AZEC

Asia Zero Emission Community
Progress Report 2023

Economic Research Institute
for ASEAN and East Asia

and

Secretariat of AZEC

18th December 2023

Table of Contents

AZEC

- What is AZEC?
- Background
- History

01

What is AZEC?

Our philosophy and commitment

We, as the Asia Zero Emission Community (hereafter called AZEC) partners, shared our ideas and the views on the challenges and opportunities of decarbonization and jointly committed to accelerating a clean, sustainable, just, affordable, and inclusive energy transition towards carbon neutrality/net-zero emissions in the Asian region building on the mutual trust cultivated over the years.

One goal, Various pathways

We recognize that accelerating the energy transition in the Asian region is key to achieve the goals of the Paris Agreement, including holding the increase in the global average temperature to well below 2°C above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5°C above preindustrial levels.

We further recognize that the energy transition should allow for various and practical pathways tailored to the circumstances of each country, including in the Asian region which is experiencing rapid increases in the energy demand due to economic growth.

AZEC Ministerial Meeting in March 2023
https://www.meti.go.jp/english/press/2023/0306_002.html

**Ref: Asia Zero Emission Community Joint Statement*
https://www.meti.go.jp/press/2022/03/20230306005/20230306005-24.pdf

What is AZEC?

Asia Zero Emission Community (AZEC) Platform

AZEC pursues energy transitions tailored to each country's circumstances, together with Asian countries that are actively endeavoring toward carbon neutrality while having similar challenges to Japan in decarbonization.

AZEC is a platform consisting of Asian countries that are promoting decarbonization.

Japan intends to contribute its resources and experience to AZEC, by providing support on technology, finance, and human resources through Asia Energy Transition Initiative (AETI), Joint Crediting Mechanism (JCM), etc., and through policy coordination with partner countries.

AZEC aims to support new technologies and reduce costs through market expansion.

Examples of support

- Financial support by JBIC, NEXI, JICA, etc.
- Assistance in developing roadmaps and long-term strategies for Carbon Neutrality (CN)
- Establishment and dissemination of Asia Transition Finance
- Development, demonstration, and deployment of decarbonization technologies such as renewable energy, energy saving, hydrogen, ammonia, biomass, and carbon capture, utilization and storage (CCUS)

Examples of policy coordination

- Sharing information on maximizing deployment of renewable energies
- Establishment of standards for energy conservation, energy management, and other decarbonization technologies
- Sharing the direction of utilization of bio-energy, hydrogen, ammonia, etc. in the field of thermal power generation
- Consideration on effective utilization of power grids

What is AZEC?

Our common views

We share the following common views and will work together as the AZEC partners

√ Recognizing the importance of tackling climate change as a common global challenge and advancing cooperation towards carbon neutrality/net-zero emissions while ensuring energy security,

√ Recognizing Asia is projected to remain the engine of global economic growth and energy demand expansion (Figure 1. and 2.) and confirming the importance of promoting energy transition in a manner that is compatible with economic growth and resilience especially through innovation,

√ Recognizing there are various and practical pathways towards carbon neutrality/ net-zero emissions depending on the circumstances of each country including, but not limited to: industrial structures, social contexts, geographies and stages and rates of development, and the importance of utilizing a diverse range of energy sources and technologies to design and implement such pathways.

Our areas of cooperation

Aligned to these views as well as our respective national policies and legislations, we will share information, have discussions and take actions through the AZEC platform, in the areas including but not limited to;

√ development, demonstration, and deployment of decarbonization strategies, plans, businesses and technologies such as energy efficiency, renewables, hydrogen, ammonia, energy storage, bioenergy, carbon capture, utilization and storage (CCUS);

√ financial support for investments in decarbonization infrastructure including the power grid and the development of clean energy supply chains, including for critical minerals and materials;

√ development, harmonization, and securing interoperability of standards of decarbonization technologies, and strengthening of human resource capacity in the area.

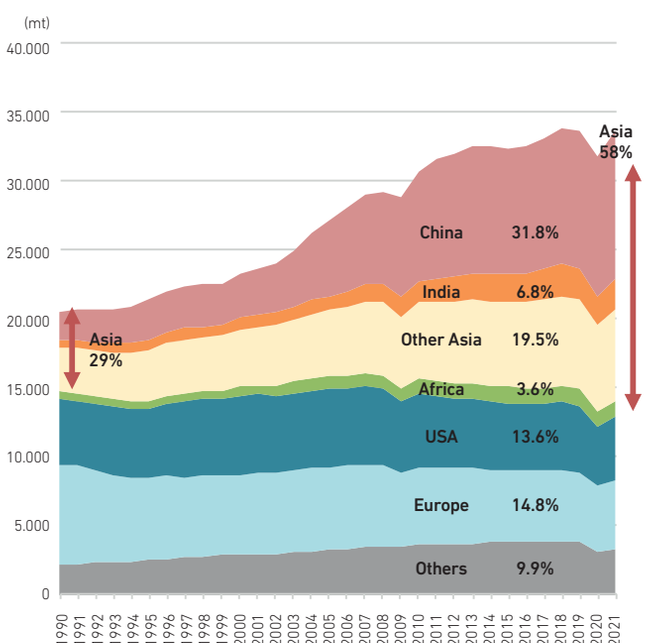
**Ref: Asia Zero Emission Community Joint Statement*
https://www.meti.go.jp/press/2022/03/20230306005/20230306005-24.pdf

Background

The importance of decarbonizing Asian region

Asia has more than tripled its greenhouse gas emissions from 1990 to 2021 due to its economic growth and increasing energy demand. In 1990, emissions from the developed countries accounted for two-thirds of global emissions. The Asian region now accounts for more than half of the emissions (Figure 1). Decarbonizing the Asian region is key to global-level Carbon Neutrality.

Figure 1. CO_2 Emissions from Fuel Combustion



*Source: World CO_2 Emissions from Fuel Combustion, IEA.

Triple breakthrough of economic growth, energy security and carbon neutrality

While the goal of Carbon Neutrality is common across countries, the pathways should be various and practical based on the different situation of each country.

Given the prospects for further economic growth, it is important to aim for carbon neutrality by ensuring economic growth and energy security at the same time.

Considering the energy situation in Asia, such as the rapidly growing energy demand (Figure 2.); uneven distribution of renewable potential (Figure 3.); small grid size in archipelagoes and even in continental areas; weak inter-grid connections and shifts to LNG due to limited availability in pipeline gas, no single approach can secure 3Es (environment, economy, and energy security), and various approaches should be considered.

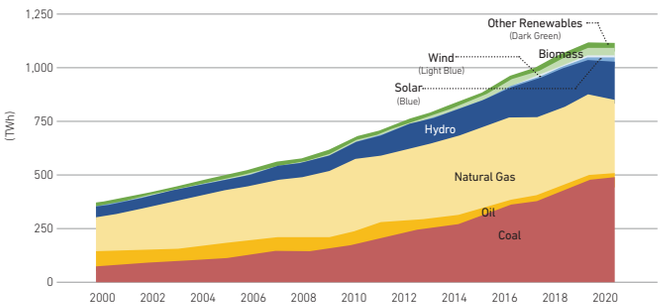
Background

Figure 2. Electricity production by sources in developed countries and ASEAN countries

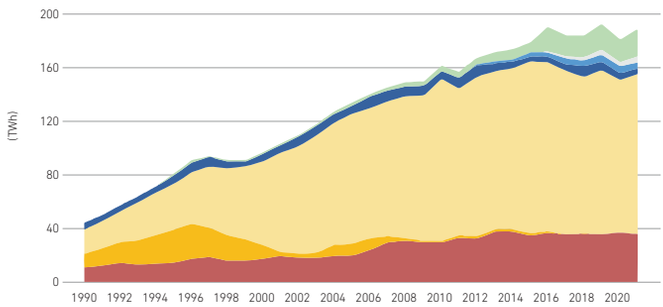
Electricity Production by Source (ASEAN countries)

*Prepared by Ministry of Economy, Trade and Industry based on "Energy Balances", IEA.

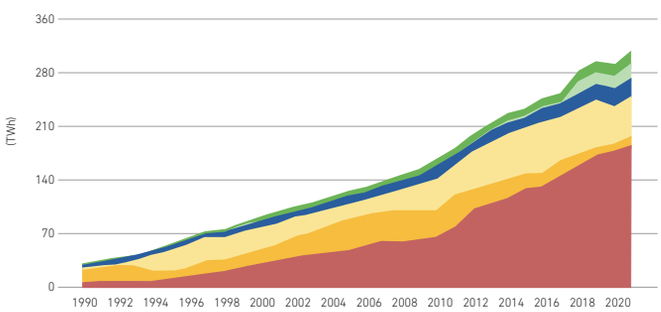
<ASEAN in 2000-2020*> (*Due to data availability)



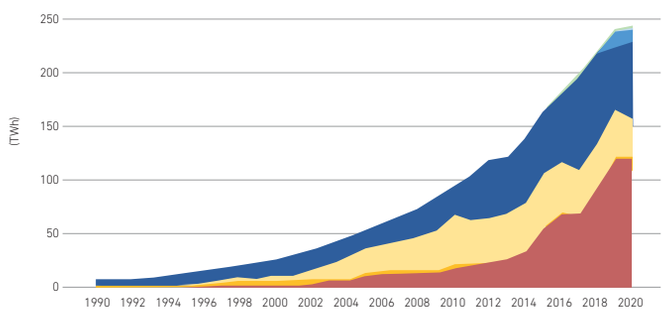
<Thailand in 1990-2021>



<Indonesia in 1990-2021>

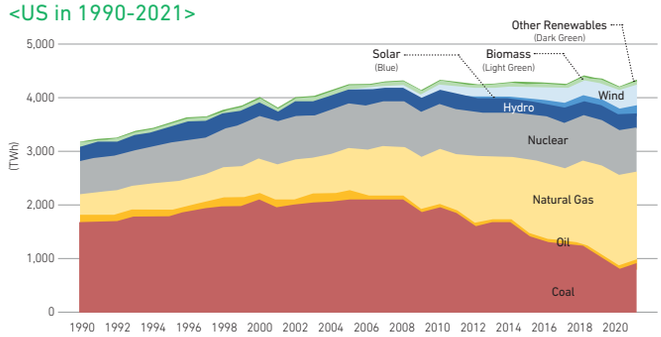


<Viet Nam in 1990-2020*> (*Due to data availability)

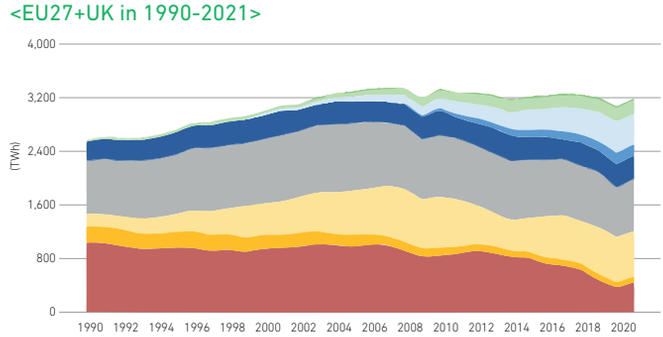


Electricity Production by Source (Developed Countries)

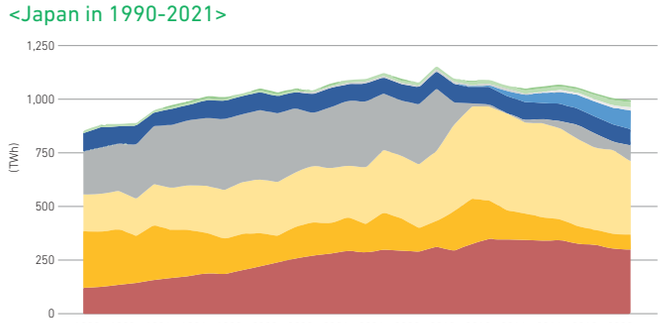
<US in 1990-2021>



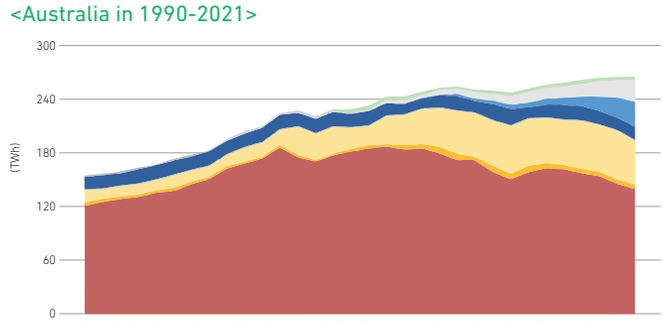
<EU27+UK in 1990-2021>



<Japan in 1990-2021>

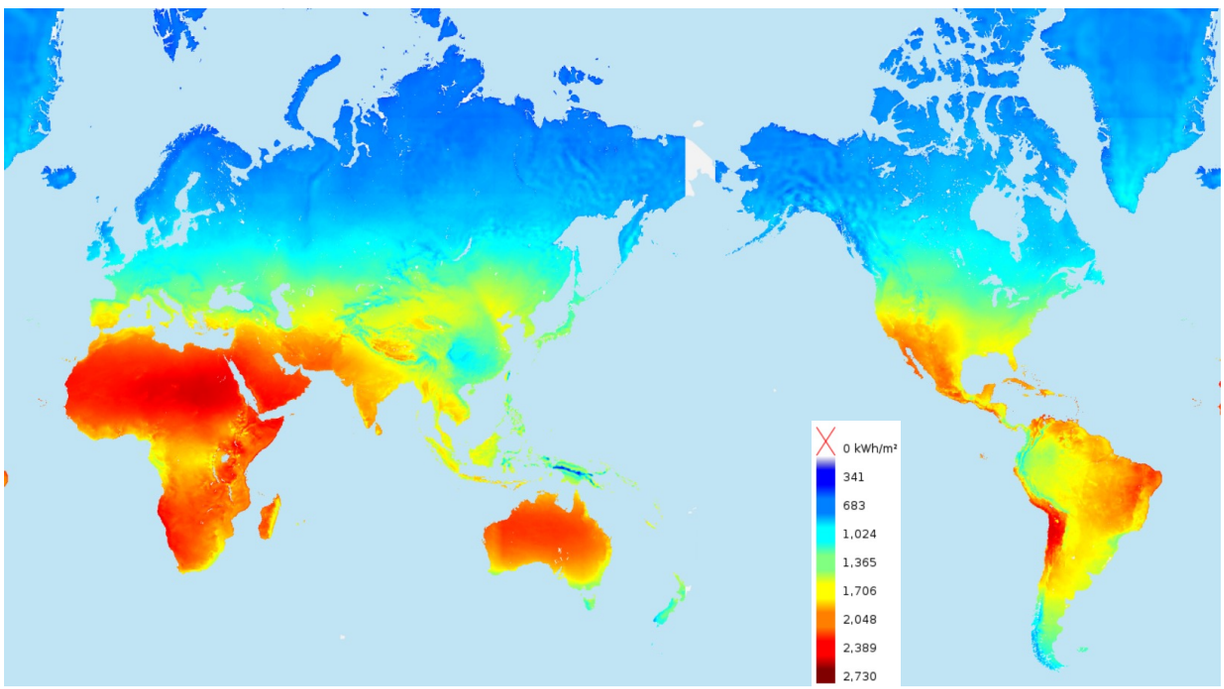


<Australia in 1990-2021>

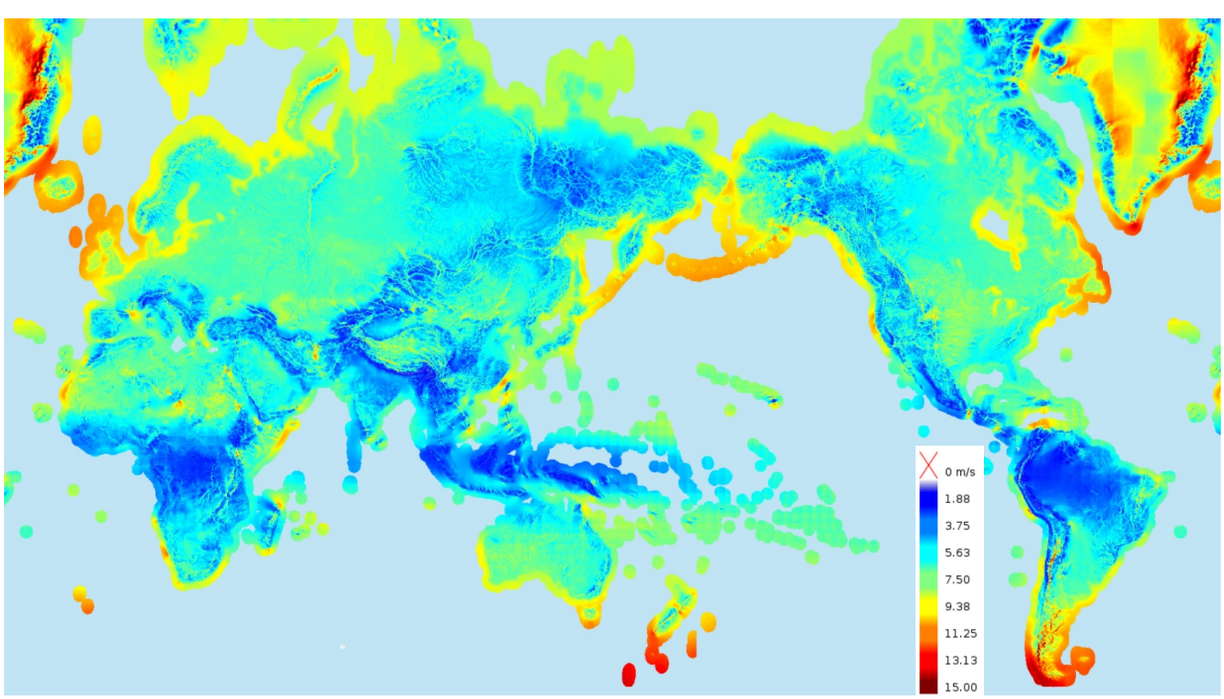


Background

Figure 3. Renewable energy potential



Global annual average global horizontal irradiation



Global annual average wind speed at 100m height

*Source: 'Global Atlas' https://globalatlas.irena.org/

Ref: How to refer 'Global Atlas' https://globalatlas.irena.org/help

History

Prime Minister KISHIDA Fumio's Speech on AZEC

In January 2022, Mr. KISHIDA Fumio, Prime Minister of Japan, proposed the AZEC concept with the idea of contributing to the decarbonization in Asia by making use of Japanese technologies and systems.

"One more important point is that Japan will make use of its technologies, systems and know-how in hydrogen and ammonia and other areas to contribute to the decarbonization of the world, especially Asia, and lead the world in technical standards and international infrastructure development, together with the countries of Asia."

"We aim to join forces with like-minded countries in Asia in creating something that can be called the 'Asia Zero Emission Community'."

