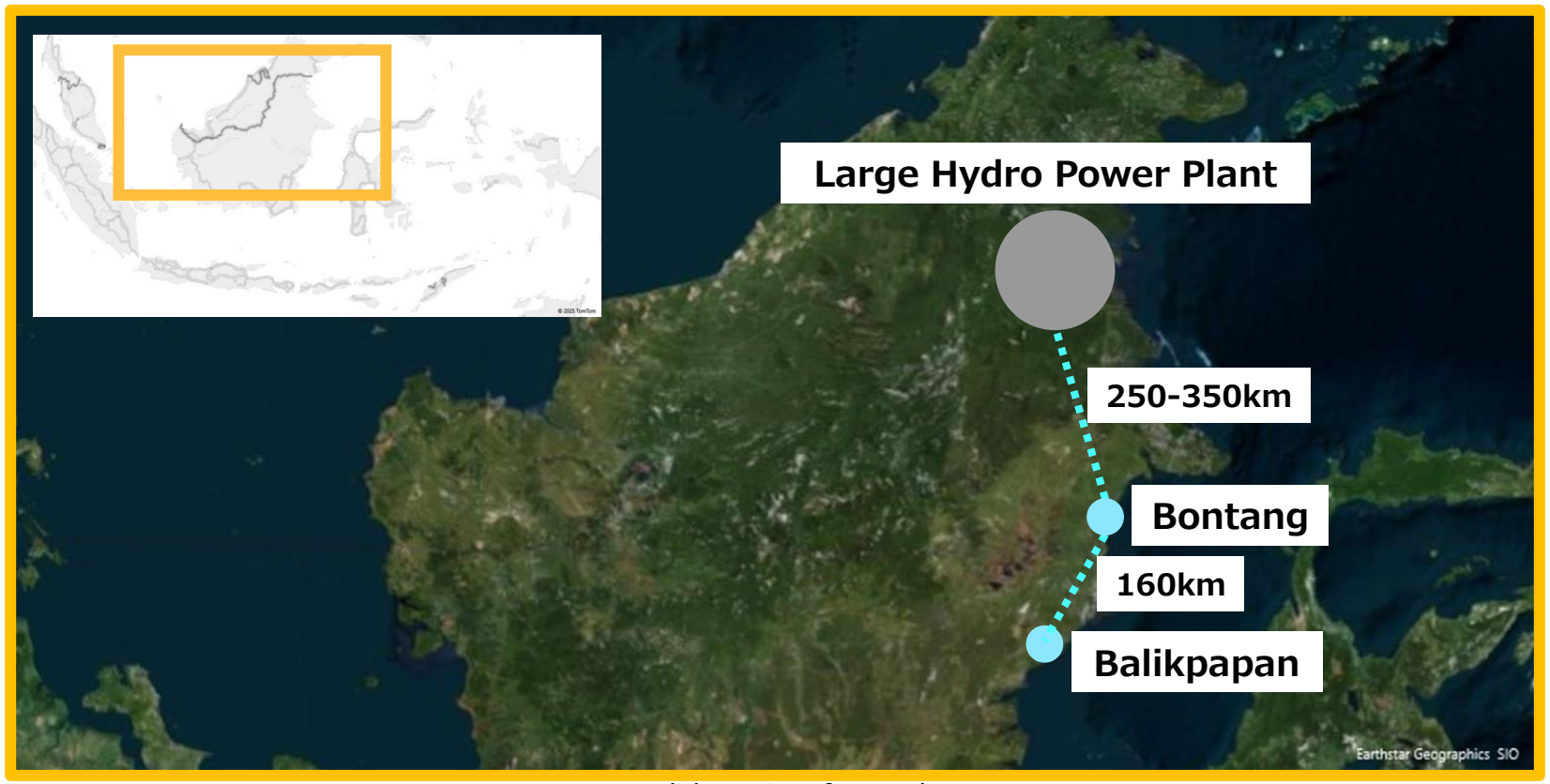
MOU Signing (Jakarta)

- Joint study by Tokyo Electric Power Services Co., Ltd. and Sumitomo Corporation
- Work on power system analysis is outsourced to PLN Enjiniring, subsidiary of PLN
- The study is carried out efficiently through the MOU between PLN, TEPSCO, and SC

Memorandum of Understanding on e-methane Development in Indonesia

Cooperation outline : Between 2022 and 2023, Pertamina and IHI conducted a feasibility study on e-methane production costs. Following that study, in 2025 Tokyo Gas will join as well and altogether explore the opportunity and feasibility of exporting e-methane to Japan.

Purpose of MOU : The production of e-methane will utilize CO2 emitted from Badak LNG in Bontang as the feedstock, and therefore this initiative will contribute to the development of a decarbonized society in Japan and around the world.



Candidate sites for study

references a topographic map from 3D Map (Excel), which Tokyo Gas Asia processed.

Joint Development of Bioenergy Projects in Malaysia and Indonesia

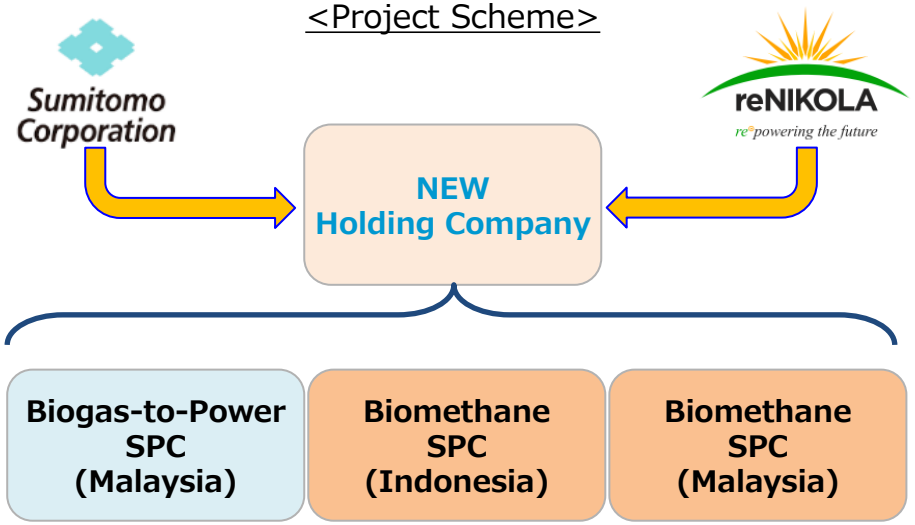
Cooperation outline : Establishing a collaborative framework by reNIKOLA Holdings SDN BHD and Sumitomo Corporation to jointly develop and expand the bioenergy (biogas and biomethane) businesses in Malaysia and Indonesia, with the aim of contributing to the realization of carbon neutrality in both countries.

Purpose or objectives of MOU : The cooperation aims to promote the energy transition and the growth of sustainable energy independent from fossil fuels, such as through the reproduction of palm oil residues into bioenergy (biogas and biomethane) in Malaysia and Indonesia.

Other : MOU signing ceremony was held in May 2025, led by MOSTI (Ministry of Science, Technology and Innovation), at the Malaysia Pavilion of the Osaka Expo held under the theme “Weaving a Future in Harmony,”

<Image of plant construction in a similar project>

<Project Scheme>



Fuel Conversion Project Using Green Hydrogen Burners in the Lao PDR

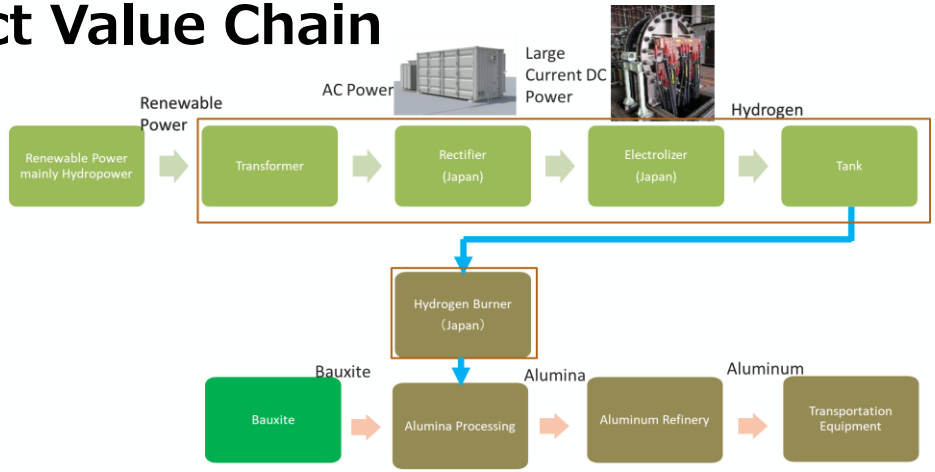
Cooperation outline : TSB Green Nex and Lao Green Hydrogen of the Laos will jointly conduct a feasibility study on a project to convert fuel source for the calcination process in planned alumina processing—based on bauxite deposits in Sekong Province, Laos—from fossil fuels to green hydrogen.