**Ref: Policy Speech by PM to the 208th Session of the Diet, Jan. 17, 2022*

https://japan.kantei.go.jp/101_kishida/statement/202201/_00009.html

"This community would become a platform to advance efforts such as international joint investment on development of zero-emission technologies and hydrogen infrastructure, joint financing, standardization of related technologies, and establishment of an Asian emissions trading market."

Photo: Cabinet Public Affairs Office

**Ref: Speech by PM at "Davos Agenda", Jan. 18, 2022*

https://japan.kantei.go.jp/101_kishida/statement/202201/_00008.html

History

The concept of AZEC was announced

On November 14, 2022, Mr. KISHIDA held a summit meeting with His Excellency Mr. Joko Widodo, President of the Republic of Indonesia. Japan and Indonesia jointly announced an initiative toward realizing the Asia Zero Emission Community (AZEC) concept. The two leaders welcomed the Joint Announcement on the AZEC Concept.

Ref: Japan-Indonesia Summit Meeting
https://www.mofa.go.jp/s_sa/sea2/id/page1e_000529.html

Joint Announcement on Asia Zero Emission Community (AZEC) Concept
November 14th, 2022

Japan and Indonesia jointly announced an initiative toward realizing the Asia Zero Emission Community (AZEC) concept on 14th November 2022 in Bali, on the side-lines of the G20 Summit. Both countries believe that Asia, as the center of global economic growth, will become a driving force for the world economy as well as a model for cooperation in realizing a clean, sustainable, just, affordable, and inclusive energy transitions while taking into account different national circumstances. Security of supply, affordability, and people-centered are the main keys in the energy transition process to achieve the goal of carbon neutrality/net zero emission to enable this region to lead the global energy transition process without compromising economic development.

Japan and Indonesia, who share the view that energy transition will drive economic growth, invite other Asian nations to join this initiative. Both countries believe that mutually beneficial cooperation and collaboration in sharing experiences and capacities are the key to realizing the AZEC concept.

Japan expressed its readiness to assist Indonesia by mobilizing resources and funding from Japanese public institutions together with Indonesian parties to support the energy transition process in Indonesia, as part of the AZEC cooperation framework. Nippon Export and Investment Insurance (NEXI) will sign an amendment of Memorandum of Understanding (MoU) aiming to secure the provision of financing insurance of up to USD 500 million to support the efforts of PLN as the Indonesian state-owned fully integrated electric utility company to implement energy transition. Japan Bank for International Cooperation (JBIC) and PLN have also signed an MoU to promote sustainable energy transition through collaboration between PLN and the Japanese business community to strengthen partnerships in the deployment of potential renewable energy projects and technology to reduce emission. This cooperation is not limited to the aforementioned activities and will continue to be developed involving more parties.

The two countries hope that the developing AZEC cooperation can pioneer the model of cooperation in Asia. We reiterate our invitation to other Asian countries in joining these collaborative efforts to accelerate energy transitions in Asia.

Ref: Joint Announcement on Asia Zero Emission Community (AZEC) Concept
https://www.mofa.go.jp/files/100420486.pdf

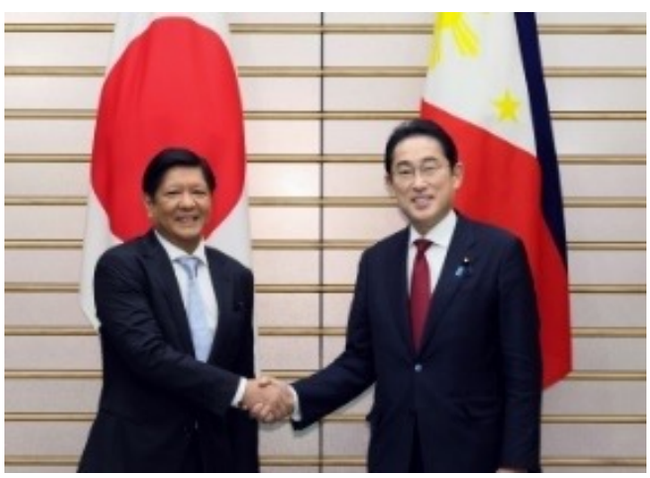
History

The concept of AZEC was supported at the Leaders' level

On October 22 2022, Mr. KISHIDA held a leaders' meeting with the Hon. Anthony Albanese, MP, Prime Minister of the Commonwealth of Australia. Mr. KISHIDA mentioned the "Asia Zero Emission Community (AZEC)" Concept and Prime Minister Albanese expressed his support for it.

On February 9 2023, Mr. KISHIDA held a Summit Meeting with H.E. Ferdinand R. Marcos, Jr., President of the Republic of the Philippines. President Marcos expressed his appreciation for the wide range of Japan's cooperation and conveyed his support to the "Asia Zero Emission Community (AZEC)" concept.

**Ref: Japan-Australia Leader's Meeting*
https://www.mofa.go.jp/a_o/ocn/au/page1e_000510.html



**Ref: Japan-Philippines Summit Meeting*
https://www.mofa.go.jp/s_sa/sea2/ph/page1e_000569.html

History

AZEC Ministerial Meeting

The AZEC partners held a Ministerial Meeting in Tokyo on March 4th 2023. The ministers of Australia, Brunei, Cambodia, Indonesia, Japan, Laos, Malaysia, Philippines, Singapore, Thailand and Viet Nam (in alphabetical order), and the representatives of international organizations, namely the Economic Research Institute for ASEAN and East Asia (ERIA) and the International Energy Agency (IEA), participated.

Photo: Ministry of Economy, Trade and Industry of Japan

"The circumstances surrounding energy vary from country to country. Like Japan, there are many countries in Asia that face difficult energy situations, lacking natural resources and constantly exposed to the risks of natural disasters such as earthquakes and typhoons.

For Asian countries, it is very important to have as many energy options as possible for a stable supply, and to promote practical energy transitions to achieve this."

"I understand that Asia's journey toward decarbonization may not be an easy one. But that is why I am convinced that Asian countries need to work together. To achieve decarbonization in Asia, we need to attract investment capital and materialize projects. And we need to achieve a practical energy transition that is tailored to the circumstances of Asia. I am very pleased and encouraged to be working together with you to meet these challenges."

Prime Minister KISHIDA's message in the AZEC Ministerial Meeting

"Over the past year, energy markets have become even more uncertain. Faced with what has been described as the first global energy crisis in history, achieving both energy security and decarbonization in a balanced fashion has become a major policy challenge all over the world."

Photo: Prime Minister's Office of Japan
https://www.kantei.go.jp/jp/101_kishida/discourse/20230304message.html

History

The First AZEC Senior Officials Meeting

On 24 June 2023, AZEC Senior Officials Meeting (SOM) was held in Jakarta, Indonesia with the support of ERIA (the Economic Research Institute for ASEAN and East Asia).

As a special guest, H.E. Mr. Arifin Tasrif, Minister of Energy and Mineral Resources, Indonesia, attended the meeting and delivered a speech. Senior officials and other stakeholders of member countries discussed future cooperation and confirmed following items.

**Ref: The First Asia Zero Emission Community Senior Officials Meeting (AZEC SOM)*

https://www.meti.go.jp/english/press/2023/0626_001.html

Policy coordination

AZEC Study Projects supported by Japan
- Master plan for Hydrogen and Ammonia in the Asian region
- Common understanding and Technical standards for CCS
- Further promotion of "Joint Crediting Mechanism (JCM)" in AZEC region

Support

- Financial Support: through JBIC, NEXI, JICA and JOGMEC etc.
- Technological Support: Development, demonstration, and deployment of decarbonization technologies such as renewable energy, energy saving, hydrogen, ammonia, biomass, and CCUS through NEDO and JOGMEC etc.
- Capacity Building: Lectures, Business Events, Sight Visits and etc. through JICA, IEEJ, ECCJ, AOTS and JETRO etc.

Current Development of Energy Transition in AZEC partners

- Development of Energy Transition
- NDCs and CN Commitments

02

Development of Energy Transition

Australia

Australia has set emissions reduction targets of 43% by 2030 (on 2005 levels) and net zero emissions by 2050. The Government has also set a national renewable electricity target of 82% by 2030. Australia's key policies include:

- Transforming the Australian electricity grid to unlock greater penetration of renewable energy and accelerate decarbonisation.
- The National Reconstruction Fund to support renewables manufacturing and the deployment of low emissions technologies.
- The Powering the Regions Fund to support the development of new clean energy industries and the decarbonisation priorities of existing industry.
- The Safeguard Mechanism, providing a predictable policy framework for industry, consistent with a national trajectory to net zero.
- Australia's first National Electric Vehicle Strategy, to reduce emissions and accelerate the uptake of electric vehicles.
- Building domestic expertise in renewable hydrogen production, forming international supply chains.
- The application of new standardized and internationally-aligned reporting requirements for climate risks and opportunities for large businesses.

Ref: Australia's NDC communication 2022

https://unfccc.int/sites/default/files/NDC/2022-06/Australias%20NDC%20June%202022%20Update%20%283%29.pdf

Ref: (Date: Jul 26 (Wed.), 2023)

Minister Yasutoshi NISHIMURA and H.E. Mr. Chris Bowen, Minister for Climate Change and Energy of Australia

https://www.meti.go.jp/english/press/2023/0726_003.html

Ref: (Date: Oct 8 (Sun.), 2023)

Minister Yasutoshi NISHIMURA and Senator Hon Don FARRELL, Minister for Trade and Tourism

Hon Chris BOWEN MP, Minister for Climate Change and Energy

Hon Madeleine KING MP, Minister for Resources and Minister for Northern Australia

https://www.meti.go.jp/english/press/2023/1008_001.html

Development of Energy Transition

Brunei Darussalam

Brunei Darussalam will reduce GHG emissions by 20% relative to Business-As-Usual (BAU) levels by 2030, and set its target to achieve Net Zero in 2050.

The Brunei Darussalam National Climate Change Policy (BNCCP), among others, outlines the principles and strategies for a sustainable nation:

- Reduce overall emissions in the Industrial Sector.
- Increase carbon sink through afforestation and reforestation with a target of planting 500,000 new trees.
- Increase total share of renewable energy to at least 30% of total capacity in the power generation mix by 2035.
- Reduce GHG emissions by at least 10% through better supply and demand management of electricity consumption by 2035.

**Ref: (Date: Sep. 27 (Tue.), 2022)*

State Minister Nakatani and The Honorable Pehin Datu Lailaraja Major General (Retired) Dato Paduka Seri Haji Awang Halbi bin Haji Mohd Yussof, Minister at the Prime Minister's Office, Brunei Darussalam

https://www.meti.go.jp/english/press/2022/0927_004.html

**Ref: Brunei Darussalam's NDC 2020*

https://unfccc.int/sites/default/files/NDC/2022-06/Brunei%20Darussalam%27s%20NDC%202020.pdf

Development of Energy Transition

Kingdom of Cambodia

Currently, 62% of the country's installed energy capacity is sourced from renewables, with a goal to achieve net zero emissions by 2050. Central to this is the integration of renewable energy sources, enhancing energy efficiency, and expanding electrification.

Cambodia has revised Power Development Plan 2022-2040, which is focused on reaching installed capacity of renewables of 70% by 2030.

This comprehensive plan is poised to accelerate the transition to a cleaner and low-carbon power grid, focusing on solar, wind, and renewable biomass. It is guided by the principles of CARE: Clean, Affordable, Reliable, and Equitable energy.

Cambodia is phasing out domestic coal and upholding our commitment to not construct hydropower on the mainstream Mekong River. In the line with the National Energy Efficiency Policy 2022-2030, which aims to reduce energy consumption by 19% by 2030, Cambodia has created the National Energy Efficiency

Ref: (Date: Nov. 12 2022)

Mr. KISHIDA, Prime Minister of Japan and Samdech Akka Moha Sena Padei Techo Hun Sen, Prime Minister of the Kingdom of Cambodia

https://japan.kantei.go.jp/101_kishida/diplomatic/202211/_00004.html

Committee.
Moving towards Cambodia's Long-Term Strategy for Carbon Neutrality, December 2021, which commits to 40 percent of EV cars and urban buses and 70 percent of electric motorbikes by 2050 and reduced import duties on electric vehicles in 2021. The Government is also taking steps to incentivise investments in electric vehicle assembly facilities within Cambodia. In the updated Nationally determined contributions, Cambodia aims to reduce emissions by around 42 percent by 2030. And the Green Cambodia strategy aims to plant over 1 million trees yearly to achieve 60% forest cover and be a country with carbon neutrality by 2050.

Ref: Ministry of Mines and Energy, the Kingdom of Cambodia

Development of Energy Transition

Republic of Indonesia

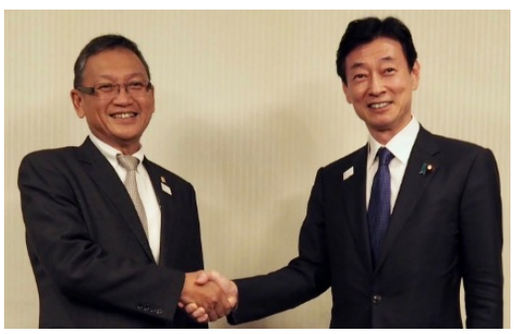
Indonesia is committed with carbon neutrality and policies coping with climate change, ratified Paris Agreement and increased its NDC from 29% to 32%. Indonesia introduces renewables by utilizing FIT, and puts all the measures into practice such as geothermal, rooftop solar power and energy conservation.

Indonesia has recently started carbon cap and trade in power production and decided not to install or expand coal fired power after 2030 and promote retirement of existing coal fired power plants, with international support, such as multilateral partnership with AZEC and JETP and bilateral partnership with Australia.

Indonesia accelerates renewable energy introduction, and, at the same time, regards natural gas as important as energy sources during energy transition, and uses bioenergy (include biomass, biogas, and biofuel) geothermal, hydrogen and ammonia, CCS/CCUS, also promotes EV.

Indonesia boost the implementation of energy efficiency in industry and buildings through energy management and in household through Minimum Energy Performance Standards (MEPS) on appliance. In June 2023, GoI has issued new Government Regulation No. 33/2023 on Energy Conservation that regulate mandatory implementation of energy management for certain industries, building and transportation categories.

Ref: Speech by H.E. Arifin Tasrif, Minister for Energy and Natural Resources



**Ref: (Date: Apr 14 (Fri.), 2023)*
Minister Yasutoshi NISHIMURA and H.E. Mr. Arifin Tasrif, Minister of Energy and Mineral Resources, Republic of Indonesia
https://www.meti.go.jp/english/press/2023/0417_005.html

**Ref: (Date: May 26 (Fri.), 2023)*
Minister Yasutoshi NISHIMURA and H.E. Mr. Airlangga Hartarto, Coordinating Minister of Economic Affairs, Indonesia
https://www.meti.go.jp/english/press/2023/0528_001.html

**Ref: (Date: Sep 28 (Thu.), 2023)*
Minister Yasutoshi NISHIMURA and H.E. Mr. Arifin Tasrif, Minister of Energy and Mineral Resources, Republic of Indonesia
https://www.meti.go.jp/english/press/2023/0929_004.html

Development of Energy Transition

Japan

The Sixth Strategic Energy Plan approved by the Japanese cabinet in Oct. 2021 presents two key themes; (1) showing the approach toward achieving carbon neutrality by 2050 and the GHG emission reduction target in 2030 (-46% reduction from FY2013 level, aiming for an additional 50% higher); and (2) presenting initiatives to ensure stable supply and reduce energy costs, etc.

The target power source composition in FY2030 is 36-38% renewable energy, 20-22% nuclear, 41% thermal power generation, and 1% hydrogen and ammonia.

In order to simultaneously achieve the three goals of decarbonization, a stable energy supply, and economic growth, the Basic Policy for the Realization of GX (green transformation) was approved by the Japanese cabinet in Feb. 2023. Based on the Policy, Japan has promoted decarbonization initiatives, such as switching to decarbonized power sources, like renewable energy and nuclear power, in addition to advancing thorough energy efficiency improvement.

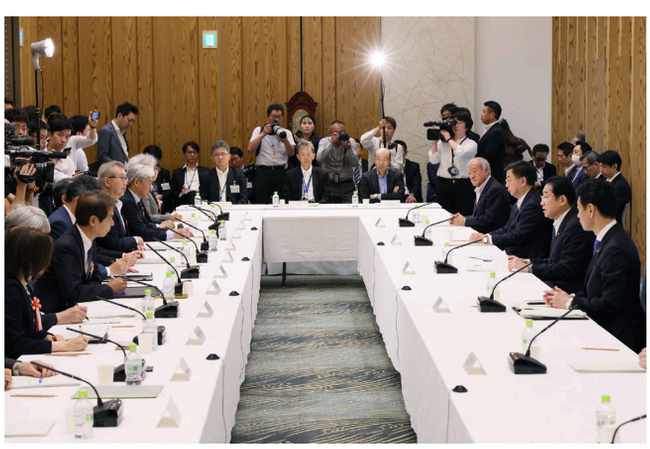


Photo: Prime Minister's Office of Japan
https://www.kantei.go.jp/jp/101_kishida/actions/202306/27gx.html

Ref: Cabinet Decision on the Sixth Strategic Energy Plan
https://www.meti.go.jp/english/press/2021/1022_002.html
Ref: the Basic Policy for the Realization of GX
https://www.meti.go.jp/english/press/2023/0210_003.html

Development of Energy Transition

Lao People's Democratic Republic

Lao PDR, called as battery of Asia, exports its abundant hydropower (32TWh) to Thailand and Viet Nam. Power production (40TWh) consists of hydropower (71%) and coal-fired power (28%). The exported power (32TWh) is almost equivalent with its hydro capacity.

On the other hand, hydropower has been challenged by the seasonal fluctuation, as exporting in rainy season but importing in dry season.

Lao PDR depends on coal fired power plants as baseload due to its abundant endowment of domestic coal resources.

Lao PDR plan in 2030 is hydro-power (75%), coal-fired thermal power (14%) and solar (11%) (in comparison with current portfolio consisting of hydropower (71%) and coal fired thermal power (28%)).

Ref: (Date: Sep 25 (Mon.), 2023)

State Minister Kazuchika IWATA and H.E. Dr. Sinava SOUPHANOUVONG, Vice Minister, Ministry of Energy and Mines of Lao PDR

https://www.meti.go.jp/english/press/2023/0927_004.html

Ref: (Date: Oct 30 (Wed.), 2023)

Minister Yasutoshi NISHIMURA and H.E. Mr. Phosay Sayasone, Minister of Energy and Mines of Lao PDR

https://www.meti.go.jp/english/press/2023/1030_002.html

*Ref: Ministry of Energy and Mines, Lao PDR

Development of Energy Transition

Malaysia

Malaysia intends to reduce its economy-wide carbon intensity (against GDP) of 45% in 2030 compared to 2005 level.

Malaysia published National Energy Transition Roadmap (NETR) in August 2023. NETR's Responsible Transition Pathway 2050 (RT2050) sets to reduce 32% of energy sector's GHG emission from 259 $MtCO_2eq$ (2019) to 175 $MtCO_2eq$ (2050). The Total Primary Energy Supply (TPES) by 2050 will comprise of natural gas (56%), renewables (22%), crude oil and petroleum (21%) and coal (1%). Renewable Energy (RE) installed capacity for power mix will increase to 70% and no new coal power plants.

The NETR has identified 6 transition levers namely, energy efficiency (EE), RE, hydrogen, bioenergy, green mobility, and carbon capture, utilisation and storage (CCUS) as well as 50 initiatives to transition Malaysia to a low carbon economy. NETR also outlines 10 flagship projects to demonstrate the varying level of technology and solutions needed to address energy transition. Malaysia will approach energy transition through a whole-of-nation approach guided by the 12th Malaysia Plan and its Mid-Term Review, National Energy Policy, 2022 – 2040 (DTN) and NETR.

**Ref: (Date: Mar. 4 (Sat.), 2023)*

Minister Yasutoshi NISHIMURA and Y.B. Tuan Mohd Rafizi bin Ramli, Minister of Economy, Malaysia, and YM Datuk Tengku Muhammad Taufik Tengku Kamadjaja Aziz, President & Group CEO of Petroliam Nasional Berhad (PETRONAS)

https://www.meti.go.jp/english/press/2023/0306_002.html

**Ref:* Speech by .B. Tuan Mohd Rafizi bin Ramli, Minister of Economy, Malaysia in AZEC Ministerial Meeting

**Ref: Malaysia's update of its first NDC*

https://unfccc.int/sites/default/files/NDC/2022-06/Malaysia%20NDC%20Updated%20Submission%20to%20UNFCCC%20July%202021%20final.pdf

Development of Energy Transition

Republic of the Philippines

The Philippines' energy transition pathway consists of aggressive implementation of policies and measures on renewable energy, energy efficiency and conservation, and new and emerging technologies such as hydrogen and ammonia, electric vehicles, battery energy storage systems, and nuclear power, among others. Another vital component of Philippines' energy transition is access to finance and technology.

The Philippines plans to increase the share of renewables in the power generation mix up to 50% in 2040 from current share of 22%. The Philippines allowed full foreign ownership of renewable energy projects. In addition, LNG is viewed as an important transition fuel that is seen to complement the entry of variable renewable energy.

**Ref: (Date: Mar. 4 (Sat.), 2023)*

Minister Yasutoshi NISHIMURA and Hon. Raphael P. M. Lotilla, Secretary of Energy, the Philippines

https://www.meti.go.jp/english/press/2023/0306_002.html

**Ref: (Date: Aug 25 (Fri.), 2023)*

State Minister Shinichi NAKATANI and Hon. Raphael P. M. Lotilla, Secretary of Energy, the Philippines

https://www.meti.go.jp/english/press/2023/0825_007.html

Development of Energy Transition

Republic of Singapore

Singapore is a small and alternative energy disadvantaged nation. Notwithstanding this, Singapore aims to achieve net zero by 2050. To decarbonise the power sector, Singapore is tapping on three sources of clean energy.

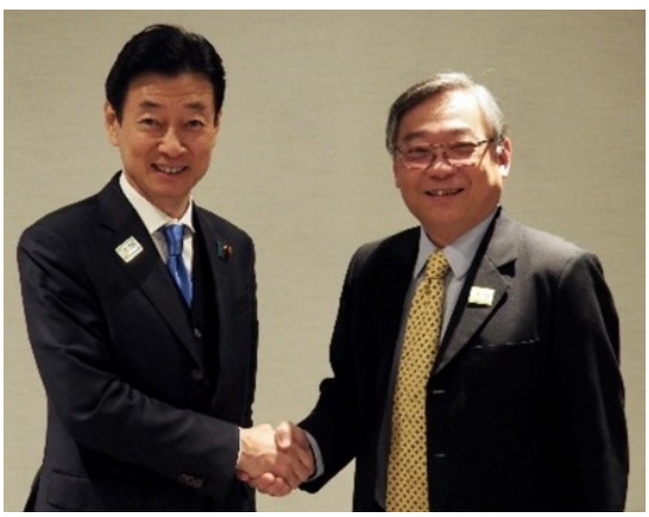
First, we are accelerating the deployment of solar energy, which is Singapore's most viable renewable energy source. Singapore has surpassed 1 GWp of solar deployment, and we are more than halfway towards achieving our target of 2 GWp of solar deployment by 2030.

Second, we are working with our regional partners to develop regional power grids and import up to 4 GW of low-carbon electricity by 2035. In 2023, Singapore awarded Conditional Approvals to projects to import up to 4.2GW of low-carbon electricity from Cambodia, Indonesia and Viet Nam.

Third, we are exploring new alternative sources of energy such as hydrogen and geothermal energy. In 2022, Singapore published its National Hydrogen Strategy. Singapore will now be conducting a Request for Proposal for a small-scale commercial project utilizing low-carbon ammonia for power generation and bunkering, to identify a lead developer from six shortlisted consortiums. This will be one of the first commercial projects in the world to test and deploy ammonia as a fuel. Singapore is also studying our deep geothermal resource potential for generating electricity, and will be conducting an island-wide non-invasive geophysical study on this subject.

Even as we seek to decarbonize, natural gas will continue to play an important role in Singapore's energy mix. Singapore has adopted natural gas, the cleanest fossil fuel, since 2000. We will be introducing new regulation to enhance the efficiency of natural gas power generation.

Overall, Singapore is committed to playing its part to decarbonization and to combating climate change.



*Ref: (Date: May 26 (Fri.), 2023)
Minister Yasutoshi NISHIMURA and H.E. Mr Gan Kim Yong
Minister for Trade and Industry, Singapore
https://www.meti.go.jp/english/press/2023/0528_001.html

*Ref: (Date: Jul 22 (Sat.), 2023)
Minister Yasutoshi NISHIMURA and H.E. Dr. Tan See Leng,
Minister for Manpower and Second Minister for Trade and Industry, Singapore
https://www.meti.go.jp/english/press/2023/0723_001.html

*Ref: (Date: Aug 25 (Fri.), 2023)
State Minister Shinichi NAKATANI and H.E. Low Yen Ling,
Minister of State for Trade and Industry, Singapore
https://www.meti.go.jp/english/press/2023/0825_007.html

Development of Energy Transition

Kingdom of Thailand

Thailand intends to reduce its greenhouse gas emissions by 30 percent from the projected business-as-usual (BAU) level by 2030.

Thailand is committed with achieving carbon neutrality in 2050 and energy security together, implementing 2022 National Energy Plan and 2022 Electric Development Plan. Thailand will introduce technology such as CCUS, EV, BESS (Battery Energy Storage System), modernization of grids, carbon recycling, ammonia, and hydrogen. Expecting technical and financial support from partners such as Japan on CCUS, as Thailand has been putting its 5-Year CCUS Roadmap (2022-2027). Thailand expands EV up to 30% in 2030. Thailand is promoting its own BCG Economy Model, after agreement in APEC Summit.

**Ref: (Date: Mar. 4 (Sat.), 2023)*

Minister Yasutoshi NISHIMURA and H.E. Supattanapong Punmeechaow, Deputy Prime Minister and Minister of Energy, Thailand

https://www.meti.go.jp/english/press/2023/0306_002.html

**Ref:* H.E. Supattanapong Punmeechaow, Deputy Prime Minister and Minister of Energy in AZEC Ministerial Meeting

**Ref:* Thailand's 2nd Updated Nationally Determined Contribution

https://unfccc.int/sites/default/files/NDC/2022-11/Thailand%20 2nd%20Updated%20NDC.pdf

Development of Energy Transition

Socialist Republic of Viet Nam

Viet Nam sets its target to achieve Net Zero in 2050. The National Power Development 8 (PDP8) forecasts the annual GDP growth 7%, and plans to supply for the demand to fulfill the economic growth. The total installed capacity will increase from 80,704MW in 2022 to 150,489 MW in 2030.

Viet Nam targets the power supply 567 billion kWh, 30.9%-39.2% of which consists of renewables, in 2030.

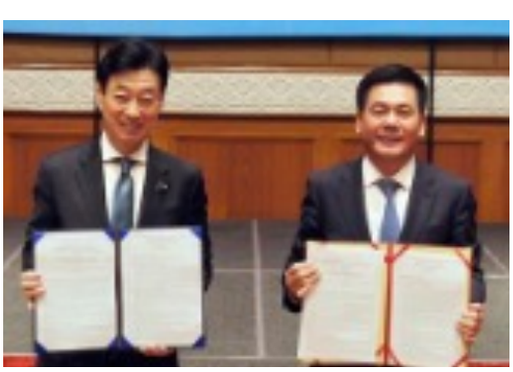
The development of LNG and on-shore wind power will be prioritized and biomass and waste heat utilization technology will be introduced. Roof top solar power will be installed at 50% of office buildings and residential houses.

Toward 2050, offshore wind power and battery storage will be developed, and coal fired power plants will be transitioned to co-firing with biomass or firing ammonia only.

Ref: Decision approving National Power Development Plan 8
https://www.jetro.go.jp/biz/areareports/special/2023/0503/37d4fae1789cdf86.html

**Ref: (Date: May 25 (Thu.), 2023)*
Minister Yasutoshi NISHIMURA and H.E. Mr. Nguyen Hong Dien, Minister of Industry and Trade of Viet Nam
https://www.meti.go.jp/english/press/2023/0528_001.html

**Ref: (Date: Aug 25 (Fri.), 2023)*
State Minister Shinichi NAKATANI and H.E. Nguyen Sinh Nhat Tan, Deputy Minister of Industry and Trade, Viet Nam
https://www.meti.go.jp/english/press/2023/0825_007.html



**Ref: (Date: Nov 3 (Fri.), 2023)*
Minister Yasutoshi NISHIMURA and H.E. Mr. Nguyen Hong Dien, Minister of Industry and Trade of Viet Nam
https://www.meti.go.jp/press/2023/11/20231103003/20231103003.html

NDCs and CN Commitments

*as of November 2023

Country	Emission Reduction Target in NDCs	CN
Australia	43% reduction by 2030 (from its 2005 level)	2050
Brunei	20% reduction compared to BAU by 2030	-
Cambodia	41.7% reduction compared to BAU by 2030	2050
Indonesia	31.89% reduction compared to BAU by 2030 *43.2% reduction with international support	2060
Japan	46% reduction of GHG emission in 2030FY from its 2013 level	2050
Lao PDR	60% reduction compared to BAU or reducing 62,000 $ktCO_2e$ of CO_2 equivalent by 2030	2050
Malaysia	45% reduction of economy-wide carbon intensity in 2030 compared to 2005 level	2050
Philippines	75% reduction compared to BAU *2.71% unconditional (using economy's resources) and 72.29% conditional (using Means of Implementation to be provided by Developed Countries)	-
Singapore	Peaking out GHG emission by 2030 with less than 65 million tons of CO_2e emission 36% reduction of GHG economic intensity in 2030 compared to 2005 level	2050
Thailand	30% reduction compared to BAU by 2030 *25% reduction with international support	2065 for GHG 2050 for CO_2
Viet Nam	9% reduction compared to BAU by 2030 *27% reduction with international support	2050

Updated Information on AZEC related Activities

Summary of meetings, training programs, frameworks under the AZEC

1) Inauguration of "AZEC/GX Promotion Working Team" in Viet Nam
2) Inauguration of "AZEC Japan-Indonesia Joint Task Force" in Indonesia
3) AZEC International Conference to Promote the JCM and Develop Carbon Markets
4) AZEC Energy Transition Workshop 2023
5) The 5th CEFIA Government-Private Forum
6) Projects in AETI
7) Second Japan-Indonesia Public-Private Economic Dialogue (Track 1.5)
8) Third Asia CCUS Network Forum
9) AZEC Online Seminar

03

Summary of meetings, training programs, frameworks under the AZEC

1. Inauguration of "AZEC/GX Promotion Working Team" in Viet Nam

On July 26, 2023, Japan and Viet Nam agreed to inaugurate an "AZEC/GX Promotion Working Team" in Hanoi, Viet Nam.

Viet Nam is the first country after the launch of AZEC to inaugurate a framework in which the Japanese public and private sectors and the government of the partner country hold deliberations in the country.

**Ref:* https://www.meti.go.jp/english/press/2023/0726_004.html

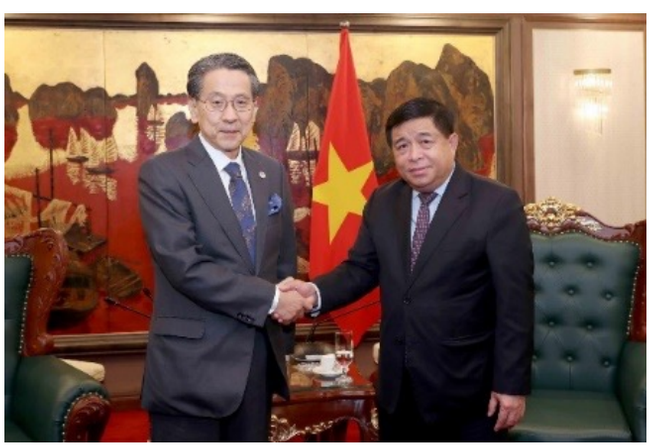


Photo: Japan Bank for International Cooperation

2. Inauguration of "AZEC Japan-Indonesia Joint Task Force" in Indonesia

On September 21, 2023, Japan and Indonesia agreed to inaugurate AZEC Japan-Indonesia Joint Task Force in Jakarta, Indonesia.

**Ref:* https://www.meti.go.jp/english/press/2023/0921_002.html

Photo: Japan Bank for International Cooperation

Summary of meetings, training programs, frameworks under the AZEC

3. AZEC International Conference to Promote the JCM and Develop Carbon Markets

- On September 28 and 29, 2023, METI and the Ministry of the Environment (MOE) jointly held the AZEC-JCM International Conference. The conference brought together government officials from energy and environment ministries and agencies in AZEC partner countries.
- At the conference, participants exchanged information and views focusing on five topics:
  [i] Progress on JCM,
  [ii] Recent development on carbon markets in partner countries,
  [iii] Relationship between Energy markets and Carbon markets in partner countries,
  [iv] Status on Implementing Article 6 of the Paris Agreement, and
  [v] Possibilities for regional cooperation through collaboration among JCMs and other efforts.
- Participants held proactive discussions on future approaches to promoting the utilization of the Joint Crediting Mechanism (JCM) and developing carbon markets in AZEC partner countries.

Ref: https://www.meti.go.jp/english/press/2023/0929_002.html

Summary of meetings, training programs, frameworks under the AZEC

4. AZEC Energy Transition Workshop 2023

The Institute of Energy Economics, Japan (IEEJ) held the AZEC Energy Transition Workshop 2023 from Oct. 13 to 19, 2023. Participants reported and exchanged views on energy transition policies and the challenges faced in their respective countries. Participants also engaged in site visits to witness Japan's cutting-edge technologies and relevant pilot projects. Through this workshop, participants deepened mutual understanding of "one goal, various pathways" to achieve carbon neutrality.

**Ref:* https://eneken.ieej.or.jp/data/11363.pdf

5. The 5th CEFIA Government-Private Forum

On August 25, 2023, the 5th CEFIA (Cleaner Energy Future Initiative for ASEAN) Government-Private Forum was held in Bali, Indonesia, jointly with the ASEAN Energy Business Forum (AEBF) 2023. Participants from governments, companies, financial institutions, etc. of Japan and the ASEAN countries held active discussions on cooperation projects between Japan and ASEAN countries toward implementing decarbonizing technologies, cross-cutting efforts for financing, avoided emissions, and foster entrepreneurs, and digital energy management. In addition, a business matching event was held between participating Japanese companies and industrial associations and ASEAN companies.

**Ref:* https://www.meti.go.jp/english/press/2023/0825_005.html

Summary of meetings, training programs, frameworks under the AZEC

6. Projects in AETI

Roadmap development

- The ERIA*1 and the IEEJ*2 have developed the roadmaps (model analyses) that utilize all energy sources and technologies based on cost minimization models, based on carbon neutrality target years of each ASEAN country.

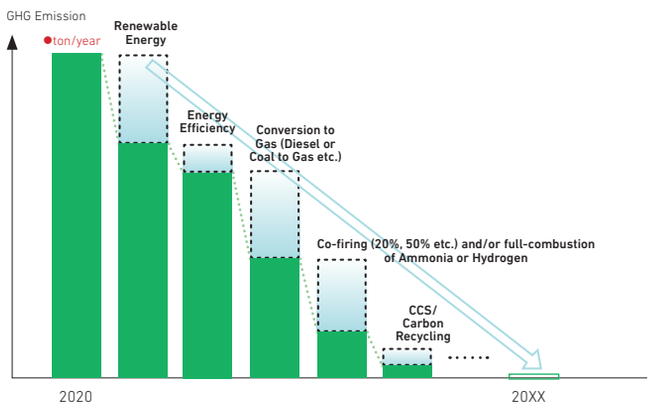
- While carefully listening to the requests of ASEAN countries, ERIA accompanies and supports each government in formulating and flexibly optimizing their roadmaps in line with their domestic circumstances and energy policy directions.

*1 : ERIA = Economic Research Institute for ASEAN and East Asia
*2 : IEEJ = the Institute of Energy Economics, Japan

Human resource development

- Japan has provided HR development training programs for government officials and business professionals in Asian countries, such as Viet Nam and Thailand.
- The program consisted of (1) lectures on energy transition and roadmap, (2) site visits to key industrial, and (3) business matching session.

<Image of achieving net-zero in Asia>



[Cost minimization model]
- An assumption that **the cheapest energy sources and technologies will be introduced first**, followed by more expensive ones.

Summary of meetings, training programs, frameworks under the AZEC

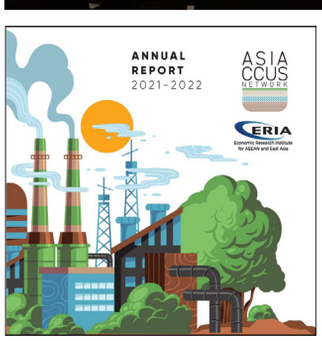
7. Second Japan-Indonesia Public-Private Economic Dialogue (Track 1.5)

On May 30, 2023, the second meeting of the "Japan-Indonesia Public-Private Economic Dialogue (Track 1.5)" was held in Tokyo to discuss the promotion of efforts by Japanese and Indonesian public and private sectors in such areas as digital technology, green industry and human capital development based on "the ASIA-Japan Investing for the Future Initiative."