Purpose or objectives of MOU : Amid growing global demand for green aluminum, calcination process in alumina production still relies on fossil fuels. By replacing these with green hydrogen, the project seeks to contribute to decarbonization and support development of green aluminum production.

Other points : A green hydrogen roasting project is already underway in Laos, and the knowledge gained from that initiative will be leveraged for this project. Although the bauxite deposits in the province are among one of the largest in the world, they remain undeveloped due to insufficient infrastructure.

Sekong Province in Lao

Project Value Chain



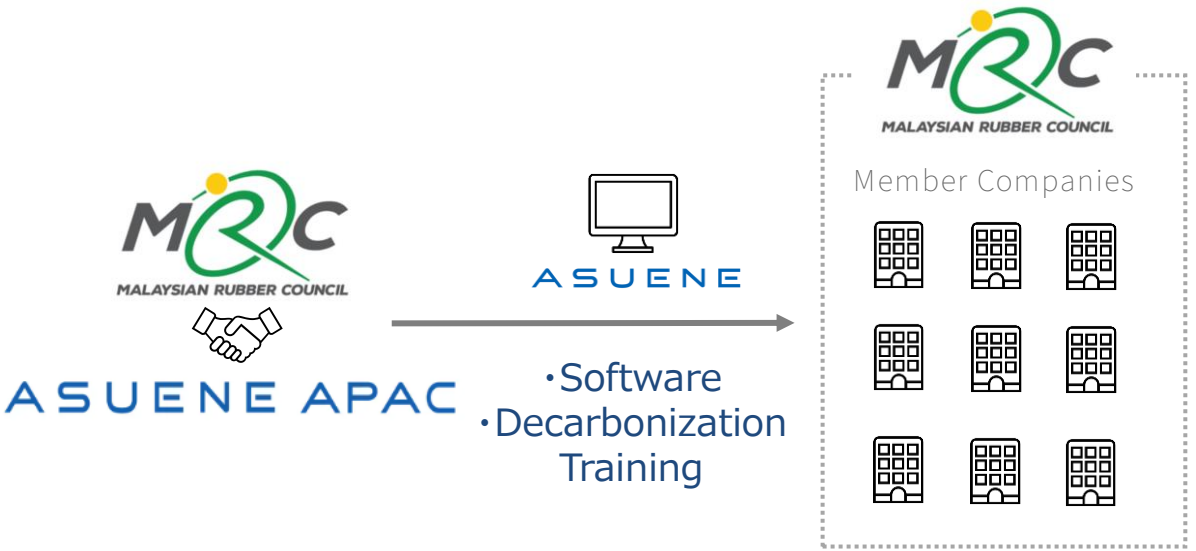
Decarbonization Collaboration with Malaysian Rubber Council

Cooperation outline : Provision of decarbonization training and introduction of calculation system for MRC member companies

Purpose or objectives of MOU : Maximize the decarbonization impact of the entire industry by promoting the introduction of decarbonization knowledge and calculation solutions to small and medium-sized enterprises in the Malaysian rubber industry.

Project site

Collaboration Scheme



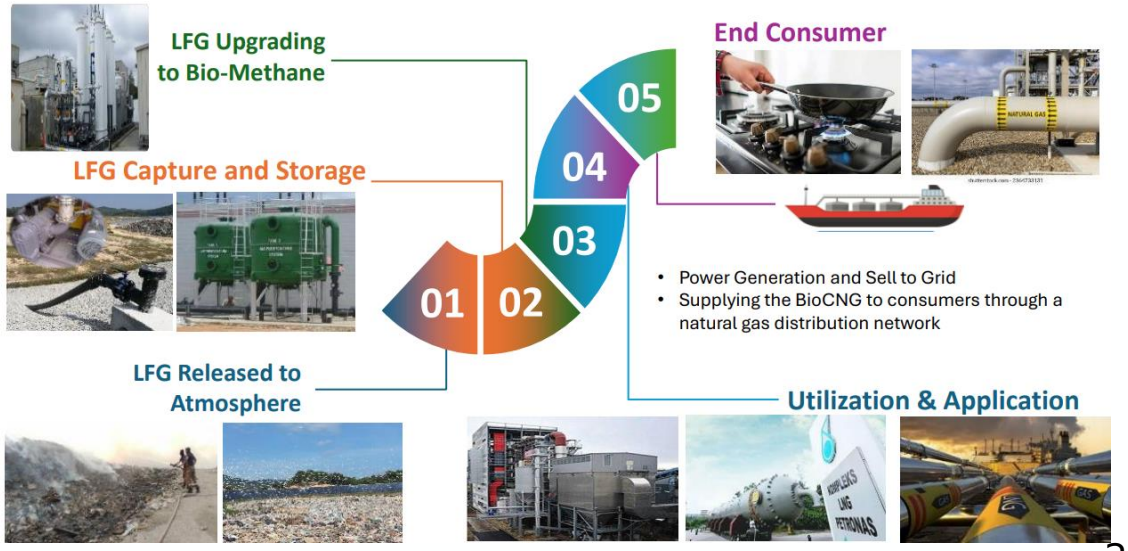
Landfill rehabilitation & development project in Malaysia

Cooperation outline : Idemitsu International (Asia), PETCO Trading Labuan Company, Saxon Renewable Energy and AE Carbon Capital will explore the possibilities of potential business opportunities and/or to collaborate in relation to a landfill rehabilitation & development project in Malaysia.

Purpose or objectives of MOU : The collaboration aims to jointly study and/or assess the feasibility of the potential project. The project aims to extract methane from the landfill and recover it for either power generation or upgrading to Bio-CNG while simultaneously generating carbon credits.

Pictures of project site

Project Concept

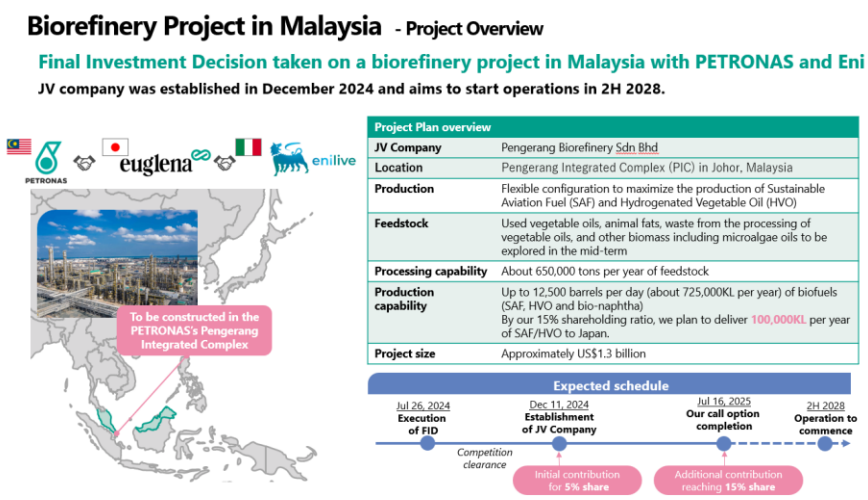


Euglena completed 15% Investment in Biorefinery JVCo with PETRONAS and Eni

Cooperation Outline : Euglena Co., Ltd. had increased its equity stake to 15% in the joint venture company responsible for constructing and operating a commercial-scale biorefinery in Malaysia jointly promoted with PETRONAS Mobility Lestari Sdn Bhd, a subsidiary of PETRONAS and Enilive S.p.A., a subsidiary of Eni S.p.A. as of July 16, 2025.

Objective : Securing the stake holding to the World Scale biorefinery project of which construction is scheduled to complete in 2nd half 2028, and contribute to the Carbon Neutral of transportation sectors in Asia.