Ref: https://www.meti.go.jp/english/press/2023/0531_001.html

8. Third Asia CCUS Network Forum

On September 27, 2023, the third Asia CCUS Network Forum was held in a hybrid format at Hilton Hiroshima. The forum provided several activities focusing on the practical aspect of carbon capture, utilization and storage (CCUS): discussion on CCUS importance and global trends, Asia-wide CCUS projects, and a signing ceremony of several memorandums of understanding (MoUs) regarding CCUS, which are developing import/export mechanism of CO_2 and knowledge sharing CCS technology. The Asia CCUS Network will continue to support the expansion of CCUS deployment in Asia as a platform.



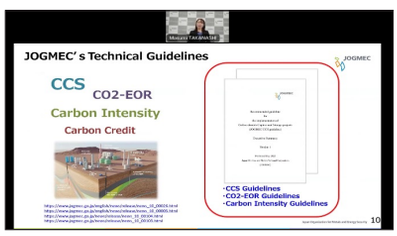
Summary of meetings, training programs, frameworks under the AZEC

9. AZEC Online Seminar (URL: https://asiazeroemission.com/)

Hydrogen
By NEDO

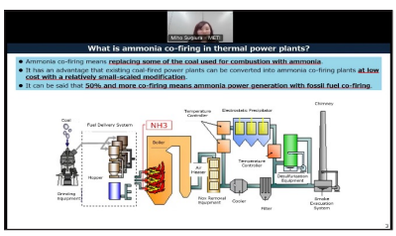
The Contents
- Japan's policy and related updates including the direction of how to promote hydrogen
- Introduction and explanation of R&D projects of hydrogen including fuel cell application, hydrogen and gas turbine, MW scale electrolysis

CCS
By JOGMEC



The Contents
- CO_2 storage potential in Southeast Asia
- Introduction of JOGMEC's Workshop and Handbook for CCS Carbon Credit
- JOGMEC's Technical Guidelines(CCS, CO_2-EOR, Carbon Intensity)
- JOGMEC's projects and cooperation in Asia-Pacific

Ammonia
By METI



The Contents
- Explanation of the effectiveness of ammonia co-firing especially in Asia
- Introduction of ammonia co-firing into existing coal-fired power plants and ammonia firing into gas-fired power plants
- Technology development for the utilization of ammonia

Support Programs and Resources in AZEC

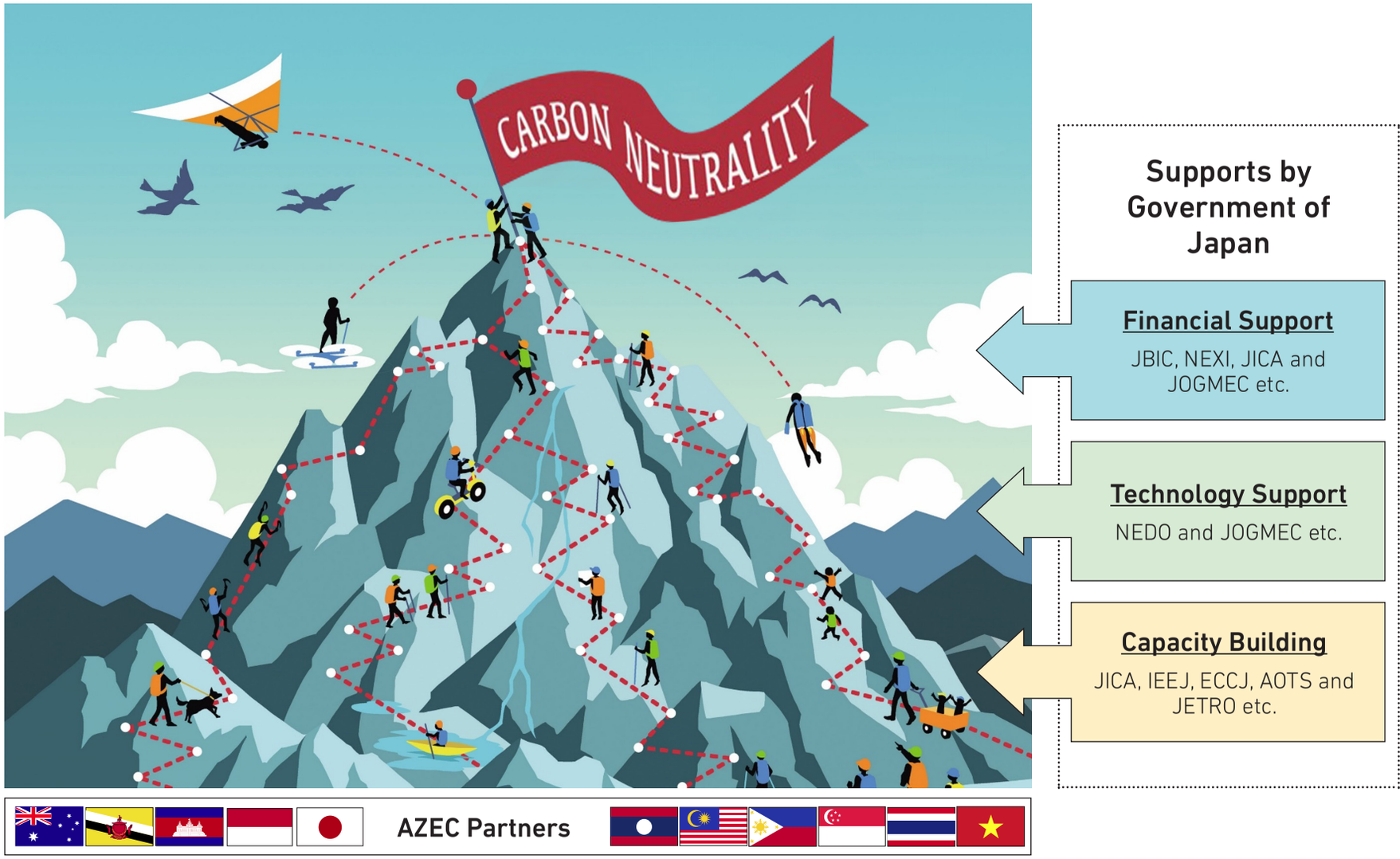
The following are Japanese agencies and organizations engaged in AZEC, with rich experiences in financial supports and technical cooperation such as capacity building, improving business environment and technology introduction.

- The Association for Overseas Technical Cooperation and Sustainable Partnerships (AOTS)
- The Energy Conservation Center, Japan (ECCJ)
- The Institute of Energy Economics, Japan (IEEJ)
- Japan Bank for International Cooperation (JBIC)
- Japan External Trade Organization (JETRO)
- Japan International Cooperation Agency (JICA)
- Japan Organization for Metals and Energy Security (JOGMEC)
- New Energy and Industrial Technology Development Organization (NEDO)
- Nippon Export and Investment Insurance (NEXI)

04

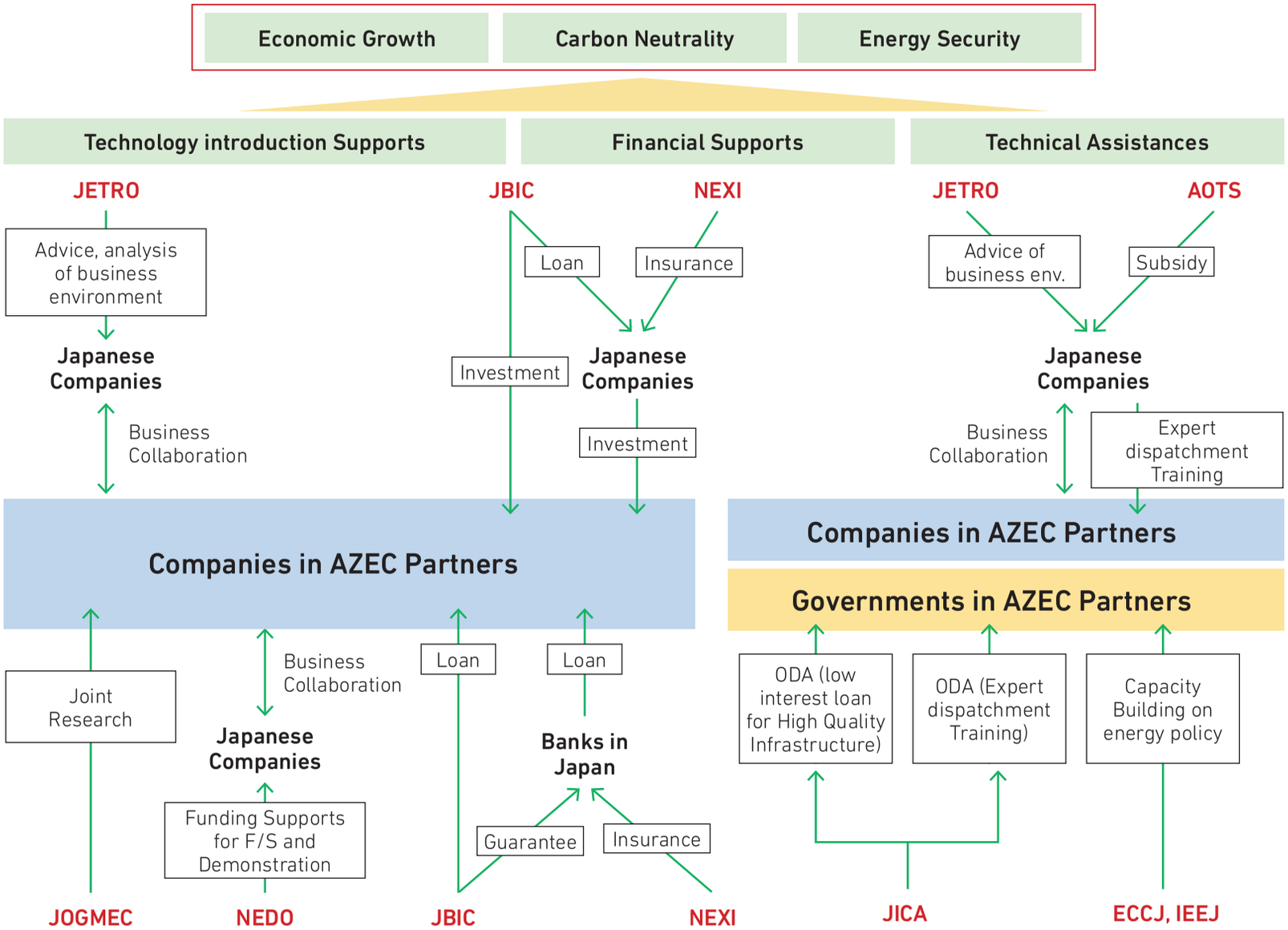
Outline of Supports in AZEC

Japan provides financial support, technology support and capacity building to AZEC partners pursuing energy transitions tailored to each country's circumstances.



Outline of Supports in AZEC

*Including, but not limited to the chart below.



Supports for AZEC partners by AOTS

AOTS has provided trainings for **3,312 engineers and managers** of and has dispatched **182 Japanese experts** to AZEC partner countries through Japanese government subsidized program (Support Program for HRD to Export Carbon Reduction Technology/ HRD Program towards Zero Emission in Asian Countries & Regions)

Number of Trainees and Experts (FY2014~FY2023*)

*The numbers include trainees/ experts of programs completed before end of Oct 2023

Overseas Training for Reducing Defects in Automotive Parts Production Process with Electric Furnaces (FY2019)

A Japanese Auto-parts manufacturer sent an engineer to its Thai subsidiary to conduct a 22-day group training on production management using high-efficiency welding furnaces.

Achievement
By improving workers' skill and reducing defect rate, the Thai subsidiary has achieved elimination of production and energy losses.

Thailand

Technical training in JPN 941 trainees
Management training in JPN 98 trainees
- FY2017 The Prog. on *Monozukuri* (Production Management) (THPM)
- FY2019 Prog. on Productivity Improvement (THPI)

Training in Thailand 162 trainees
- FY2017 Training for Indoor Wiring Technicians at Overseas Offices - Intermediate
- FY2017 Training for Indoor Wiring Technicians at Overseas Offices – Advanced
- FY2017 On-site Training on Plastic Molding & Mold - Intermediate
- FY2017 On-site Training on Plastic Molding & Mold – Intermediate 1
- FY2017 On-site Training on Plastic Molding & Mold – Intermediate 2
- FY2019 Training for Reducing Defects in Electric Furnace Process
- FY2019 Training for Reduction of Mold Design and Machining Time
- FY2020 Training on Energy Saving at Production Site
- FY2021 Training on Energy Saving at Production Site

Expert dispatch 54 experts

Viet Nam

Technical training in JPN 327 trainees
Management training in JPN 94 trainees
- FY2017 The Production Management Training Prog. (VNPM)
- FY2017 The Productivity Improvement Training Prog. (VNPI)
- FY2018 The Productivity Improvement Training Prog. (VNPI)
- FY2019 The Program on Productivity Improvement (VNIP)

Training in Viet Nam 91 trainees
- FY2015 Production Mgt. and Hardened Flesh Remediation
- FY2017 Improvement of Installation and Reduction of CO_2 Emission by utilizing VE method etc.
- FY2017 Improvement of Productivity and Energy Efficiency by utilizing IE Methods
- FY2019 Production Management Training for Leaders of Wooden Mold Production Site
- FY2019 QC Mgt. Training for Productivity Improvement

Expert dispatch 47 experts

Singapore

Technical training in JPN 11 trainees

Australia

Management training in JPN 1 trainee

Laos

Technical training in JPN 20 trainees

Cambodia

Technical training in JPN 20 trainees

Malaysia

Technical training in JPN 70 trainees
Management training in JPN 36 trainees
- FY2017 The Prog. on Environmental Management (MYEM)

Training in Malaysia 12 trainees
- FY2017 On-site Training for Plastic Molding & Mold Beginners

Expert dispatch 7 experts

Indonesia

Technical training in JPN 533 trainees
Management training in JPN 61 trainees
- FY2017 The Logistics Management Training Program (IDLM)
- FY2017 The Program on Production Maintenance (IDMP)

Training in Indonesia 318 trainees
- FY2017 On-site training for Plastic Molding & Mold Beginners
- FY2018 On-site training on Dies & Molds
- FY2016 *Gemba Kaizen* (5S, Visual Mgt. & Elimination of Muda) 1
- FY2016 *Gemba Kaizen* (5S, Visual Mgt. & Elimination of Muda) 2
- FY2017 Basics of *Monozukuri* 1
- FY2017 Basics of *Monozukuri* 2
- FY2017 Improvement and Energy Saving of Production Process
- FY2018 Improvement of Production Site utilizing IoT 1
- FY2018 Improvement of Production Site utilizing IoT 2
- FY2020 Training on Productivity Improvement by TPS
- FY2021 Training on Energy Saving Activities at Production Site

Expert dispatch 59 experts

Philippines

Technical training in JPN 256 trainees
Management training in JPN 46 trainees
- FY2016 The Prog. on Program & Project Management (PHPP)
- FY2017 The Program on Environmental Management (PHEM)
- FY2017 The Corporate Management Program (PHPE)
- FY2018 The Prog. on Program & Project Management (PHPP)

Training in the Philippines 215 trainees
- FY2016 Tips for Successful *Gemba Kaizen* Activities
- FY2017 *Gemba Kaizen* (5S, Visual Mgt. & Elimination of Muda)
- FY2017 Energy Saving by Improving Machine Efficiency and Quality
- FY2017 Training for Indoor Wiring Technicians at Overseas Offices - Intermediate
- FY2018 Training for Indoor Wiring Technicians at Overseas Offices - Advanced
- FY2018 Basics of *Monozukuri* and *Kaizen*
- FY2019 Production Management Training for Leaders of Wooden Mold Production Site
- FY2023 Seminar on Energy Recovery from Waste

Expert dispatch 15 experts

Technical Training in Japan for Construction Engineers of High-Efficiency Thermal Power Plants in which Japanese Companies Involve (FY2017)

13-week JP language training at AOTS training center
+
8-month onsite training at a power plant in Japan

Achievement
The trainees, who have acquired skills in generator installation, long-term maintenance and safety management, are engaged in the construction of high-efficiency thermal and geothermal power plants in Indonesia, contributing to improving power generation efficiency and lowering carbon emissions in Indonesia.

Management Training in Japan
The Program on Energy Management in Manufacturing Industry (FY2015, 2016 & 2017)

A 2-week group training at AOTS consisting of lectures, facility visits and group discussion, etc. on
- Energy management at manufacturing industry, and
- Energy saving in each phase of product lifecycle: development, design and manufacturing.

Achievement
From AZEC partners, 1 corporate manager from Australia, 8 from Thailand, and 2 from Viet Nam participated. They made use of what they learned in Japan to solve the issues and promote energy conservation for the purpose of generating profit at their respective companies.

Management Training Programs for All Countries & Regions with Participation from AZEC partners

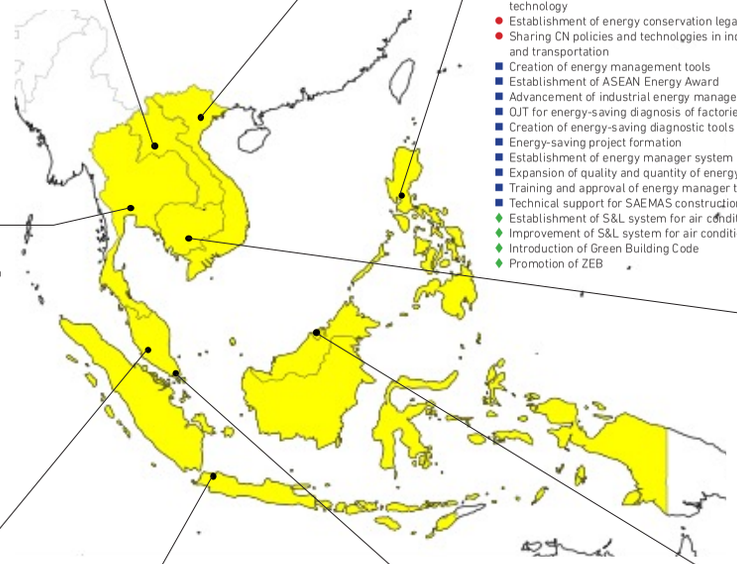
- FY2015 The Production Management Training Program (PMTP)
- FY2015 The Prog. on Energy Management in Manufacturing Industry (PEMM)
- FY2015 The Quality Control Training Course (QCTC)
- FY2016 The Corporate Mgt. Prog. on Energy & Resource Saving (CMPE)
- FY2016 The Production Management Training Program (PMTP)
- FY2016 The Prog. on Energy Management in Manufacturing Industry (PEMM)
- FY2016 The Quality Control Training Course (QCTC)
- FY2016 The Production Management Training Program 2 (PMTP2)
- FY2016 The Program on Development of Smart Community (VNSC)
- FY2016 The Program on Production Management (THPM)
- FY2017 The Corporate Mgt. Prog. on Energy & Resource Saving (CMPE)
- FY2017 The Logistics Management Training Program (LMTP)
- FY2017 The Training Program on Program & Project Management (PPTP)
- FY2017 The Training Program on Program & Project Management for Advanced Infrastructure (PPMI)
- FY2017 The Production Management Training Program (PMTP)
- FY2017 The Program on Energy Management in Manufacturing Industry (PEMM)
- FY2017 The Quality Control Training Course (QCTC)
- FY2017 The Production Management Training Program 2 (PMTP2)
- FY2017 The Quality Control Training Course 2 (QCTC2)
- FY2017 The Executive Program on Production Management 2 (EPPM2)
- FY2017 The Logistics Management Training Program 2 (LMTP2)
- FY2018 The Logistics Management Training Program (LMTP)
- FY2018 The Program on Innovative Production Management by IT (TIPM)
- FY2018 The Program on Eco Business Innovation (TEBI)
- FY2018 The Production Management Training Program (PMTP)
- FY2018 The Quality Control Training Course (QCTC)
- FY2019 The Program on Productivity Improvement (TPPI)

Supports in AZEC partners by ECCJ

ECCJ
The Energy Conservation Center, Japan

ECCJ has supported **172 projects** in the field of energy management in AZEC region countries for "legal framework development and human resource development" to enhance energy efficiency and disseminate energy-saving equipment and technologies, in addition to establishing the legal system for the energy conservation act.

List of METI Energy Conservation Human Resource Development Projects(FY 2004 - FY 2023) As of November 17, 2023



Lao PDR
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Narrowing the gap in EE&C policies and legal system in the region
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Regional harmonization of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

Thailand
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Support for formulation of energy management handbooks
- ■ Establishment of energy manager award system
- ■ Support for formulation of industrial EC guidelines
- ■ Support for introduction of equipment energy management manuals
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ CN diagnosis/project formation support
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Improvement of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Support for building energy management systems for universities
- ♦ Promotion of ZEB

Malaysia
- ● Transfer of Japan's energy conservation legal system and technology
- ● Creation of energy conservation master plan
- ● Establishment of energy conservation legal system
- ● Support for thermal management introduction system
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Industrial energy management system model project
- ■ CN diagnosis/project formation support
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Improvement of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

Indonesia
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Establishment of energy conservation regulations
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Improvement of qualities of energy conservation policy officer
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Support for building energy management systems for the rubber industry
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Industrial energy management system model project
- ■ Introduction of industrial energy saving target setting method
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Improvement of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

Philippines
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Improvement of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

Singapore
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

Viet Nam
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Support for formulation of energy conservation laws
- ● Establishment of infrastructure for enforcement of energy conservation laws
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Improvement of qualities of energy conservation policy officer
- ■ Improvement of qualities of local bureau staff
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Improvement of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB
- ♦ Building energy saving technology

Cambodia
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Narrowing the gap in EE&C policies and legal system in the region
- ● Sharing CN policies and technologies in industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Regional harmonization of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

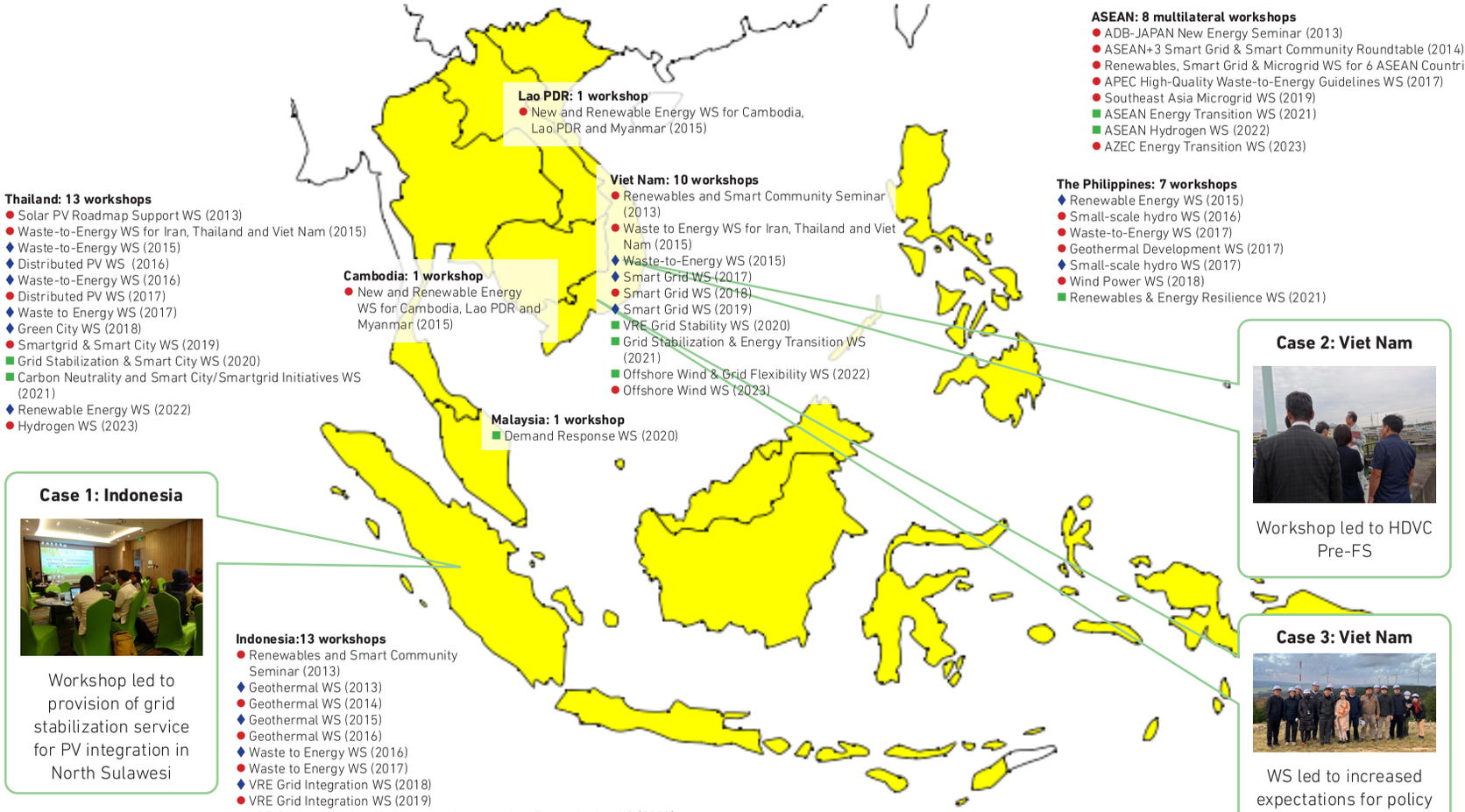
Brunei Darussalam
- ● Transfer of Japan's energy conservation legal system and technology
- ● Establishment of energy conservation legal system
- ● Sharing CN policies and technology for industry, buildings, and transportation
- ■ Creation of energy management tools
- ■ Establishment of ASEAN Energy Award
- ■ Advancement of industrial energy management
- ■ OJT for energy-saving diagnosis of factories and buildings
- ■ Creation of energy-saving diagnostic tools
- ■ Energy-saving project formation
- ■ Establishment of energy manager system
- ■ Expansion of quality and quantity of energy managers
- ■ Training and approval of energy manager trainers
- ■ Technical support for SAEMAS construction
- ♦ Establishment of S&L system for air conditioners
- ♦ Introduction of Green Building Code
- ♦ Promotion of ZEB

CN: Carbon Neutrality
EE&C: Energy Efficiency and Conservation
SAEMAS: Sustainable ASEAN Energy Management Certification Scheme

Supports in AZEC partners by IEEJ

IEEJ has conducted **52 workshops** on new and renewable energy with AZEC partner countries to support human resource and policy development, thus contributing to the introduction of cutting-edge technologies and policy dialogue tailored to the individual circumstances of each country.

Workshops under METI "New Energy Capacity Building Project" (2013-2023)



Thailand: 13 workshops
- ● Solar PV Roadmap Support WS (2013)
- ● Waste-to-Energy WS for Iran, Thailand and Viet Nam (2015)
- ♦ Waste-to-Energy WS (2015)
- ♦ Distributed PV WS (2016)
- ♦ Waste-to-Energy WS (2016)
- ● Distributed PV WS (2017)
- ♦ Waste to Energy WS (2017)
- ♦ Green City WS (2018)
- ● Smartgrid & Smart City WS (2019)
- ■ Grid Stabilization & Smart City WS (2020)
- ■ Carbon Neutrality and Smart City/Smartgrid Initiatives WS (2021)
- ♦ Renewable Energy WS (2022)
- ● Hydrogen WS (2023)

Lao PDR: 1 workshop
- ● New and Renewable Energy WS for Cambodia, Lao PDR and Myanmar (2015)

Cambodia: 1 workshop
- ● New and Renewable Energy WS for Cambodia, Lao PDR and Myanmar (2015)

Viet Nam: 10 workshops
- ● Renewables and Smart Community Seminar (2013)
- ● Waste to Energy WS for Iran, Thailand and Viet Nam (2015)
- ♦ Waste-to-Energy WS (2015)
- ♦ Smart Grid WS (2017)
- ● Smart Grid WS (2018)
- ♦ Smart Grid WS (2019)
- ■ VRE Grid Stability WS (2020)
- ■ Grid Stabilization & Energy Transition WS (2021)
- ■ Offshore Wind & Grid Flexibility WS (2022)
- ● Offshore Wind WS (2023)

Malaysia: 1 workshop
- ■ Demand Response WS (2020)

ASEAN: 8 multilateral workshops
- ● ADB-JAPAN New Energy Seminar (2013)
- ● ASEAN+3 Smart Grid & Smart Community Roundtable (2014)
- ● Renewables, Smart Grid & Microgrid WS for 6 ASEAN Countries (2015)
- ● APEC High-Quality Waste-to-Energy Guidelines WS (2017)
- ● Southeast Asia Microgrid WS (2019)
- ■ ASEAN Energy Transition WS (2021)
- ■ ASEAN Hydrogen WS (2022)
- ● AZEC Energy Transition WS (2023)

The Philippines: 7 workshops
- ♦ Renewable Energy WS (2015)
- ● Small-scale hydro WS (2016)
- ● Waste-to-Energy WS (2017)
- ● Geothermal Development WS (2017)
- ♦ Small-scale hydro WS (2017)
- ● Wind Power WS (2018)
- ■ Renewables & Energy Resilience WS (2021)

Indonesia:13 workshops
- ● Renewables and Smart Community Seminar (2013)
- ♦ Geothermal WS (2013)
- ● Geothermal WS (2014)
- ♦ Geothermal WS (2015)
- ● Geothermal WS (2016)
- ♦ Waste to Energy WS (2016)
- ● Waste to Energy WS (2017)
- ♦ VRE Grid Integration WS (2018)
- ● VRE Grid Integration WS (2019)
- ■ VRE Grid Integration, Hydrogen and Low-carbon Technologies WS (2020)
- ■ Renewables Deployment WS (2021)
- ■ Carbon Neutrality WS (2022)
- ● Carbon Neutrality. (Hydrogen & Biomass) WS (2023)

● WS in Japan ♦ Local WS ■ Online WS

Case 1: Indonesia

Workshop led to provision of grid stabilization service for PV integration in North Sulawesi

Case 2: Viet Nam

Workshop led to HDVC Pre-FS

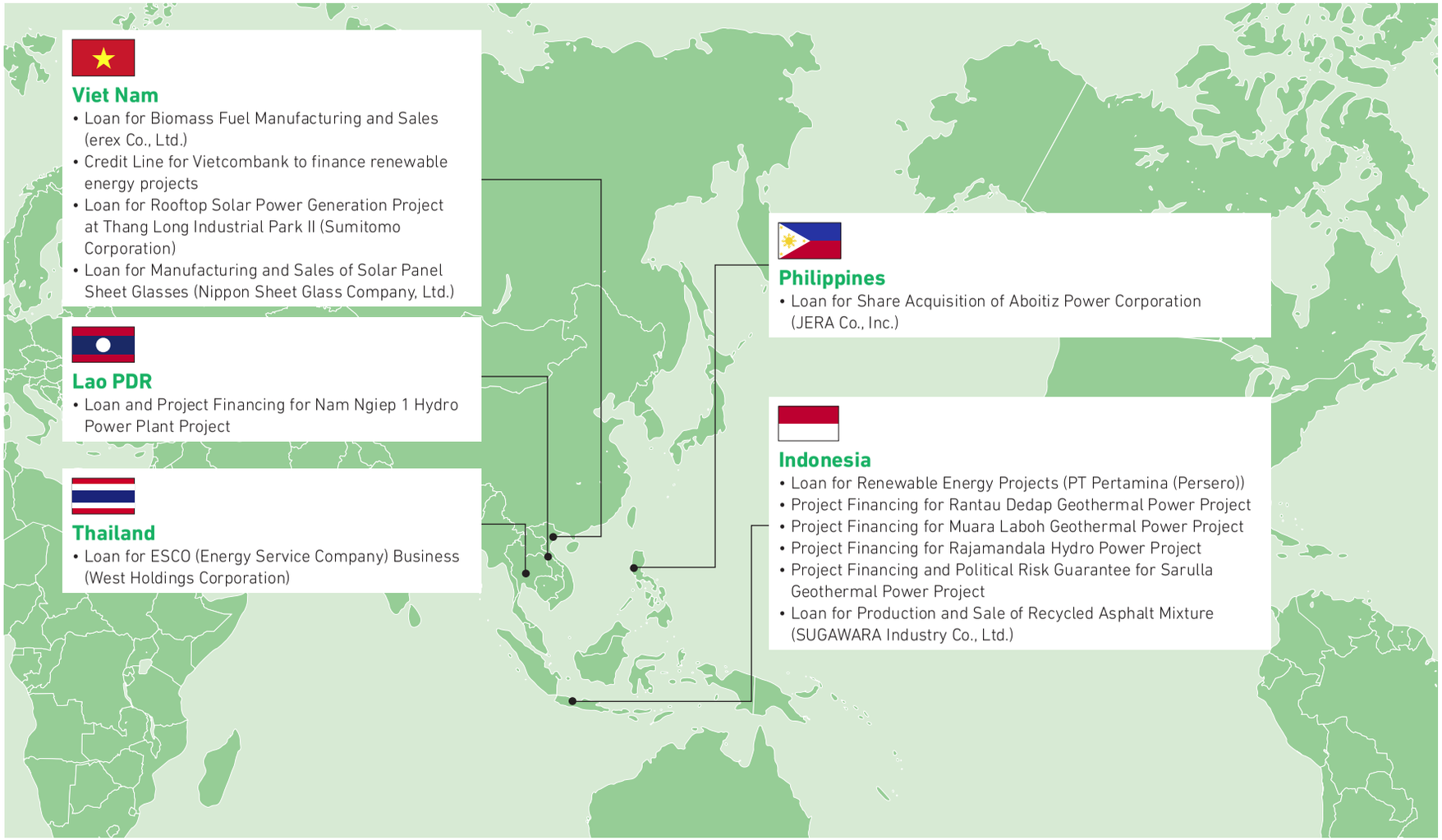
Case 3: Viet Nam

WS led to increased expectations for policy dialogue on offshore wind policy

Major Track Record in AZEC partner countries

JBIC

JBIC has provided financial support for energy transition which contributes to economic growth and addressing climate change.



Viet Nam
- Loan for Biomass Fuel Manufacturing and Sales (erex Co., Ltd.)
- Credit Line for Vietcombank to finance renewable energy projects
- Loan for Rooftop Solar Power Generation Project at Thang Long Industrial Park II (Sumitomo Corporation)
- Loan for Manufacturing and Sales of Solar Panel Sheet Glasses (Nippon Sheet Glass Company, Ltd.)

Lao PDR
- Loan and Project Financing for Nam Ngiep 1 Hydro Power Plant Project

Thailand
- Loan for ESCO (Energy Service Company) Business (West Holdings Corporation)

Philippines
- Loan for Share Acquisition of Aboitiz Power Corporation (JERA Co., Inc.)

Indonesia
- Loan for Renewable Energy Projects (PT Pertamina (Persero))
- Project Financing for Rantau Dedap Geothermal Power Project
- Project Financing for Muara Laboh Geothermal Power Project
- Project Financing for Rajamandala Hydro Power Project
- Project Financing and Political Risk Guarantee for Sarulla Geothermal Power Project
- Loan for Production and Sale of Recycled Asphalt Mixture (SUGAWARA Industry Co., Ltd.)