Outline of Biorefinery Project



Project Site: Pengerang Integrated Complex

Biomass steam supply agreement between Kaneka Malaysia Group and BAC Renewable Energy

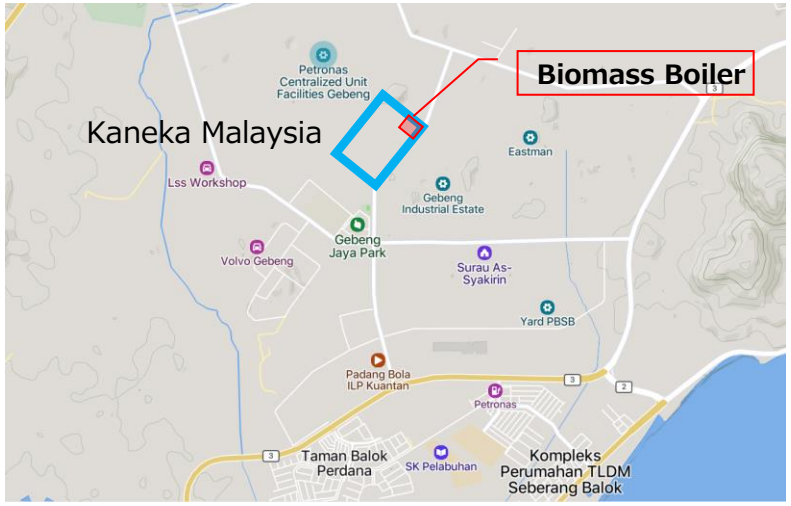
Cooperation outline : As part of effort from the Kaneka Malaysia Group (KM) to achieve carbon neutrality by 2050, KM contracts the steam purchase agreement with BAC Renewable Energy (BACRE).

Purpose or objectives of MOU : BACRE, which has a scheme from collecting biomass fuel to producing steam, and Kaneka Malaysia, which is using steam, work together to contribute to meet the Malaysia Energy Transition Road Map.

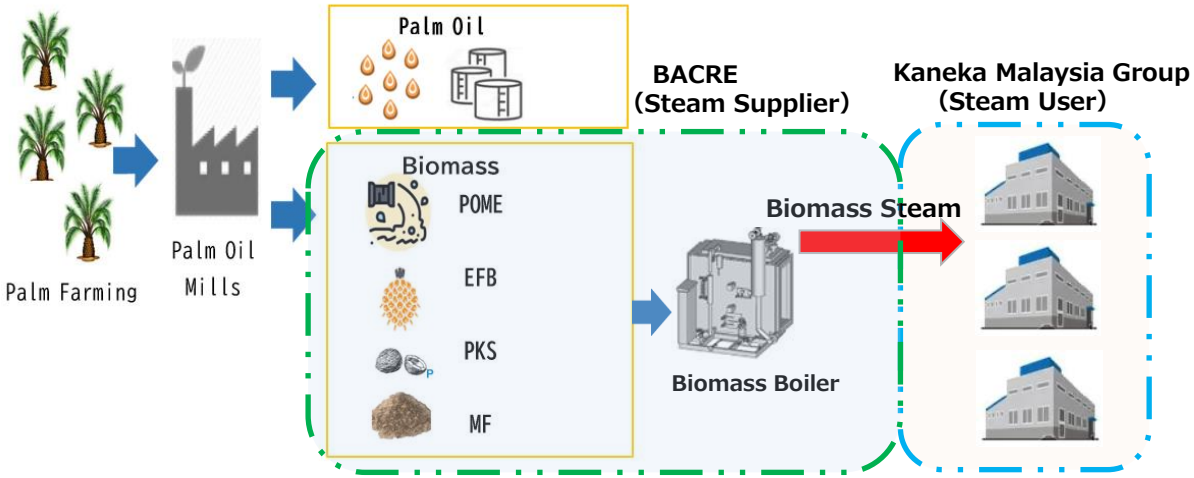
Other points : The contract has been signed in April 2024, and the biomass steam will be supplied from September 2026.

URL : [Home - Kaneka Malaysia]

<Site of Project>



<Scheme>



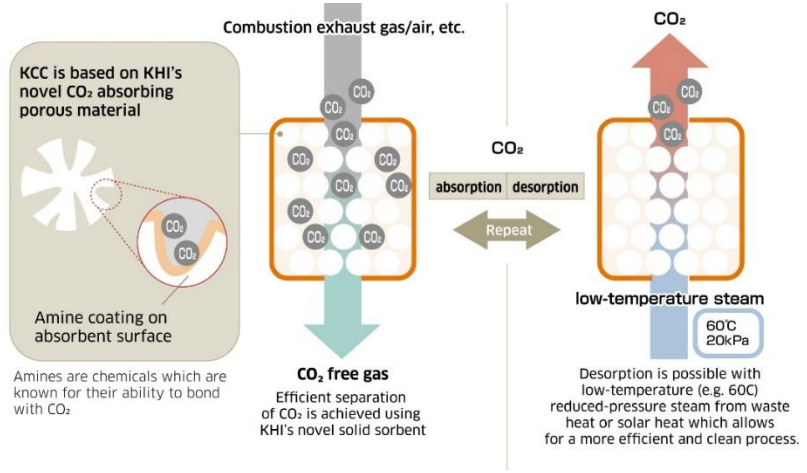
MOU on the Implementation of a Feasibility Study for CO_2 Capture from Emission Sources in Malaysia between Kawasaki Heavy Industries and PETRONAS CCS Solutions Sdn. Bhd.

Cooperation outline : A study will be conducted on the application of Kawasaki's CO_2 capture technology (KCC; Kawasaki CO_2 Capture) to industrial emission sources in Malaysia, examining policy, economic, and technical aspects. In addition, considerations will be made toward the introduction of a demonstration unit aimed at capturing CO_2 from local emission sources.

Objectives of MOU : Through the implementation of this feasibility study, the aim is to assess the potential for introducing CCS technology in Malaysia's industrial sector, and by linking it to the next steps of demonstration and commercialization, contribute to the achievement of Malaysia's NDC targets and the enhancement of its export competitiveness.

PCCSS and Kawasaki

Overview of CO_2 Capture Technology (KCC)



MoC between METI and The Government of Malaysia in the field of CCS

Cooperation outline : Initiating bilateral discussions to enable cross-border CCS, discussion on policy to enable CCS deployment, and strengthening technical co-operation

Purpose or objectives of MOU : Creating a framework for knowledge sharing and exchange activities to promote co-operation in the area of CCS

METI

Establish the Joint Committee to facilitate the implementation of the cooperation including;

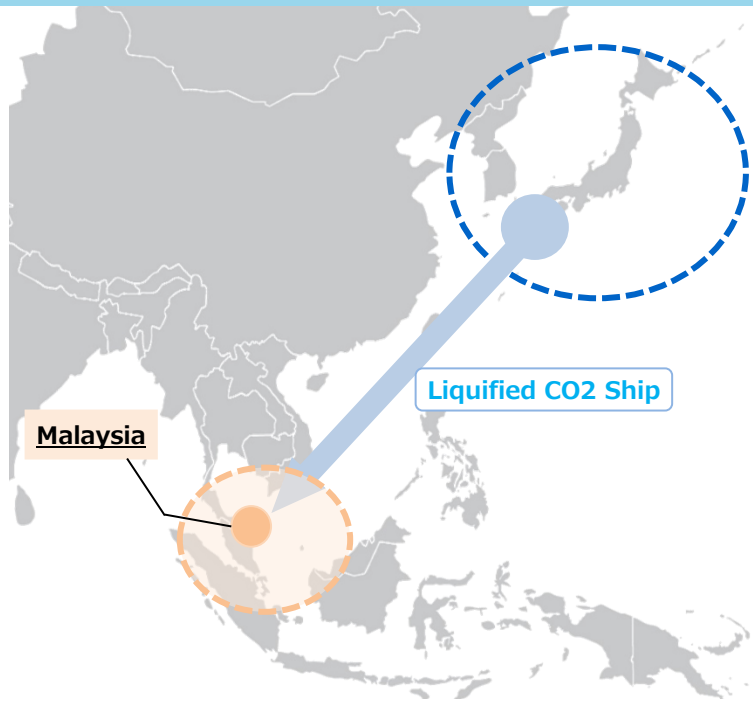
- bilateral discussions on cross-border CCS
- CCS policy discussion
- strengthening technical co-operation

Government of Malaysia

Key Principles Agreement execution for Southern Offshore Peninsular Malaysia CCS project

Outline : The CCS project has been jointly developed by PETRONAS, Mitsui and TotalEnergies since 2023 and the parties agreed to enter Key Principles Agreement (KPA) in July 2025 to develop the project further. The project aims to develop the first CCS value chain to store industrial CO2 from Asian countries, mainly Japan, in offshore Peninsular Malaysia. The project is awarded JOGMEC's Advanced CCS program and aiming to commence operations by the early 2030s.