Major Track Record in AZEC partner countries by JBIC

Country	Project Overview	Related Companies	Amount	URL
Indonesia	Loan for Renewable energy projects in Indonesia (implemented by PT Pertamina (Persero)) (December 2022)	Indonesia/PT Pertamina (Persero)	USD30 million	https://www.jbic.go.jp/en/information/press/press-2022/1215-017136.html
Indonesia	Project Financing for Rantau Dedap Geothermal Power Project in Indonesia (implemented by PT Supreme Energy Rantau Dedap (SERD)) (March 2018) *SERD is an Indonesian company invested in by Marubeni Corporation, Tohoku Electric Power Co., Ltd. and other sponsors.	Japan/ Marubeni, Tohoku Electric, Indonesia/PT Supreme Energy Rantau Dedap, etc.	Approx USD188 million	https://www.jbic.go.jp/en/information/press/press-2017/0328-010746.html
Indonesia	Project Financing for Muara Laboh Geothermal Power Project in Indonesia (implemented by PT. Supreme Energy Muara Laboh (SEML)) (January 2017) *SEML is an Indonesian company invested in by Sumitomo Corporation and other sponsors.	Japan/Sumitomo Corporation, Indonesia/ PT. Supreme Energy Muara Laboh, etc.	Approx USD198 million	https://www.jbic.go.jp/en/information/press/press-2016/0130-52890.html
Indonesia	Project Financing for Rajamandala Hydro Power Plant Project in Indonesia (implemented by PT. Rajamandala Electric Power (REP)) (June 2014) *REP is an Indonesian company invested in by The Kansai Electric Power Co., Inc.	Japan/Kansai Electric, Indonesia/ PT. Rajamandala Electric Power, etc.	Approx USD66 million	https://www.jbic.go.jp/en/information/press/press-2014/0625-22435.html

Major Track Record in AZEC partner countries by JBIC

Country	Project Overview	Related Companies	Amount	URL
Indonesia	Project Financing and Political Risk Guarantee for Sarulla Geothermal Power Plant Project in Indonesia (implemented by Sarulla Operations LTD (SOL)) (March 2014) *SOL is a Cayman Islands company invested in by Itochu Corporation, Kyushu Electric Power Co., Inc. and other sponsors.	Japan/Itochu Corporation, Kyushu Electric, Indonesia/PT. Sarulla Operations Ltd, etc.	USD492 million	https://www.jbic.go.jp/en/information/press/press-2013/0331-19526.html
Indonesia	Loan for production and sale of recycled asphalt mixture carried out by PT. SUGAWARA KOGYO in Indonesia	Japan/ PT. SUGAWARA KOGYO INDONESIA	IDR13 billion	-
Lao PDR	Loan and Project Financing for Hydro Power Plant Project in Lao People's Democratic Republic (Lao PDR) (implemented by Nam Ngiep 1 Power Company Limited (NNP1)) (August 2014, September 2014) * NNP1 is a Laotian company invested in by The Kansai Electric Power Co., Inc., and other sponsors	Japan/Kansai Electric Power, Laos/MINISTRY OF FINANCE OF LAO P.D.R, Nam Ngiep 1 Power Company Limited, Thailand/EGAT International Company, etc.	USD234.5 million	https://www.jbic.go.jp/en/information/press/press-2014/0904-28349.html https://www.jbic.go.jp/en/information/press/press-2014/0819-27804.html
Philippines	Loan for Share Acquisition of Philippine Company Aboitiz Power Corporation by JERA Co., Inc. (December 2021)	Japan/JERA Philippines/Aboitiz Power Corporation	USD630 million	https://www.jbic.go.jp/en/information/press/press-2021/1227-015711.html
Thailand	Loan for ESCO (Energy Service Company) Business in Thailand by West Holdings Corporation (March 2020, June 2022)	Japan/West Holdings Thailand/ WEST International (Thailand) Co., Ltd.	THB360 million	https://www.jbic.go.jp/en/information/press/press-2022/0621-016448.html https://www.jbic.go.jp/en/information/press/press-2019/0331-013328.html

Major Track Record in AZEC partner countries by JBIC

Country	Project Overview	Related Companies	Amount	URL
Viet Nam	Loan for Biomass Fuel Manufacturing and Sales Business in Viet Nam by erex Co., Ltd. (September 2023, October 2023)	Japan/erex Viet Nam/EREX SAKURA BIOMASS TUYEN QUANG CO.,LTD, EREX SAKURA BIOMASS YEN BAI CO.,LTD	USD16.6 million	https://www.jbic.go.jp/en/information/press/press-2023/press_00119.html https://www.jbic.go.jp/en/information/press/press-2023/press_00104.html
Viet Nam	Credit Line for Vietcombank to finance renewable energy projects in Viet Nam (June 2019, March 2023)	Viet Nam/ Vietcombank	USD265 million	https://www.jbic.go.jp/en/information/press/press-2022/0329-017547.html https://www.jbic.go.jp/en/information/press/press-2019/0626-012288.html
Viet Nam	Loan for Rooftop Solar Power Generation Project in Viet Nam by Sumitomo Corporation (March 2022)	Japan/Sumitomo Corporation Viet Nam/Thang Long Industrial Park II Corporation	Approx USD8 million	https://www.jbic.go.jp/en/information/press/press-2021/0331-016132.html
Viet Nam	Loan for Manufacturing and Sales of Solar Panel Sheet Glasses in Viet Nam by Nippon Sheet Glass Company, Ltd. (August 2019)	Japan/Nippon Sheet Glass Company Viet Nam/NSG Viet Nam Glass Industries Ltd.	USD54 million	https://www.jbic.go.jp/en/information/press/press-2019/0829-012484.html

Contribution to Decarbonization in Indonesia (JETRO)

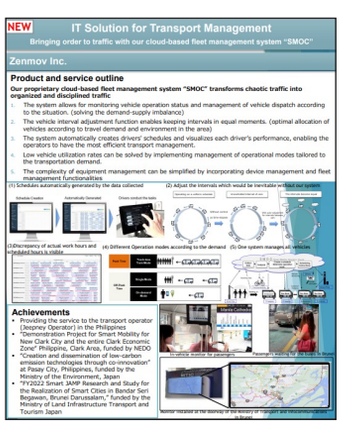
Business Catalog by Japanese Companies for Decarbonization Realization in Indonesia

JETRO Jakarta Office has published “Business Catalog by Japanese Companies for Decarbonization Realization in Indonesia”, introducing products and services developed by Japanese companies operating in Indonesia that can contribute to decarbonization.

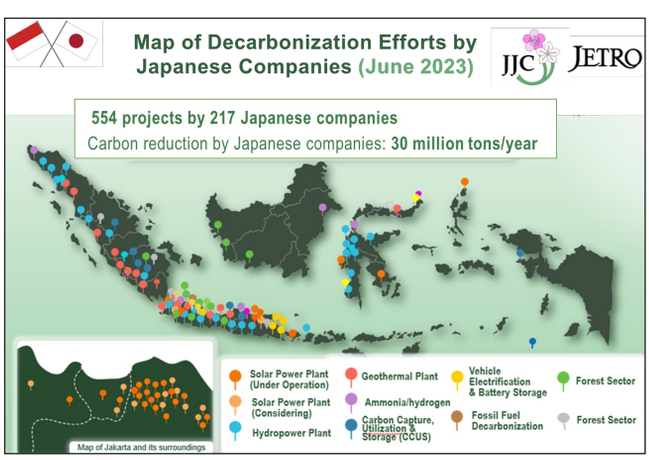
The catalog introduces products and services in various fields such as the introduction of renewable energy, energy conservation and digital technology.

Visualization of Japanese Contribution to decarbonization in Indonesia

JETRO Jakarta Office and Jakarta Japan Club publish a list of decarbonization projects carried out by Japanese companies. It is estimated that Japanese companies’ effort reduces 30 million tons carbon dioxide emission, which is equivalent to about 5% of Indonesia’s total CO_2 emission.



https://www.jetro.go.jp/newsletter/jkt/2022/231025_Business_Catalog_ver7_English.pdf



(Indonesian Version)

https://www.jetro.go.jp/newsletter/jkt/2022/EDISI%20KE%203%20LAPORAN%20DEKARBONISASI.pdf

JETRO Jakarta Office reported to the Indonesian government (Ministry of Energy and Mineral Resources, Coordinating Ministry for Economic Affairs, Coordination Ministry of Maritime and Investment, and Ministry of Industry). JETRO Jakarta Office has presented these results in around15 events and seminars by the Indonesian government, industry, and ASEAN related organizations.

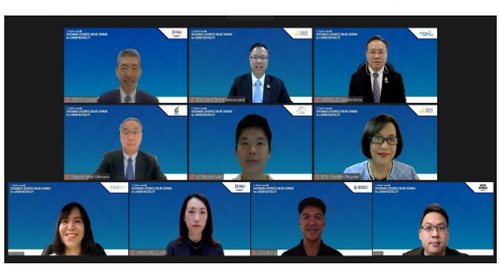
Contribution to Decarbonization in Thailand (JETRO)

JETRO

JETRO Bangkok Office is assisting Thai-Japan business collaboration for carbon neutrality with the following programs;

1. **The JAPAN Pavilion including 9 Japanese companies in "SETA 2022"** which is the Executive Asian Energy Leadership Forum in Sep. 2022.
2. Organizing the **"Thailand-Japan Sustainable Business Seminar and Business Matching for CN"** and issued **Business Catalog** by JETRO Webpage, co-hosted with EECO and BOI in Feb. and Nov. 2023.
3. **"International Energy AZEC workshop"**, organized with Ministry of Energy Thailand in Mar. 2023 to promote Thai-Japan business partnerships.

"Thailand-Japan Sustainable Business Seminar and Business Matching for Carbon Neutrality" and Business Catalog



Catalog link:
https://www.jetro.go.jp/ext_images/thailand/pdf/JETRO2022CNCatalogueENGFinal.pdf

SETA 2022

Exhibitor Directory:
https://www.jetro.go.jp/ext_images/thailand/pdf/seta2022exhibitordirectoryeng.pdf

International Energy AZEC Workshop

Flyer:
https://www.jetro.go.jp/ext_images/thailand/pdf/230308AZECFlyerENFinal.pdf

Supports in AZEC partners by JICA

As a climate change countermeasure, JICA is promoting the implementation of the Paris Agreement and co-benefits type climate change countermeasures. Over the past 50 years, the cumulative total of ODA loan to Southeast Asian countries in the AZEC region is **976 billion yen** (agreed amount) for **119 projects** (number of L/A).

THAILAND

- THE BAN CHAO NEN HYDROELECTRIC PROJECT
- UPPER QUAEYAI HYDRO POWER PROJECT
- NONG PLA LAI PROJECT
- BHUMIBOL HYDRO POWER PLANT REHABILITATION PROJECT
- THE SIRIKIT HYDROELECTRIC PROJECT UNIT 4
- LAM TA KHONG PUMPED STORAGE PROJECT
- INNOVATION ON PRODUCTION AND AUTOMOTIVE UTILIZATION OF BIOFUELS FROM NON-FOOD BIOMASS (SATREPS)

LAOS

- NAM NGUM HYDROPOWER PROJECT
- NAM LEUK HYDROPOWER PROJECT
- NAM NGUM 1 HYDROPOWERSTATION EXPANSION PROJECT
- MONSOON WIND POWER PROJECT
- PROJECT FOR INTEGRATED ENERGY MASTER PLAN TOWARDS SUSTAINABLE CARBON NEUTRAL SOCIETY
- PROJECT ON POWER SYSTEM MASTER PLAN
- THE STUDY ON POWER NETWORKS SYSTEM PLAN

PHILIPPINES

- THE ABULUG RIVER HYDROELECTRIC PROJECT
- TONGONAN GEOTHERMAL POWER PLANT CONSTRUCTION PROJECT
- SOUTHERN NEGROS GEOTHERMAL DEVELOPMENT PROJECT
- PALINPINON II GEOTHERMAL PROJECT
- TIWI GEOTHERMAL POWER PLANT COMPLEX REHABILITATION PROJECT
- MAK-BAN GEOTHERMAL POWER PLANT COMPLEX REHABILITATION PROJECT
- MT. LABO GEOTHERMAL PROJECT
- NORTHERN NEGROS GEOTHERMAL PROJECT
- CAPACITY DEVELOPMENT ON ENERGY POLICY AND PLANNING FOR A MORE EFFECTIVE AND COMPREHENSIVE PHILIPPINE ENERGY PLAN (PEP) FORMULATION
- SUSTAINABLE IMPROVEMENT OF RENEWABLE ENERGY DEVELOPMENT IN VILLAGE ELECTRIFICATION

MALAYSIA

- THE TEMENGOR HYDRO-ELECTRIC PROJECT
- TRENGGANU HYDRO-ELECTRIC PROJECT
- TENOM PANGI HYDRO-ELECTRIC PROJECT
- BERSIA HYDRO-ELECTRIC PROJECT
- KENERING HYDRO-ELECTRIC PROJECT
- BATANG AI HYDROELECTRIC PROJECT
- REHABILITATION OF THE TENOM PANGI HYDROPOWER PROJECT
- KENYIR HYDROELECTRIC POWER PLANT PROJECT II
- DEVELOPMENT OF ADVANCED HYBRID OCEAN THERMAL ENERGY CONVERSION (OTEC) TECHNOLOGY FOR LOW CARBON SOCIETY AND SUSTAINABLE ENERGY SYSTEM

CAMBODIA

- PHNOM PENH TRANSMISSION AND DISTRIBUTION EXPANSION PROJECT
- KAMPONG CHHNANG PROVINCE SOLAR POWER PROJECT
- PROJECT FOR DEVELOPMENT OF CLEAN ENERGY TRANSITION ROADMAP TOWARDS CARBON NEUTRAL SOCIETY
- PROJECT FOR IMPROVEMENT OF TRANSMISSION SYSTEM OPERATION AND MAINTENANCE

VIET NAM

- HAM TUAN - DA MI HYDROPOWER PROJECT
- DA NHIM POWER SYSTEM REHABILITATION PROJECT
- DAI NINH HYDROPOWER PROJECT
- THAC MO HYDROPOWER STATION EXTENSION PROJECT
- SUPPORT PROGRAM TO RESPOND TO CLIMATE CHANGE (I)~(VII)
- QUANG TRI PROVINCE ONSHORE WIND POWER PROJECT
- NINH THUAN PROVINCE ONSHORE WIND POWER PROJECT
- WASTE TO ENERGY AND WASTE TREATMENT PROJECT IN BINH DUONG PROVINCE
- SUSTAINABLE DEVELOPMENT OF RURAL AREA BY EFFECTIVE UTILIZATION OF BIO-WASTES WITH HIGHLY EFFICIENT FUEL CELL TECHNOLOGY(SATREPS)
- ESTABLISHMENT OF ENERGY MANAGEMENT TRAINING CENTER
- MASTER PLAN FOR ENERGY CONSERVATION IN THE POWER SECTOR
- THE STUDY ON NATIONAL ENERGY MASTER PLAN

INDONESIA

- THE KARANGKATES SECOND STAGE DEVELOPMENT PROJECT
- WLINGI MULTIPURPOSE PROJECT (DAM AND POWER STATION)
- WONOGIRI MULTIPURPOSE DAM PROJECT
- THE ASAHAN HYDROELECTRIC AND ALUMINUM PROJECT
- WONDGIRI HYDRO POWER PLANT PROJECT
- SAGULING HYDRO-ELECTLIC POWER PLANT PROJECT
- BAKARU HYDROELECTRIC POWER PLANT PROJECT
- RIAM KIWA HYDROELECTRIC POWER PLANT PROJECT
- KOTAPANJANG HYDROELECTRIC POWER & ASSOCIATED TRANS.LINE PRO
- BILI-BILI MULTI-PURPOSE DAM PROJECT
- RENUN H.E.P. & ASSOCIATED TRANSMISSION LINE PROJECT
- WONOREJO MULTIPURPOSE DAM CONSTRUCTION PROJECT
- PEUSANGAN 1 & 2 HYDROELECTRIC POWER PLANT PROJECT
- SIPANSIHAPORAS H.P.P. PROJECT
- MULTIPURPOSE DAM H.P.P. PROJECT
- UPPER CISOKAN PUMPED STORAGE HEPP (ES)
- LAHENDONG GEOTHERMAL POWER PLANT PROJECT
- ULUBELU GEOTHERMAL POWER PLANT PROJECT
- ASAHAN NO.3 HYDRO-ELECTRIC POWER PLANT CONSTRUCTION PROJECT
- CLIMATE CHANGE PROGRAM LOAN (I~III)
- LUMUT BALAI GEOTHERMAL POWER PLANT PROJECT
- HULULAIS GEOTHERMAL POWER PLANT PROJECT
- MASTERPLAN FOR ENERGY TRANSITION MANAGEMENT PROJECT
- TECHNOLOGY DEVELOPMENT OF STEAM-SPOT DETECTION AND SUSTAINABLE RESOURCE USE FOR LARGE ENHANCEMENT OF GEOTHERMAL POWER GENERATION
- CAPACITY DEVELOPMENT FOR ENHANCEMENT OF THE GEOTHERMAL DEVELOPMENT
- THE PROJECT FOR INTEGRATED SUSTAINABLE ENERGY AND FOOD PRODUCTION FROM MICROALGAE-BASED CARBON CAPTURE CAPTURE UTILIZATION (SATREPS)

ODA loans: black
Private Sector Investment Finance: blue
Technical Cooperation: green

On-going Supports in AZEC partners by JICA

Project	Support	Companies	Amount
Supporting a long-term energy transition roadmap and master plan to achieve a national carbon neutral society in Cambodia	Technical Cooperation	Ministry of Mines and Energy (MME), Cambodia Kyoto University, Nippon Koei, Chugoku Electric Power Co.	250 million yen
Supporting a long-term energy transition roadmap and master plan to achieve a national carbon neutral society in Indonesia	Technical Cooperation	PLN, Ministry of Energy and Mineral Resources (MEMR), Indonesia Japanese Partners (Procurement Stage)	250 million yen
The Project for Integrated sustainable energy and food production from microalgae-based carbon capture and utilization in Indonesia	Technical Cooperation	Padjadjaran University / Bandung Institute of Technology / Indonesia University of Education / Gadjah Mada University / National Research and Innovation Agency / Jawa Power / Awina Sinergi International	300 million yen
Indonesia: Peusangan Hydroelectric Power Plant Construction Project (Phase II)	ODA Loan	PT PLN	Commitment: 13.6 billion yen
Indonesia: Additional Loan for Asahan No.3 Hydroelectric Power Plant Construction Project	ODA Loan	PT PLN	Commitment: 13.4 billion yen Pledged, LA not yet
Supporting a long-term energy transition roadmap and master plan to achieve a national carbon neutral society in Laos	Technical Cooperation	Ministry of Energy and Mines (MEM), Laos Tokyo Electric Power Company (TEPCO), TEPSCO, Mitsubishi Research Institute, Pacific Consultants, etc.	280 million yen

On-going Supports in AZEC partners by JICA

Project	Support	Companies	Amount
Waste to Energy and Waste Treatment Project in Binh Duong Province	Private Sector Investment Finance	Viet Nam BIWASE	
Supporting construction and operation of an 88MW onshore wind farm in Ninh Thuan Province, South Viet Nam	Private Sector Investment Finance	BIM Energy Holding, (Viet Nam), ACEN (Philippines), Sumitomo Mitsui Banking Corporation, etc.	
Supporting construction and operation of a 600MW onshore wind farm in Sekong/Attapeu Province, Laos (cross-border electricity sales to Viet Nam)	Private Sector Investment Finance	Monsoon Wind Power Company, Mitsubishi Corporation, Sumitomo Mitsui Banking Corporation, etc.	

Supports in AZEC partners by JOGMEC

JOGMEC has supported cooperation and human resource development training programs for decarbonization and energy transition in Thailand, Indonesia, Viet Nam, Malaysia, the Philippines, and Australia.

Thailand
- LNG Value Chain Training Program (17)
- Energy Transition Training Program (3)

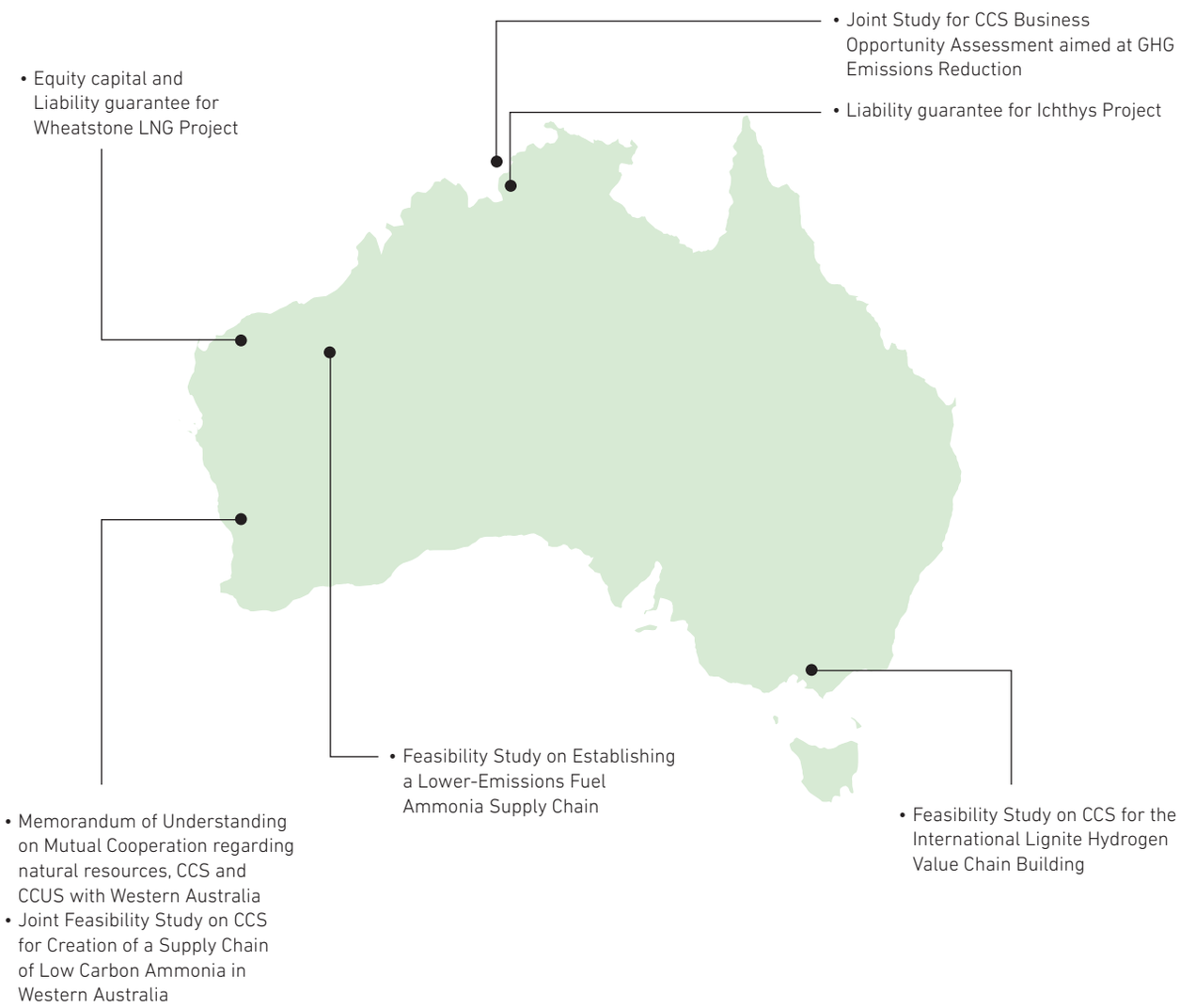
Viet Nam
- LNG Value Chain Training Program (21)
- LNG Tailor-Made Training Program (203)
- Energy Transition Training Program (3)
- CO_2-EOR Pilot Test in the Rang Dong oil field
- Joint Study on CCS

Philippines
- LNG Value Chain Training Program (16)
- LNG Tailor-Made Training Program (62)

Indonesia
- LNG Value Chain Training Program
- Zero Emission – EOR & Sustainability Training
- Energy Transition Training Program
- Joint Study on CO_2-EOR at the Sukowati oil field
- MoU for Energy Transition
- Equity capital and liability guarantee for Tangguh LNG Project
- Equity capital for Abadi LNG Project
- Joint Study for Clean Fuel Ammonia Production
- Joint Study on CO_2-EOR at the Jatibarang field

Malaysia
- LNG Value Chain Training Program (3)
- Joint Study on the Development of High CO_2 Gas
- MoC on Cross-border of CO_2 Transportation
- Joint Study on the Management of GHG emission including methane

Supports in AZEC partners by JOGMEC



Supports in AZEC partners by JOGMEC

JOGMEC

Energy Transition Training Program for countries in South-East Asia

- **Project outline (Purpose, Strengthen point, Schedule):** JOGMEC provides "Energy Transition Training Program" for participants from South-East Asia from February 27th 2023 to March 10th 2023.
- **Organization name, Partner organization name:** Relevant Ministries, Agencies and NOC in each country.
- **Country or Regions:** 12 participants from Indonesia, Malaysia, Thailand and Viet Nam
- **Funding organization, Contents, Terms**: Courses focusing on utilization of LNG, the need of energy transition are provided.

Lecture Scene

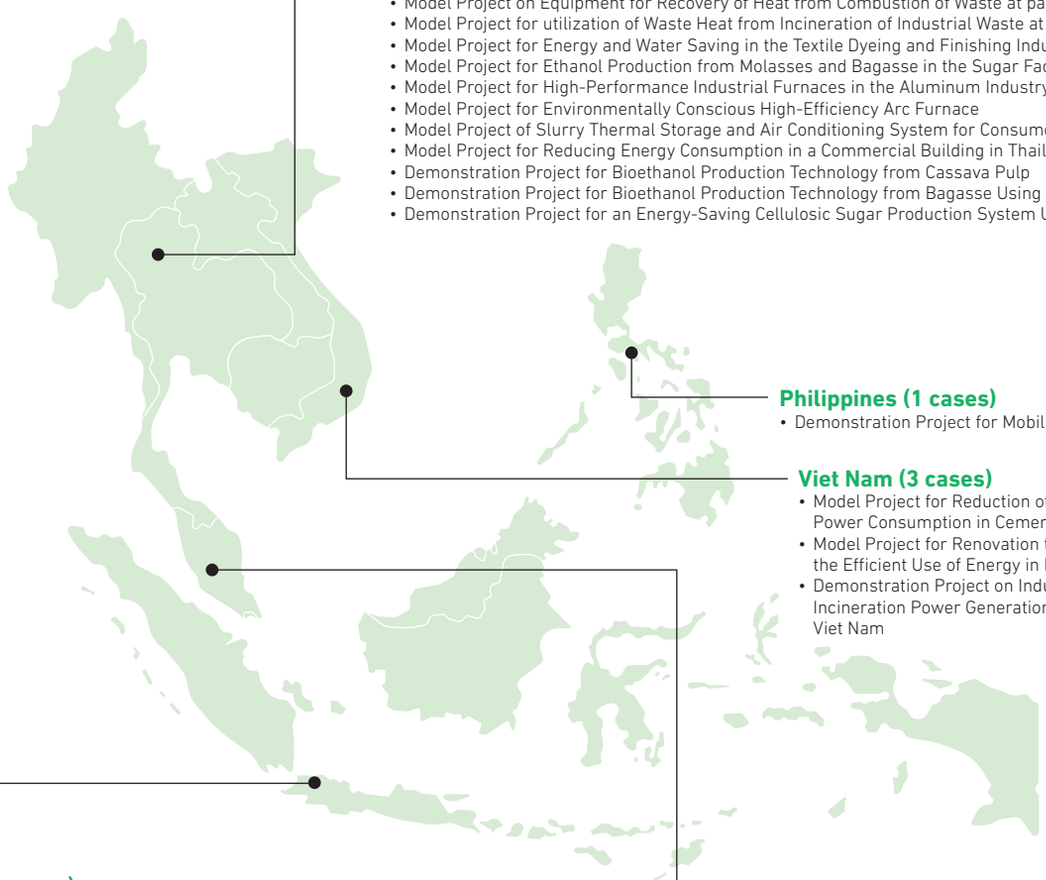
Group photo at the closing ceremony

LNG Value Chain Training Program for Asian countries

- **Project outline (Purpose, Strengthen point, Schedule):** JOGMEC provides "LNG Value Chain Training Program" for senior officials from Asian countries in October 2023. The program covers various aspects of LNG business, from LNG value chain business, technical aspects to site visits to LNG receiving terminals in Japan.
- **Organization name, Partner organization name:** Relevant Ministries, Agencies and NOC in each country.
- **Country or Regions:** Indonesia, Philippine, Thailand, Viet Nam and countries in South Asia.
- **Funding organization, Contents, Terms:** The program is expected to play a key role in promoting and deepening strong relationships between Japan and Asian countries and facilitate the further usage of LNG.

Supports in AZEC partners by NEDO

NEDO has supported the introduction of Japan's technology for decarbonization and energy transition in Thailand, Indonesia, Viet Nam, Malaysia, and the Philippines. The following **30 projects** have been implemented in the past.



Thailand (12 cases)
- Model Project for Effective Utilization of Energy
- Model Project on Equipment for Recovery of Heat from Combustion of Waste at paper and Pulp Mill
- Model Project for utilization of Waste Heat from Incineration of Industrial Waste at Industrial Estate
- Model Project for Energy and Water Saving in the Textile Dyeing and Finishing Industry
- Model Project for Ethanol Production from Molasses and Bagasse in the Sugar Factory
- Model Project for High-Performance Industrial Furnaces in the Aluminum Industry
- Model Project for Environmentally Conscious High-Efficiency Arc Furnace
- Model Project of Slurry Thermal Storage and Air Conditioning System for Consumer Office Building
- Model Project for Reducing Energy Consumption in a Commercial Building in Thailand
- Demonstration Project for Bioethanol Production Technology from Cassava Pulp
- Demonstration Project for Bioethanol Production Technology from Bagasse Using Enzymes
- Demonstration Project for an Energy-Saving Cellulosic Sugar Production System Using Bagasse

Philippines (1 cases)
- Demonstration Project for Mobility as a System

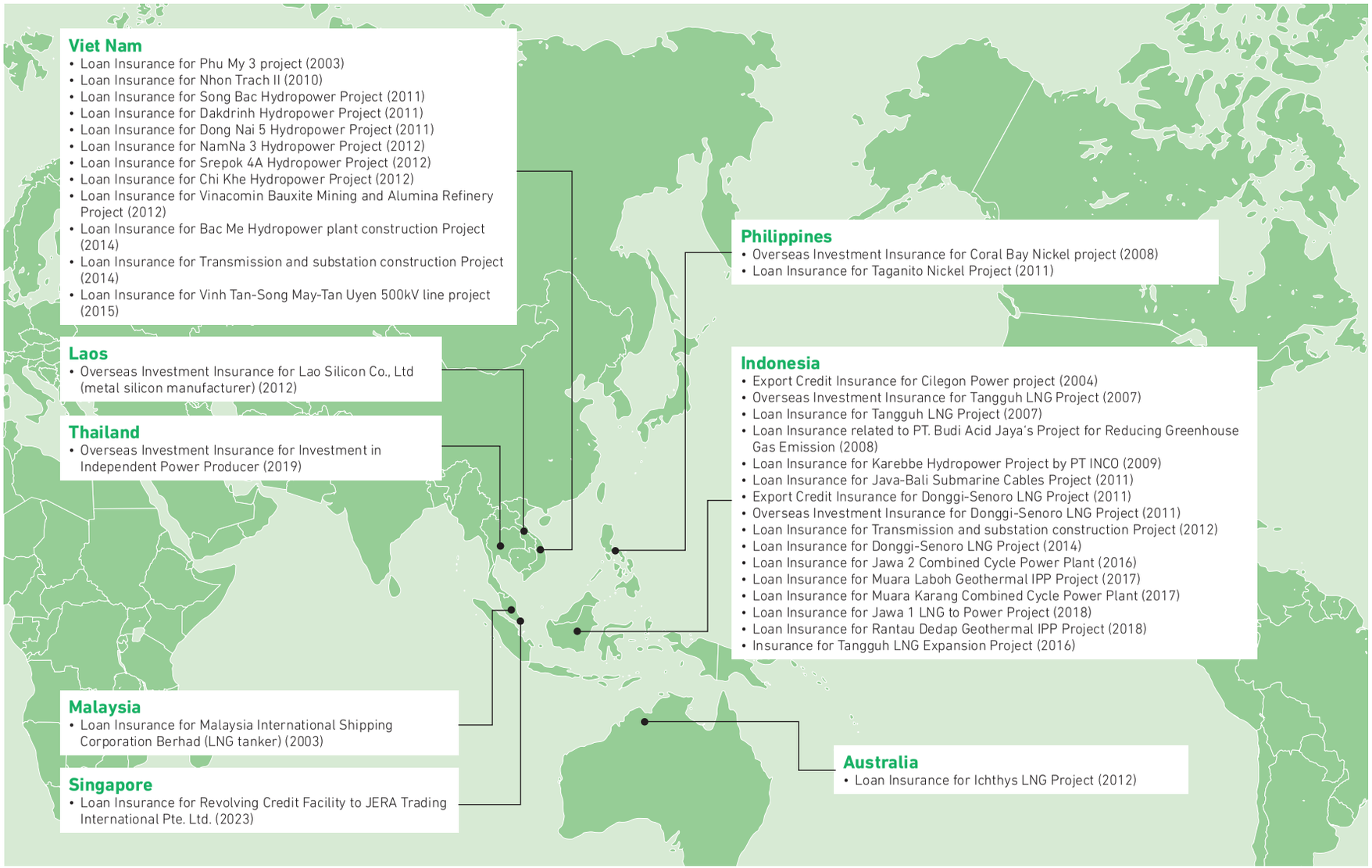
Viet Nam (3 cases)
- Model Project for Reduction of Electric Power Consumption in Cement Plant
- Model Project for Renovation to Increase the Efficient Use of Energy in Brewery
- Demonstration Project on Industrial Waste Incineration Power Generation System in Viet Nam

Indonesia (11 cases)
- Model Project for the Application of Pregrinder Technology
- Model Project for Utilization of Paper Sludge and Soiled Waste
- Model Project for Improvement of Boiler and Turbine Efficiency
- Model Project for Flare Gas and Hydrogen Recovery Systems in Oil Refinery
- Model Project for High Performance Industrial Furnace
- Model Project for Energy and Water Saving in the Textile Dyeing and Finishing Industry in Indonesia
- Model Project for Waste Heat Recovery Power Generation Technology in the Cement Industry
- Model Project for Ethanol Production from Molasses in a Sugar Factory
- Demonstration Project for Smart Communities in Industrial Parks
- Demonstration Project for the Spread of Compressed Natural Gas Vehicles and Refueling Infrastructure, Including Support for the Development of a Sustainable Environment
- Demonstration Project to Increase Energy Efficiency through Utilization of Electric Vehicle and Mobile Battery Sharing

Malaysia (3 cases)
- Model Project for Waste Treatment of Paper Sludge and Utilization of Waste Heat from Combustion of Paper Sludge
- Model Project for Alternative Fuel Combustion in the Cement Industry
- Demonstration Project for Introducing EV Buses with Fast-charging System

Supports in AZEC partners by NEXI

List of projects supported by NEXI in AZEC partner countries (FY2001-2023)



Viet Nam
- Loan Insurance for Phu My 3 project (2003)
- Loan Insurance for Nhon Trach II (2010)
- Loan Insurance for Song Bac Hydropower Project (2011)
- Loan Insurance for Dakdrinh Hydropower Project (2011)
- Loan Insurance for Dong Nai 5 Hydropower Project (2011)
- Loan Insurance for NamNa 3 Hydropower Project (2012)
- Loan Insurance for Srepok 4A Hydropower Project (2012)
- Loan Insurance for Chi Khe Hydropower Project (2012)
- Loan Insurance for Vinacomin Bauxite Mining and Alumina Refinery Project (2012)
- Loan Insurance for Bac Me Hydropower plant construction Project (2014)
- Loan Insurance for Transmission and substation construction Project (2014)
- Loan Insurance for Vinh Tan-Song May-Tan Uyen 500kV line project (2015)

Laos
- Overseas Investment Insurance for Lao Silicon Co., Ltd (metal silicon manufacturer) (2012)

Thailand
- Overseas Investment Insurance for Investment in Independent Power Producer (2019)

Malaysia
- Loan Insurance for Malaysia International Shipping Corporation Berhad (LNG tanker) (2003)

Singapore
- Loan Insurance for Revolving Credit Facility to JERA Trading International Pte. Ltd. (2023)

Philippines
- Overseas Investment Insurance for Coral Bay Nickel project (2008)
- Loan Insurance for Taganito Nickel Project (2011)

Indonesia
- Export Credit Insurance for Cilegon Power project (2004)
- Overseas Investment Insurance for Tangguh LNG Project (2007)
- Loan Insurance for Tangguh LNG Project (2007)
- Loan Insurance related to PT. Budi Acid Jaya's Project for Reducing Greenhouse Gas Emission (2008)
- Loan Insurance for Karebbe Hydropower Project by PT INCO (2009)
- Loan Insurance for Java-Bali Submarine Cables Project (2011)
- Export Credit Insurance for Donggi-Senoro LNG Project (2011)
- Overseas Investment Insurance for Donggi-Senoro LNG Project (2011)
- Loan Insurance for Transmission and substation construction Project (2012)
- Loan Insurance for Donggi-Senoro LNG Project (2014)
- Loan Insurance for Jawa 2 Combined Cycle Power Plant (2016)
- Loan Insurance for Muara Laboh Geothermal IPP Project (2017)
- Loan Insurance for Muara Karang Combined Cycle Power Plant (2017)
- Loan Insurance for Jawa 1 LNG to Power Project (2018)
- Loan Insurance for Rantau Dedap Geothermal IPP Project (2018)
- Insurance for Tangguh LNG Expansion Project (2016)

Australia
- Loan Insurance for Ichthys LNG Project (2012)

Supports in AZEC partners by NEXI

Project outline	Organizations	Amount	URL
Australia / Loan Insurance for Icthys LNG Project	INPEX, France / Total Energies SE, The Bank of Tokyo-Mitsubishi UFJ, Ltd., Sumitomo Mitsui Banking Corporation, Japan Bank for International Cooperation, and Export-Import Bank of Korea ("KEXIM")	Insurable Amount: USD2750 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/004619.html
NEXI signs MOU with Ministry of Mines and Energy (MME) of Cambodia	Ministry of Mines, Energy (MME) of Cambodia, NEXI	-	https://www.nexi.go.jp/en/topics/newsrelease/2023030201.html
Indonesia / Overseas Investment Insurance & Loan Insurance for Tangguh LNG Project	LNG Japan Corporation	Overseas Investment Insurance/ Insured Amount: JPY16.5 billion Loan Insurance/ Insured Amount: USD71.4 million (max)	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/en/topics/newsrelease/002306.html https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/en/topics/newsrelease/002157.html
Indonesia / Overseas Investment Insurance & Loan Insurance for Donggi-Senoro LNG Project	Mitsubishi Corporation, PT. PERTAMINA, PT. Medco, Sumitomo Mitsui Banking Corporation, The Bank of Tokyo Mitsubishi UFJ, Ltd. and Mizuho Bank, Ltd., Japan Bank for International Cooperation ("JBIC") and Export-Import Bank of Korea ("KEXIM")	Overseas Investment Insurance/ Insured Amount: USD1250 million Loan Insurance/ Insured Amount: USD382 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/003815.html https://www.nexi.go.jp/en/topics/newsrelease/005530.html
Indonesia / Loan Insurance for Jawa 2 Combined Cycle Power Plant	Indonesia / PT PLN(Persero), Japan Bank for International Cooperation (JBIC), Bank of Tokyo-Mitsubishi UFJ (BTMU) as Agent, Mizuho Bank (Mizuho), Australia and New Zealand Banking Group (ANZ)	Insured Amount: JPY 12.7 billion + USD 18 million	https://www.nexi.go.jp/en/topics/newsrelease/2023071101.html