Purpose of Agreement : KPA will provide further alliance between PETRONAS, Mitsui and TotalEnergies for higher techno-economics evaluation of the CCS project based on the ground works in past years since the tripartite collaboration started.



Separation · Capture

Target Industry : Cement, Steel, Refinery, Power generation
⇒Aim to found emitter hub & cluster and realize competitive separation and capture facility/system

Transportation

Scope of Development : LCO2 Ship
⇒Standardization Study, Shipyard/Shipowner Selection, Logistics Optimization

Storage

Scope of Development : Depleted gas field, Aquifer
⇒Securing overseas storage capacity, development of promising site, storage, monitoring

Project Structure

MITSUI&CO. | PETRONAS | TotalEnergies

Key Principles Agreement

MOU between DBOS and Mizuho Malaysia for Strategic Collaboration

- **Overview** : Establish strategic collaboration between Development Bank of Sarawak Berhad (DBOS) and Mizuho Bank (Malaysia) Berhad (Mizuho) to promote and support the development of infrastructure projects in line with the aspiration and vision of the State of Sarawak, a state abundant in renewable energy resources.
- **Objective** : Mizuho may introduce potential investors from its global client base to invest into Sarawak strategic projects. Mizuho may provide research and/or financing support. DBOS may consider them as potential business collaborators in advancing Sarawak.
- **Others** : Mizuho held three workshops on decarbonization with one of the Sarawak State Ministries since 2023 covering topics on hydrogen, biomass power generation and carbon credits. Mizuho has introduced two Japanese companies.

Memorandum of Cooperation on Energy Partnership between the DOE of the Philippines and the METI of Japan

Cooperation outline : The DOE of the Philippines and the METI of Japan intend to pursue a Memorandum of Cooperation on Energy Partnership.

Purpose or objectives of MOU : Both countries share the importance of the AZEC principles of "aiming for common goals through various pathways" and "simultaneously achieving economic growth, energy security, and low carbon development". In addition, both countries recognize that innovation plays an indispensable role in the pathway toward carbon neutrality, equity and inclusiveness.

Main area and scope of cooperation

1. **The formulation and update of energy transition roadmap** towards carbon neutrality based on the national circumstances and priorities of the Philippines
2. **The research and development of various energy sources and technologies**
3. Other areas of cooperation mutually decided by both sides within its scope of functions

Main forms of cooperation

1. **Capacity building and training programs** to enhance technical and managerial skills in the field of energy transition.
2. **Knowledge exchange and sharing of best practices** in areas such as renewable energy deployment, grid integration, energy storage, smart grids, hydrogen and ammonia utilization, energy efficiency measures, LNG, CCUS and policy frameworks.
3. **Collaboration on pilot projects for the demonstration and deployment** of innovative and sustainable energy solutions.
4. **Policy dialogue and engagement to foster regulatory frameworks** that support energy transitions and attract investments in clean energy.

Mizuho Bank and PEZA: MOU for business cooperation

Overview : MOU between PEZA (Philippine Economic Zone Authority) and Mizuho Bank to support entry to the Philippines and partnership with local companies, since 2012. In 2025, scope of the MOU was extended to ESG, including transition credits.

Significance : Transition credits are a solution to promote energy transition in an economic way, by applying carbon credits to coal managed phase out

【Scope of the MOU】

1) Mutual cooperation to attract Japanese and other Asian companies to the Philippines

2) Co-hosting of events such as seminars connecting Japanese and other Asian companies with Philippine companies for business matching and investment

3) Support for various procedures for Japanese and other Asian companies entering the Philippines

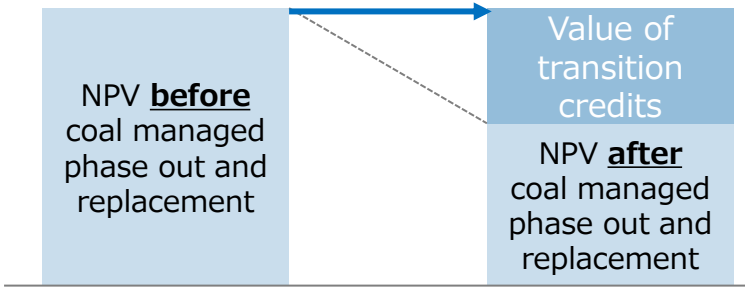
4) Collaboration on environmental, social, and governance (ESG) frameworks such as carbon credit projects and transition credits

【About PEZA】

PEZA is an agency under the Department of Trade and Industry (DTI) of the Republic of the Philippines. It is one of the government agencies responsible for receiving and advising on foreign companies' investment applications and foreign companies' applications for permits and approvals, and it serves as a contact point for investment in the Philippines.

*Transition credits are a financial mechanism to promote the early retirement of coal-fired power plants and the transition to renewable and other types of alternative energy. They involve a quantitative assessment of the CO_2 emissions from coal-fired power plants' continued operation and of the reductions from retirement, conversion of the reductions into environmental value (generation of carbon credits), and direction of the profits from sales of carbon credits to the costs of early retirement and alternative energy.

【Transition credits*】



MOU on Decarbonization between Zeroboard and Philippine Economic Zone Authority (PEZA)

Cooperation outline : Zeroboard and the Philippine Economic Zone Authority (PEZA) have signed an MOU to promote decarbonization in Philippine special economic zones. We collaborate on GHG emissions management and GX human resource development.

Purpose or objectives of MOU : Under this collaboration, we support GHG emissions calculation and visualization for PEZA-registered companies, jointly implement GX human resource development programs, co-develop a “Green SEZ” certification scheme, and select model industrial parks for pilot projects to realize sustainable special economic zones.

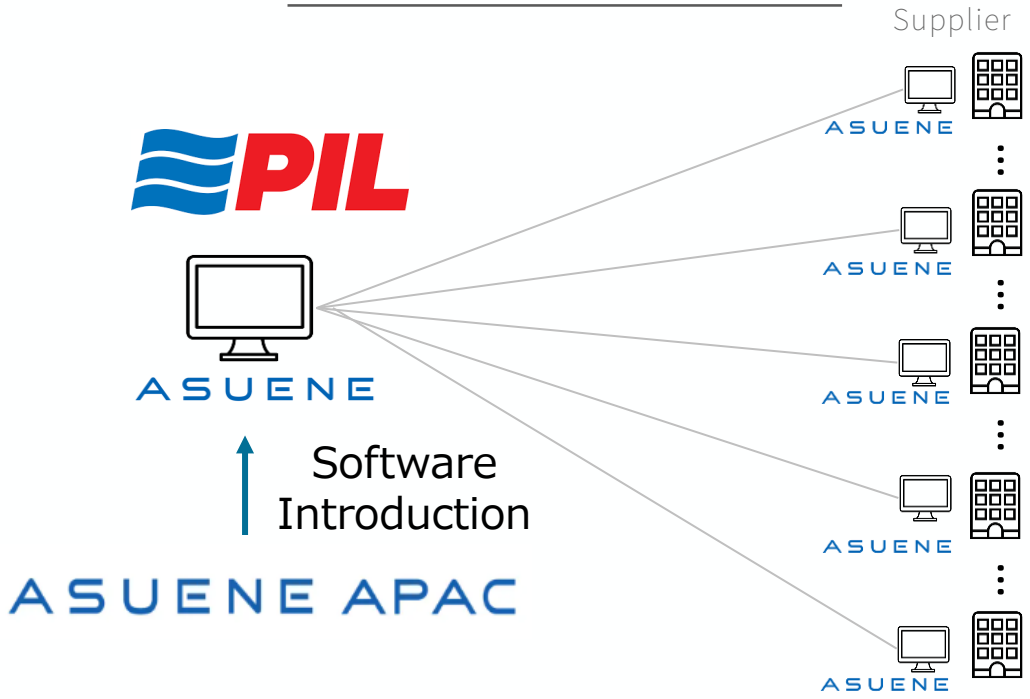
Collaboration to decarbonize the entire supply chain

Cooperation outline : Introduction of the system to PIL and efforts to promote decarbonization to PIL's supply chain partners

Purpose or objectives of MOU : Through PIL, the largest local shipping company in Singapore, we will promote CO2 visualization and decarbonization efforts to SMEs in the supply chain, creating a sustainability impact in the industry.

Signing Ceremony

Collaboration Scheme



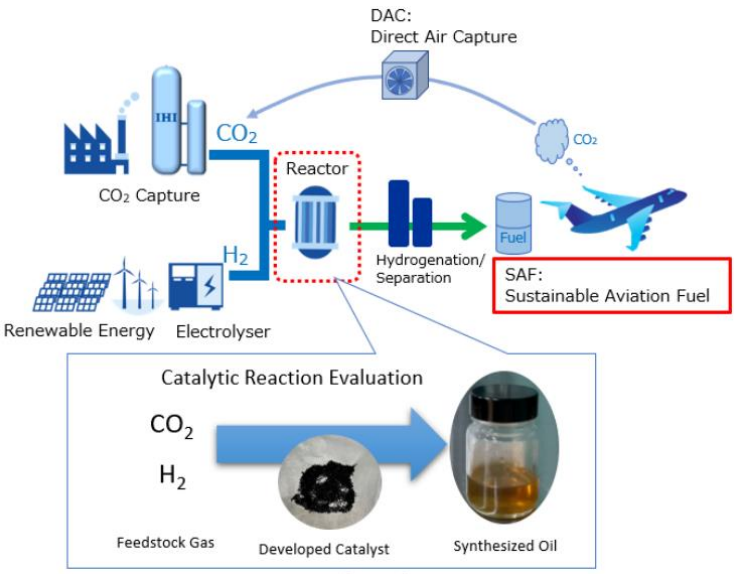
Collaboration for accelerating the commercialization of sustainable aviation fuel (SAF) synthesis technology

Cooperation outline : Accelerating the commercialization of a technology co-developed with IHI and ISCE²(*1), which synthesizes hydrocarbons directly from hydrogen and CO_2 for use in SAF.

Purpose or objectives of MOU : Accelerate efforts for implementation of this technology in the Asia-Pacific region by scaling up SAF production technology, obtaining fuel standard approval (*2) and exploring business opportunities, in order to contribute to the carbon neutrality of aviation industry.

URL : https://www.ihi.co.jp/en/all_news/2024/technology/1201109_13699.html

*1: Institute of Sustainability for Chemicals, Energy and Environment
*2: the standard for commercial deployment of SAF, regulated by ASTM International.



IHI's SAF Concept

MOU Signing ceremony on Oct 24th 2024

SAF test Rig at ISCE²

GenZero and Mizuho Bank: Strategic partnership for transition credits

Overview : In February 2025, GenZero and Mizuho Bank signed an MOU to form a strategic partnership for transition credits, which are currently being developed to facilitate the early retirement of coal-fired power plants.

Significance : By supporting the robust evaluation of decarbonization initiatives and mobilization of international carbon finance, transition credits open a path to accelerate the phase-out of coal-fired power generation while mitigating economic, energy, and social impacts.

Strategic partnership for transition credits

GenZero

- Temasek-owned decarbonisation-focused investment platform company
- Frontrunner driving transition credits efforts

MIZUHO

- Carbon credits is one of strategic focuses in sustainability
- Working to enhance the scalability and mechanisms of carbon credits as a financing method

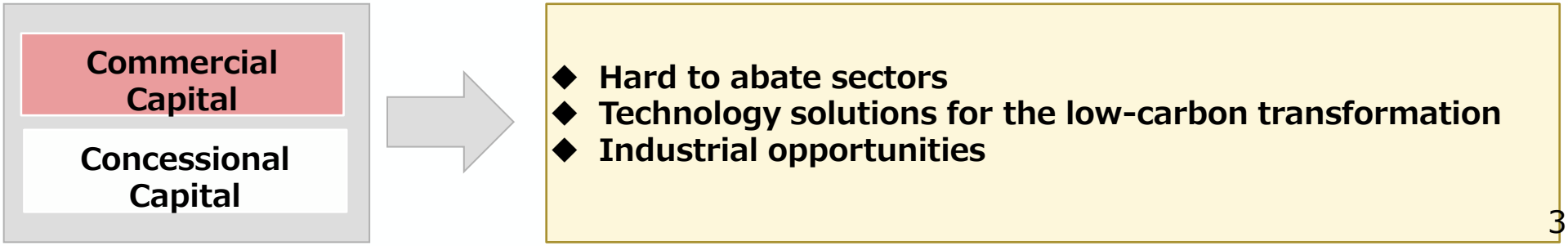
- Leverage their financial insights and networks
- Jointly develop capital raising mechanisms incorporating carbon credits
- Further the design of frameworks for transition credits

Statement of Intent to unlock investment opportunities in decarbonization in Asia

Statement Of Intent (SOI) Outline : November 12,2024 – MAS, BlackRock, IFC, NEXI, AIA, and MUFG have signed an SOI at COP29 to explore ways to work together on a blended finance debt initiative for global investors seeking opportunities to finance corporates' decarbonization projects at scale in Asia with a focus on Southeast Asia(SEA).

Purpose of SOI : To accelerate decarbonization in SEA by expanding investor access to private companies and projects working on decarbonization, thereby mobilizing public and private funds to address the region's decarbonization financing gap.

Other points : The Industrial Transformation infrastructure debt program is one of the programs under MAS' Financing Asia's Transition Partnership (FAST-P), a blended finance initiative announced by the Singapore Government at COP28 that aims to mobilize up to US$5 billion from public, private, and philanthropic partners to finance transition opportunities in SEA.



Collaboration agreement on decarbonization solutions in Thailand

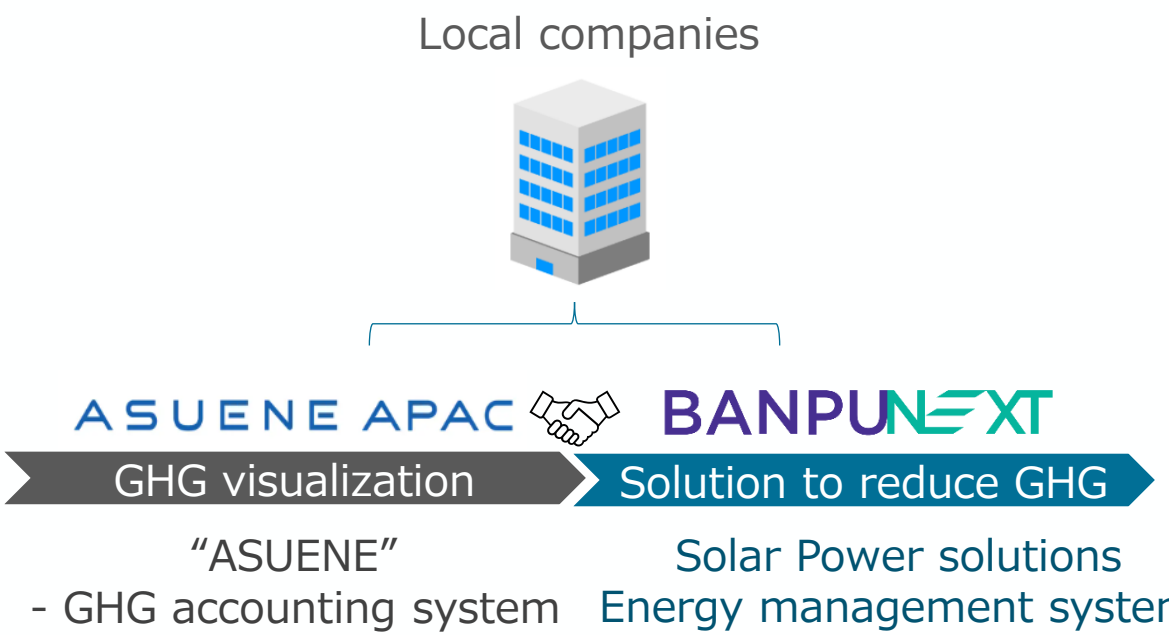
Cooperation outline : Conclusion of collaboration agreement with Thai local company Banpu Next for Asuene's GHG calculations

Purpose or objectives of MOU : Strengthen partnerships for customer referrals and promote companies' achievement of net zero by promoting visualization of CO2 emissions

URL : https://www.vritimes.com/th/articles/a97a0d24-2509-11ee-93d7-0a58a9feac02/68ea659c-dd0e-11ef-aae3-0a58a9feac02

Project site

Collaboration Scheme



Hands-on support for local Thai companies in calculating greenhouse gas (GHG) emissions

Project outline : ICETT will provide hands-on support for Thai companies (approximately three companies) in calculating greenhouse gas (GHG) emissions in fiscal year 2025 . This project will be implemented based on the Memorandum of Understanding (MOU) that Department of Industrial Works (DIW), Ministry of Industry of Thailand and ICETT signed in May 2024, to support GHG emissions calculation and reduction efforts in Thailand's industrial sector.

Intension and Aims of the project : Through the hands-on support from Utilizing ICETT's knowledge and expertise in this field, we will cooperate with Thai industry's efforts to conserve the environment, and particularly carbon neutrality from this fiscal year. Additionally, in the future,as a measure to reduce GHG emissions, we will support Japanese companies in expanding their business overseas by introducing CN technology.

Related URL : https://www.icett.or.jp/2024/05/r6_thai_may/

Hands-on support for local Thai companies in calculating GHGemissions through collaboration with DIW

Hands-on support

MOU » Seminar » Calculating GHG emissions » Plan (CN Measures) » Implemen-tation / Emission reduction

Contents of this project

Conclude MOU

- DIW and ICETT agree upon the cooperation and its direction.

Sign agreements with Thai companies to support in calculating GHG emissions and provide hands-on support

- ICETT provides hands-on support for (approximately three) companies in Thailand, in calculating GHG emissions along with Value (Supply)-Chain (Scope 3).
- Bottlenecks and processes to be improved will be identified, which would lead to the actual reduction of GHG emissions.

⇨ Lead to the achievement of CN in Thailand.

Consider plan/CN measures

- ICETT and its partner(s) support the companies in making plans to reduce emissions.
- (ICETT might introduce entities that can offer CN measures and/or implement them.)

Implement CN Measures

- By supporting implementation of GHG emission reduction measures, we will contribute to reducing GHG emissions and improving competitiveness.
- ICETT would like to encourage introduction of CN technologies of Japanese companies, particularly in Chubu region.

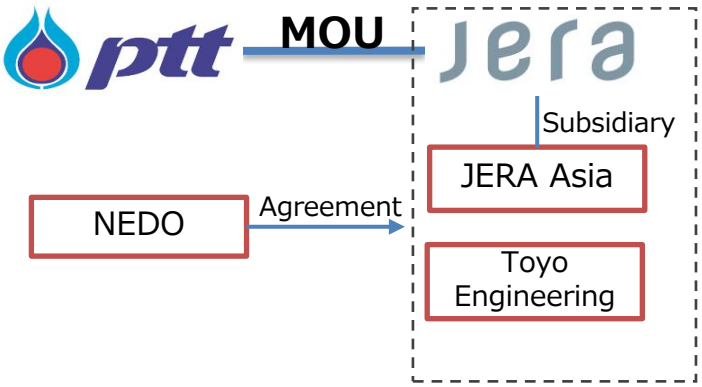
Collaboration with PTT on Building a Hydrogen and Ammonia Supply Chain for Decarbonization of Thailand

Outline of the MOU : JERA and PTT will collaborate and consider the building of hydrogen/ammonia supply chain creation in Thailand toward carbon neutrality by 2050 and net zero emission by 2065. Under the MOU, the consortium with JERA, JERA Asia and Toyo engineering is conducting the feasibility study about ammonia cracking funded by NEDO.

Purpose : To ensure the technology of ammonia cracking and expand the utilization of hydrogen in Thailand, which highly rely on the gas-fired power plant.

URL : [Collaboration with PTT on Building a Hydrogen and Ammonia Supply Chain for Decarbonization of Thailand | Press Release(2023) | JERA]

Project organization



MOU execution ceremony

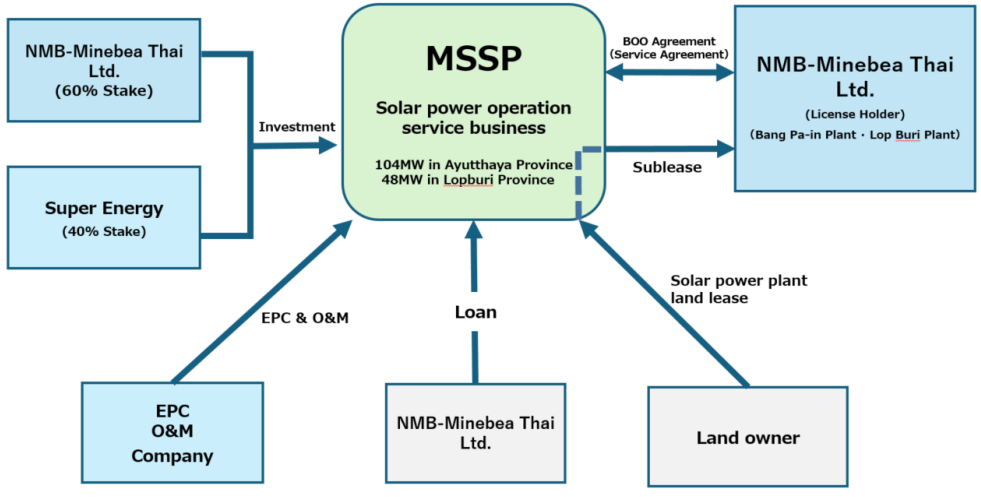
I

Promoting Collaborative Solar and Battery Storage Projects in Thailand (Lopburi & Ayutthaya)

- **Outline of the Projects** : In collaboration with Super Energy, a private power producer in Thailand, we will jointly invest in and operate a total of 152MW-scale solar power generation and battery storage projects for 25 years at sites in Bang Pa-in, Ayutthaya Province, and Lopburi Province.
- **Objectives of This Collaboration** : Approximately 38% of the electricity used at MinebeaMitsumi's Banpain and Lopburi Plant will be converted to renewable energy by these projects. The introduction of a large-scale storage system will enable efficient operation of solar power generation while reducing excess electricity
- **Current Situation**

① All necessary major contracts, including the joint venture agreement, have been executed.
② Currently trying to get permission for the projects from the Thai Energy Regulatory Commission (ERC). Operations of the projects will be starting from mid-2026.

Project scheme



Project Site

MoU on the biochar business collaboration between TOWING and SCG Cement

Cooperation outline : TOWING will enhance the biochar produced by SCG Cement with its proprietary microbial technology, creating “high-performance biochar,” and the parties jointly pursue business development in Thailand

Purpose or objectives of MOU : “Biochar,” produced by carbonizing unutilized local biomass, enables carbon to be captured in a soil when applied to farmland. Adding microbes that address agronomic issues to biochar, the project aims to tackle GHG and agronomic issues across the country

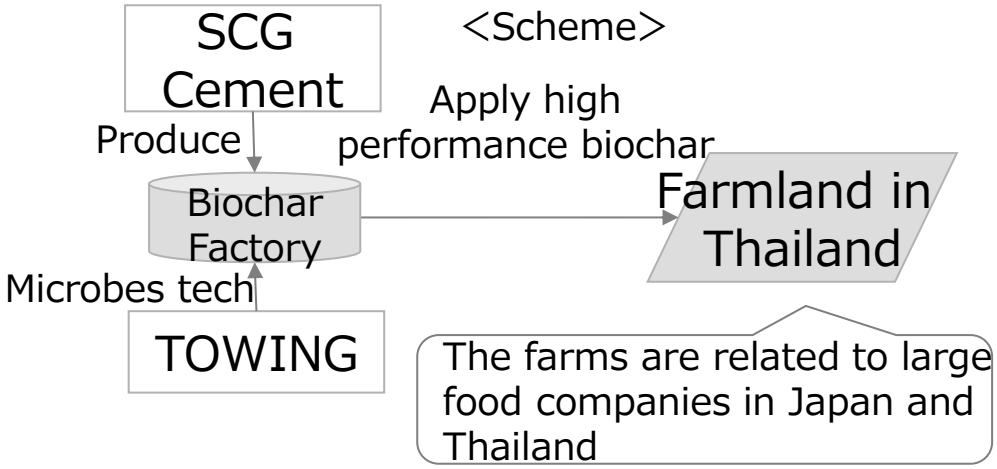
Other points : In relation to the energy transition, the heat generated during the biochar production process can be reused, while the use of high-performance biochar promotes the adoption of organic fertilizers, contributing to the less reliance of fossil-based fertilizer and fossil fuel use.

<Project photo>

Ongoing field trial in Thailand

High-performance biochar

<Scheme>



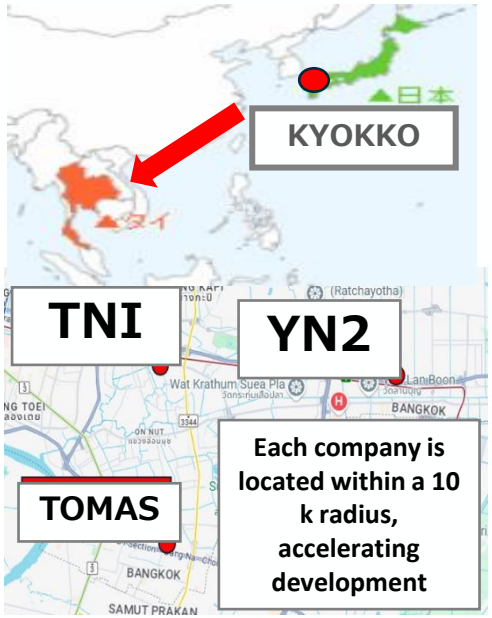
MOU on the Standardization of Accurate CO_2 Emissions Measurement for Decarbonization among Companies and Related Organizations in AZEC Partner Countries

Outline of MOU/Corporate Alliance : To promote the standardization of sensor measurement accuracy, this initiative addresses the issue of insufficient accuracy in commercially available sensors that quantitatively and automatically measure CO_2 emissions. This is a critical challenge in achieving CN in AZEC partner countries. To tackle this, a new forum for discussion and a business-matching framework will be established to formulate specific evaluation criteria.

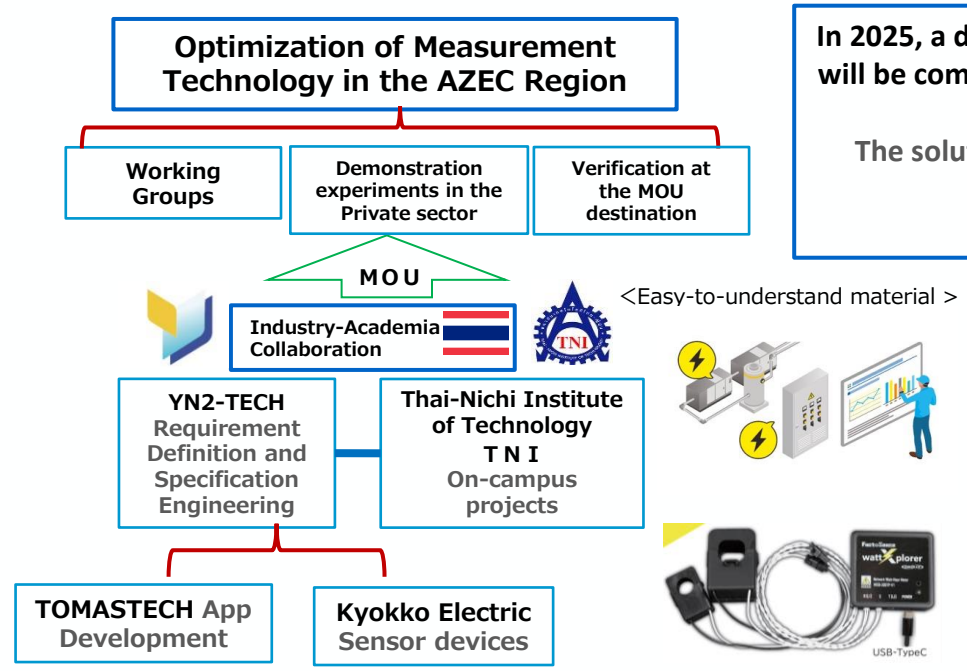
Significance and Aim of the MOU : This MOU aims to optimize measurement technologies and UI in the AZEC region, in collaboration with the Thai-Nichi Institute of Technology (TNI). The goal is to define industry standards for high-precision CO_2 measurement using sensor devices among AZEC-related partner companies. Thai-Nichi Institute of Technology(TNI), YN2-TECH, KYOKKO ELECTRIC, and TOMAS TECH will promote industry-academia collaboration and engage in discussions with other stakeholders to develop desirable measurement standards.

Other : Keeping in mind the creation of a framework for "measurement standards" such as CE marking in the industry in the future

< Map (Project Site Map)>



<PJ Scheme>

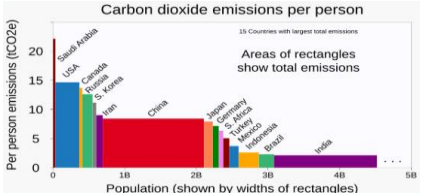


<Schedule>

In 2025, a demonstration experiment report will be compiled at TNI, the MOU partner in Thailand.

The solution will be expanded to AZEC partner countries.

A simple solution



MOU on Decarbonization between Zeroboard and Rojana Industrial Park

Cooperation outline : Zeroboard and Rojana Industrial Park signed an MOU to jointly promote decarbonization in Thailand, utilizing Zeroboard's GHG visualization and reduction platform for tenants within the industrial park.

Purpose or objectives of MOU : To enable park-wide GHG tracking, support supply chain decarbonization, and strengthen the global competitiveness of tenant companies.

Other points : Future expansion may include additional Rojana parks and broader solutions such as renewable energy and carbon credit initiatives.

Carbon Emission Reduction in the Raw Material in Region of Lam Son Sugar Industry

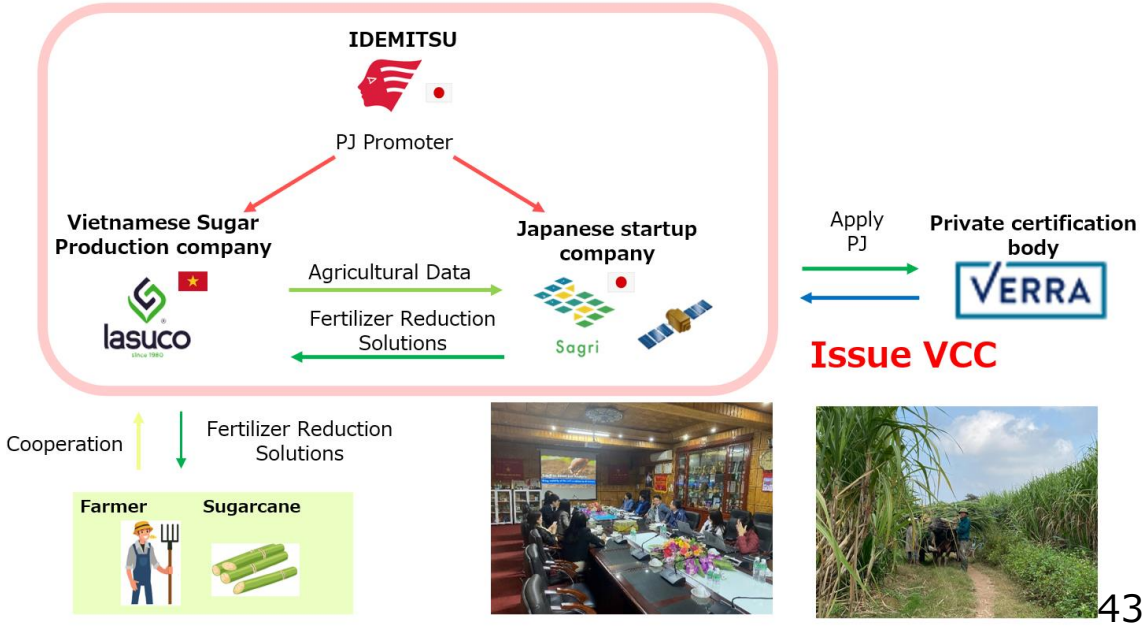
Cooperation outline : In January 2025, Idemitsu and Lasuco began a regenerative agriculture trial using Sagri's satellite tech to reduce fertilizer use and generate carbon credits from lower GHG emissions.

Objectives of MOU : Vietnam targets net-zero emissions by 2050, requiring decarbonization of its major agricultural sector. This project supports agricultural decarbonization by cutting chemical fertilizer use, which consumes significant fuel in production and increasing organic carbon in the soil.

URL : https://idemitsu.vn/press-releases/idemitsu-kosan-lasuco-and-sagri-agree-to-collaborate-on-vietnams-first-carbon-credit-registration-based-on-improved-farmland-management-vm0042/

Pictures of Workshop with farmers

Project Scheme

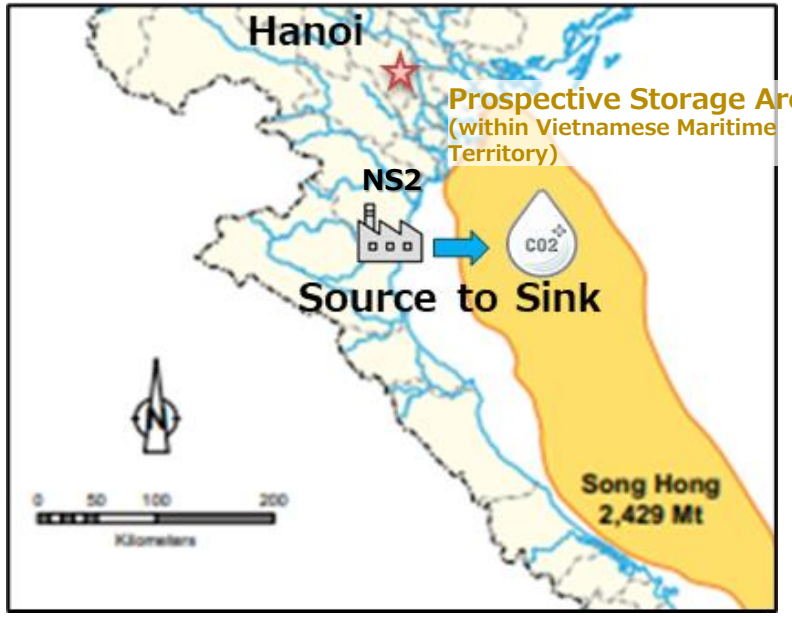


MOU for Cooperation Toward CCS Project Formation in Vietnam

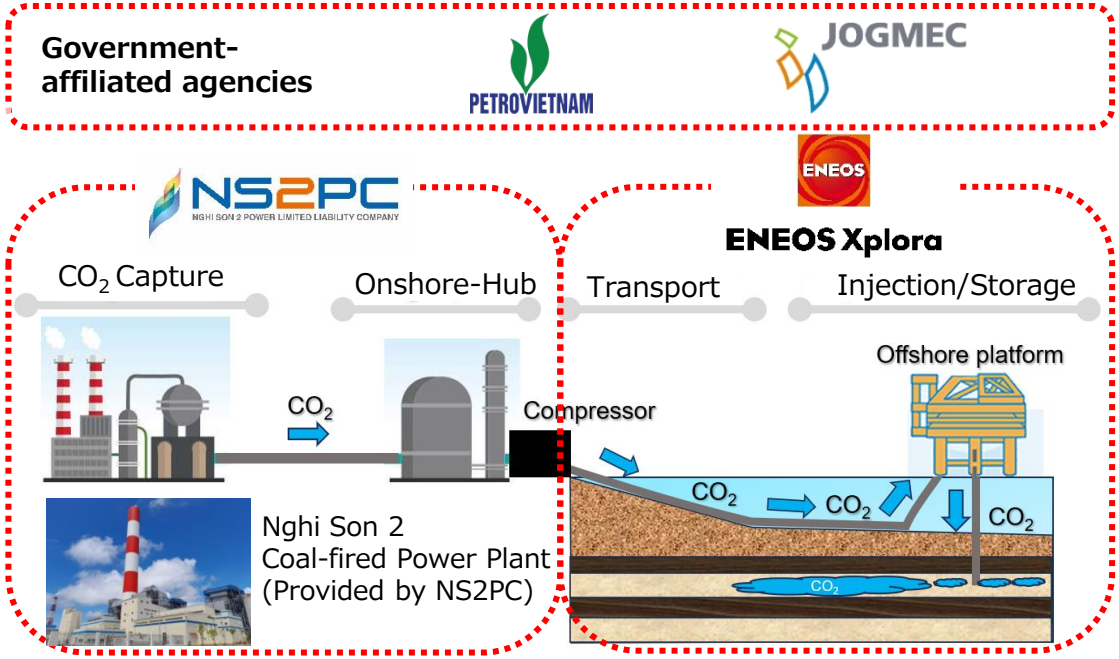
Cooperation outline : To contribute to the net zero emissions by 2050 in Vietnam, this MOU establishes a cooperative framework for launching a Carbon dioxide Capture and Storage (CCS) project.

Purpose of MOU : Toward the early launch of CCS project, a collaborative framework is built for activities contributing to legal development, securing international support, and exploring business model.

Other points : Holding joint workshops to promote information sharing, capacity building, and stakeholder engagement will be considered.



Modified after: ADB (2013)



Modified after: ENEOS Xplora material presented at the PVN-JOGMEC CCS Workshop held in Vietnam on May 29, 2025

MOU on promoting decarbonization management in Vietnam between Zeroboard and CAE

Cooperation outline : Zeroboard has formed partnership with Udata, a Vietnamese company who provides IoT, energy monitoring, energy efficiency solutions for industrial buildings.

Purpose or objectives of MOU : promote GHG emission amount calculation and visualization cloud service “Zeroboard” to CAE‘s local clients, as well as to hold decarbonization workshops to raise awareness.

Other points : support decarbonization management throughout Vietnam, aiming to reduce the environmental and climate change impacts of both parties' stakeholders, support Vietnam's national goal of carbon neutrality by 2050.

URL: https://www.zeroboard.jp/, https://cae.vn/

MOU on promoting GHG calculation tool between Zeroboard and EGP

Cooperation outline : Zeroboard and EGP became partnership to jointly promote decarbonization in Vietnam, utilizing Zeroboard’s GHG calculation and visualization platform for local companies.

Purpose or objectives of MOU : combine EGP's extensive expertise in sustainability to localize Zeroboard’s GHG calculation and visualization tool, promote “EGP – powered by Zeroboard” tool to Vietnamese companies.

Other points : Two companies will work to support decarbonized management throughout Vietnam, aiming to reduce the environmental and climate change impacts of both parties' stakeholders, in order to achieve Vietnam's national goal of carbon neutrality by 2050.

URL: https://www.zeroboard.jp/, https://egp.vn/

MOU on Decarbonization between Zeroboard and FPT IS

Cooperation outline : Zeroboard has signed a partnership MOU with FPT IS, a subsidiary of FPT Corporation, Vietnam's largest telecommunications and IT company.

Purpose or objectives of MOU : This partnership enables mutual data integration between the two GHG emissions calculation and visualization platforms, "Zeroboard" and "VertZéro", strengthening support for corporate decarbonization, aiming to expand in the ASEAN market and enhance global decarbonization efforts.

Other points : Both companies will continue to promote user-friendly systems that facilitate corporate decarbonization efforts, contributing to the realization of carbon neutrality.

URL: https://www.zeroboard.jp/, https://fpt-is.com/

MOU on promoting GHG calculation tool between Zeroboard and Udata

Cooperation outline : Zeroboard has formed partnership with Udata, a Vietnamese company who provides IoT, energy monitoring, energy efficiency solutions for industrial buildings.

Purpose or objectives of MOU : release a white-label product named “Uzero – powered by Zeroboard” for GHG emissions calculation and visualization and promote the product to Udata’s clients network.

Other points : Udata considers to integrate Uzero to Udata’s IoT ecosystem as one-stop solution.

URL: https://www.zeroboard.jp/, https://udata.ai/

MOU on Decarbonization between Zeroboard and Long Duc Industrial Park

Cooperation outline : Zeroboard and Long Duc Industrial Park signed an MOU to jointly promote decarbonization in Vietnam, utilizing Zeroboard's GHG visualization and reduction platform for tenants within the industrial park.

Purpose or objectives of MOU : To enable park-wide GHG tracking, support supply chain decarbonization, and strengthen the global competitiveness of tenant companies.

Other points : Future expansion may include additional industrial parks by the same investors and broader solutions such as decarbonization solutions matching.

URL: https://www.zeroboard.jp/, https://longduc-ip.com.vn/en/