Supports in AZEC partners by NEXI

Project outline	Organizations	Amount	URL
Indonesia / Loan Insurance for Muara Laboh Geothermal IPP Project	Sumitomo Corporation, Belgium / Electrabel S.A., Indnesia / PT. Supreme Energy, Japan Bank for International Cooperation (JBIC), the Asian Development Bank (ADB), Mizuho Bank, Ltd., the Bank of Tokyo-Mitsubishi UFJ, Ltd. and Sumitomo Mitsui Banking Corporation	Insurable Value: Equivalent to USD 132 million	https://www.nexi.go.jp/en/topics/newsrelease/2017012402.html
Indonesia / Loan Insurance for Muara Karang Combined Cycle Power Plant	Indonesia / PT PLN (Persero), Mitsubishi Corporation, Indonesia / Wijaya Karya, Mitsubishi Hitachi Power Systems, Mitsubishi Electric, Japan Bank for International Cooperation (JBIC), The Bank of Tokyo-Mitsubishi UFJ (BTMU) as Agent, Mizuho Bank (Mizuho), Australia and New Zealand Banking Group (ANZ)	Insured Amount: Equivalent to JPY6.2 billion + USD14.9 million	https://www.nexi.go.jp/en/topics/newsrelease/2017030704.html
Indonesia / Loan Insurance for Rantau Dedap Geothermal IPP Project	Marubeni Corporation, Tohoku Electric Power Co., Inc. France / ENGIE S.A., Indonesia / PT. Supreme Energy, International Cooperation (JBIC), the Asian Development Bank (ADB), Mizuho Bank, Ltd. (lead arranger), Sumitomo Mitsui Banking Corporation, and the Bank of Tokyo-Mitsubishi UFJ, Ltd.	Insurable Value: USD 126 million	https://www.nexi.go.jp/en/topics/newsrelease/2018032601.html
Indonesia / Loan Insurance for Jawa 1 LNG to Power Project	Marubeni Corporation, Sojitz Corporation, Indonesia / PT Pertamina (Persero), Mitsui O.S.K. Lines, Ltd., Japan Bank for International Cooperation (JBIC); Mizuho Bank, Ltd.; MUFG Bank, Ltd.; Oversea-Chinese Banking Corporation Ltd.; Crédit Agricole Corporate and Investment Bank, Tokyo Branch; and Société Générale Tokyo Branch	Insurance Value: USD 403 million in total	https://www.nexi.go.jp/en/topics/newsrelease/2018101501.html

Supports in AZEC partners by NEXI

Project outline	Organizations	Amount	URL
Indonesia / Loan Insurance for Tangguh LNG Expansion Project	LNG Japan Corporation	-	https://www.nexi.go.jp/en/topics/newsrelease/2016111401.html
NEXI signs Amendment of the MOU with PT PLN (Persero)	Indonesia / PT PLN (Persero), NEXI	-	https://www.nexi.go.jp/en/topics/newsrelease/2023030101.html
Singapore / Loan Insurance for Revolving Credit Facility to JERA Trading International Pte. Ltd.	JERA, JERA Trading International Pte. Ltd. (JERATI) and Sumitomo Mitsui Banking Corporation	-	https://www.nexi.go.jp/en/topics/newsrelease/2023071101.html
Viet Nam / Loan Insurance for Phu My3 BOT Power Project	Kyusyu Electric power Company, Sojitz Corporation, England / BP Holdings N.V., and Singapore / Sembcorp Utilities Ltd.	Insured Value: Principal 95 million + premium	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/001324.html
Viet Nam / Loan Insurance for Song Bac Hydropower plant construction Project	Viet Nam / Song Bac Hydropower Joint Stock Company, and Sumitomo Mitsui Banking Corporation	Insurable Amount: USD 50 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/001533.html
Viet Nam / Loan Insurance for Dong Nai 5 Hydropower plant construction Project	Viet Nam / Vinacomin, Viet Nam / Vinacomin Power, Sumitomo Mitsui Banking Corporation, Australia and New Zealand Banking Group (ANZ)	Insurable Amount: USD 200 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/004062.html
Viet Nam / Loan Insurance for Srepok4A Hydropower plant construction Project	Viet Nam / Buon Don Hydropower Joint Stock Company, and Sumitomo Mitsui Banking Corporation	Insurable Amount: USD 64.2 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/004266.html
Viet Nam / Loan Insurance for Vinacomin Bauxite Mining and Alumina Refinery Project	Viet Nam / Vinacomin, Citibank Japan Ltd., Mizuho Corporate Bank, Ltd., Sumitomo Mitsui Trust Bank, Ltd., and The Bank of Tokyo-Mitsubishi UFJ, Ltd.	Insurable Amount: USD 300 million	https://warp.ndl.go.jp/collections/info:ndljppid/11274643/www.nexi.go.jp/en/topics/newsrelease/004541.html

Supports in AZEC partners by NEXI

Project outline	Organizations	Amount	URL
Viet Nam / Loan Insurance for Bac Me Hydropower plant construction Project	Viet Nam / Vietracimex, Sumitomo Mitsui Banking Corporation, The Gunma Bank Ltd., The Chugoku Bank., Ltd., and The Bank of Yokohama, Ltd.	Insurable Amount: USD 55.4 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/en/topics/newsrelease/005245.html
Viet Nam / Loan Insurance for Transmission and substation construction Project	Viet Nam / National Power Transmission Corporation, Citibank Japan Ltd., Sumitomo Mitsui Trust Bank Ltd.., The Shizuoka Bank., Ltd. , The Tokyo Star Bank, Ltd., The Bank of Fukuoka, The Gunma Bank Ltd. and The Chiba Bank, Ltd.	Insurable Amount: Aggregate to USD255 million	https://www.nexi.go.jp/en/topics/newsrelease/005243.html
Viet Nam / Loan Insurance for Chi Khe Hydropower plant construction Project	Viet Nam / Agrita-Nghe Tinh Energy Joint Stock Company, and Sumitomo Mitsui Banking Corporation	Insured Value: USED 52.5 million	https://warp.da.ndl.go.jp/info:ndljp/pid/11274643/www.nexi.go.jp/topics/newsrelease/004539.html

Progress of AZEC Projects

- **Projects supported by the Government of Japan (GoJ)**
  - Transitions in Power sector
  - Transitions in Industry/Transport sector
- **Projects related to MOUs in March 2023**

05

Progress of AZEC Projects

Projects supported by the Government of Japan (GoJ) and those covered by MOUs in March 2023

There are lots of projects in AZEC partners pursuing energy transitions. Those are related to electricity transition, energy transitions in industry/transport sector, low-carbon fuels and development of energy transition environment.

More than 220 projects supported by the Japanese government are listed. Among those, **around 60 projects** are presented on a single page per project.

Projects related to **28 MOUs** signed on the occasion of the AZEC Ministerial Meeting are also presented as of March, with a colored square on a slide showing the progress, if any, since March.

- **Transitions in Power sector**
  Renewables/Gas, Coal, Hydrogen, Ammonia power plants/Clean energy system/Energy Storage

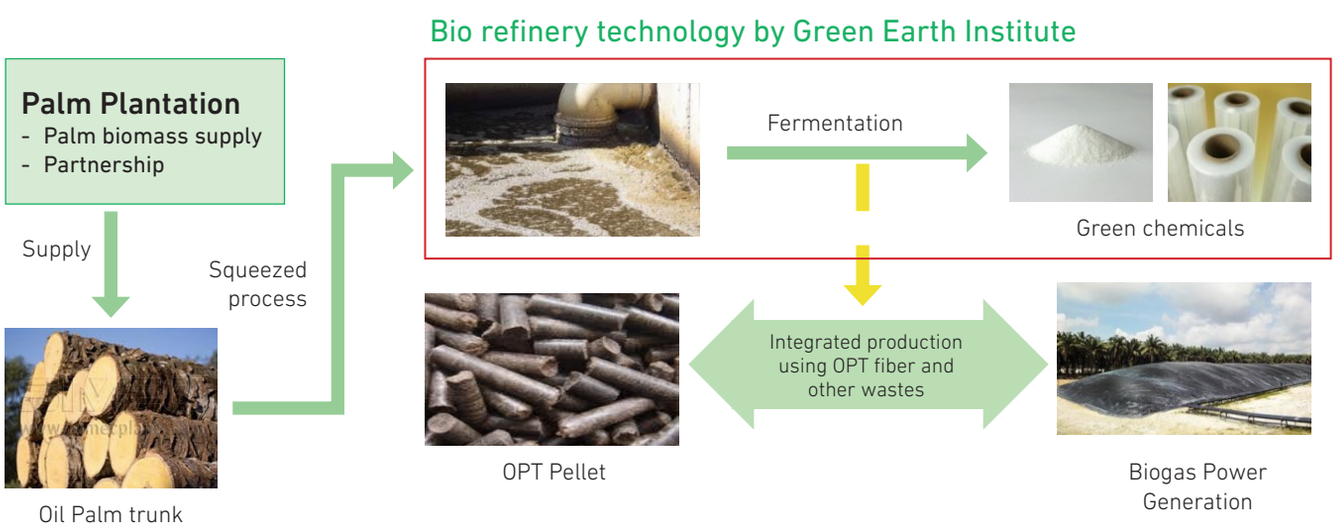
- **Transitions in Industry/Transport sector**
  Low-carbon fuels/Green hydrogen, Green Ammonia/ Biofuels/ SAF value chain/CCS/CCUS/ Carbon recycling technologies/ Bio-methene/ Optimization of LNG procurement/ Visualization technologies for GHG emissions/ Carbon credit trading service

Projects supported by the Government of Japan (GoJ)

Transitions in Power sector

Effective Utilization of Oil Palm Trunks Project

- **Project Outline:** Palm oil is the most widely used vegetable oil in the world, with the demand increasing every year. A large amount of oil palm tree waste (OPT) has been generated in the plantation through the replanting of palm tree to keep the yield of the fruits. This initiative aims building up the integrated business model with both OPT pellets production and green chemical production from the OPT squeezed juice.
- **Funding organization, Contents, Terms:** "Feasibility Study Project for Overseas Deployment of High Quality Energy Infrastructure" by Ministry of Economy, Trade and Industry
- **URL:** https://gei.co.jp/en/



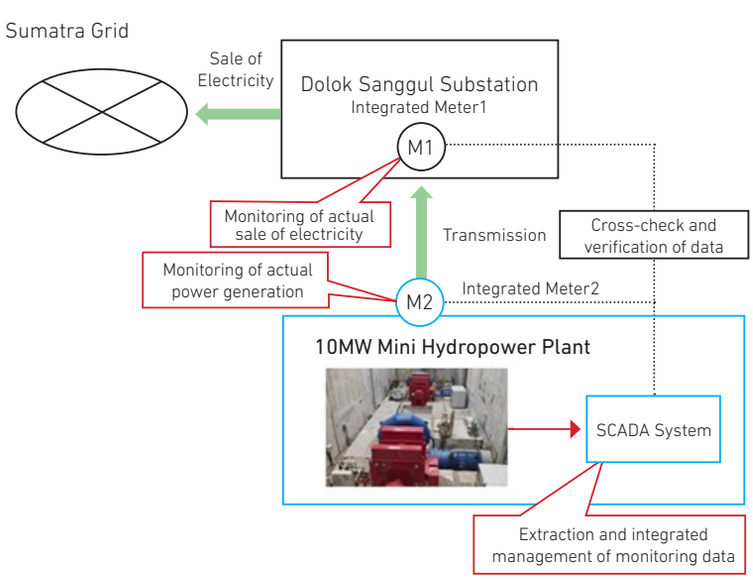
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

10MW Mini Hydro Power Plant Project in North Sumatra

TOYO ENERGY FARM CO.,LTD.

- **Project Outline:** A mini hydro power plant has been constructed in Humbang Hasunduran District of North Sumatra with a capacity of 10MW (5MW * 2). The electricity generated by the plant is supplied to a power company, resulting in GHG emission reductions by replacing grid electricity (Expected GHG Emission Reductions: 32,807 tCO_2/year).
- **Organization name, Partner organization name:** (Japan) Toyo Energy Farm Co., Ltd., (Indonesia) PT. Citra Multi Energi
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2016)
- **URL:** http://gec.jp/jcm/projects/16pro_ina_01/

Sites of JCM Model Project



Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

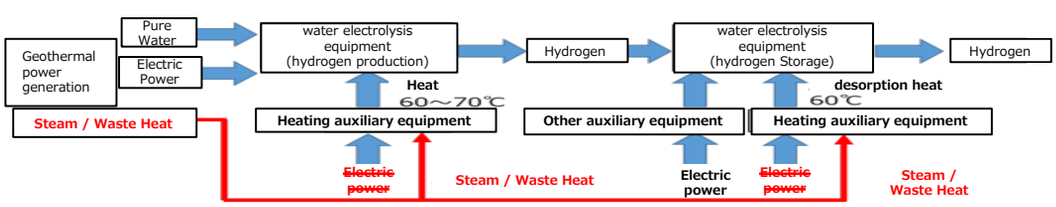
Demonstration of hydrogen technology that utilizes surplus electricity and exhaust heat from geothermal power generation to achieve economically viable hydrogen production and transportation

TEPCO
YHC

- **Project Outline:** To demonstrate efficient hydrogen production technology that utilizes surplus electricity from geothermal power generation, geothermal steam, and waste heat, and establish a viable green hydrogen production and transportation method in Indonesia with high geothermal potential.
- **Organization name, Partner organization name:** Tokyo Electric Power Company Holdings, Inc. / Yamanashi Hydrogen Company / Pertamina Power Indonesia
- **Regions:** Sulawesi Is. Lahendong
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Feasibility Study) / Sept. 2023~Sept. 2024
- **URL:** https://www.tepco.co.jp/press/release/2023/1666102_8713.html

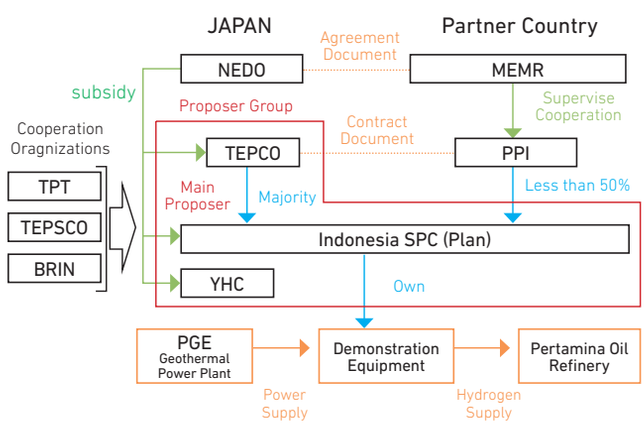
Project outline

- Verification of hydrogen production technology that can handle fluctuating surplus electricity from geothermal power generation
- Verification of technology to reduce energy consumption by using steam and waste heat generated by geothermal power generation



- Greenhouse gas reduction effect
  1. Demonstration (use Refinery): 900(t-CO_2/y) (←H 100Nm3/h)
     (Hydrogen production by reforming natural gas CO_2 emission: 1.03kg-CO_2/Nm3-H_2)
  2. Ammonia mixed combustion 20%: 980,000 (t-CO_2/y)

Project scheme

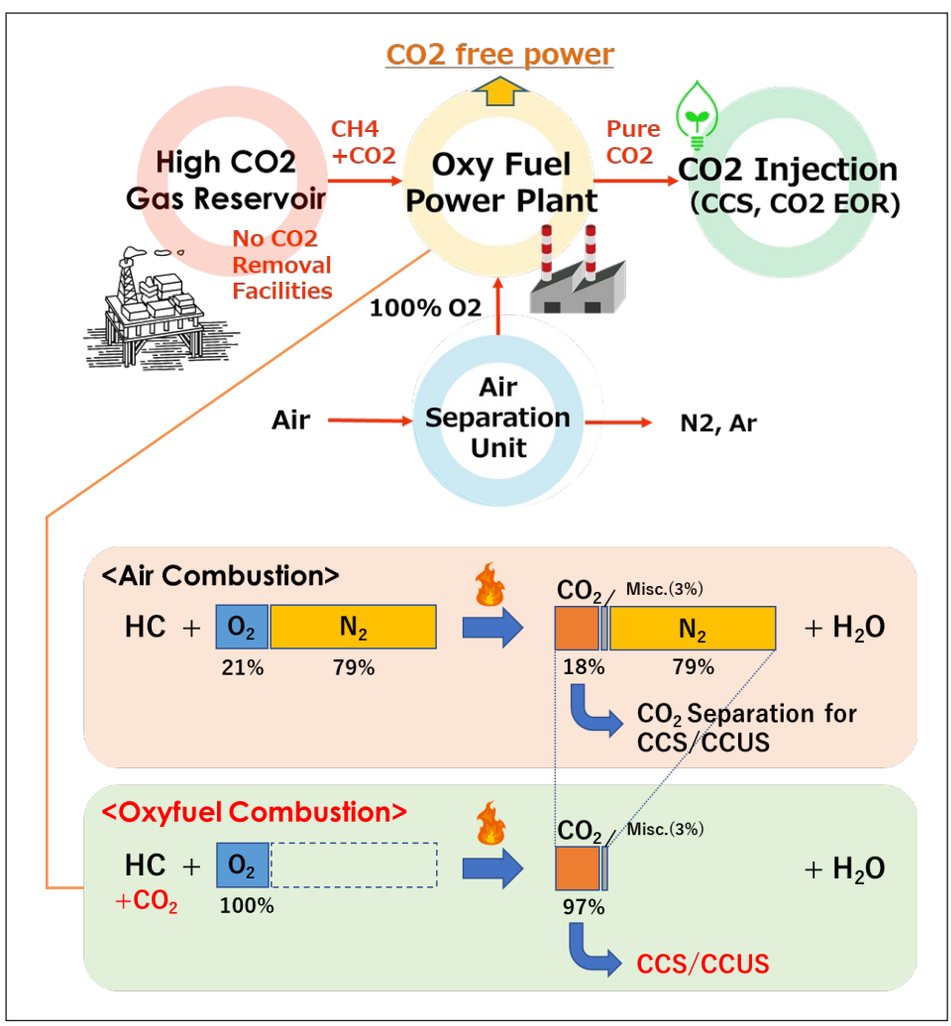


Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Blue Gas to Power using Oxyfuel Technology

MOECO

- **Project outline:** This new Blue Gas to Power concept will develop CO_2-rich gas fields into CO_2 free electricity using oxyfuel power generation technology and CCS, making a significant contribution to GHG emission reduction and energy transition while utilizing the remaining gas resources in SE Asia.
- **Organization name:** Mitsui Oil Exploration Co., Ltd. (MOECO)
- **Funding organization, Contents, Terms:** METI Subsidy program (2023)
- **URL:** https://www.moeco.com/en/news/2023/03/feasibility-study-for-blue-gas-to-power-concept-utilizing-oxyfuel-power-generation.html

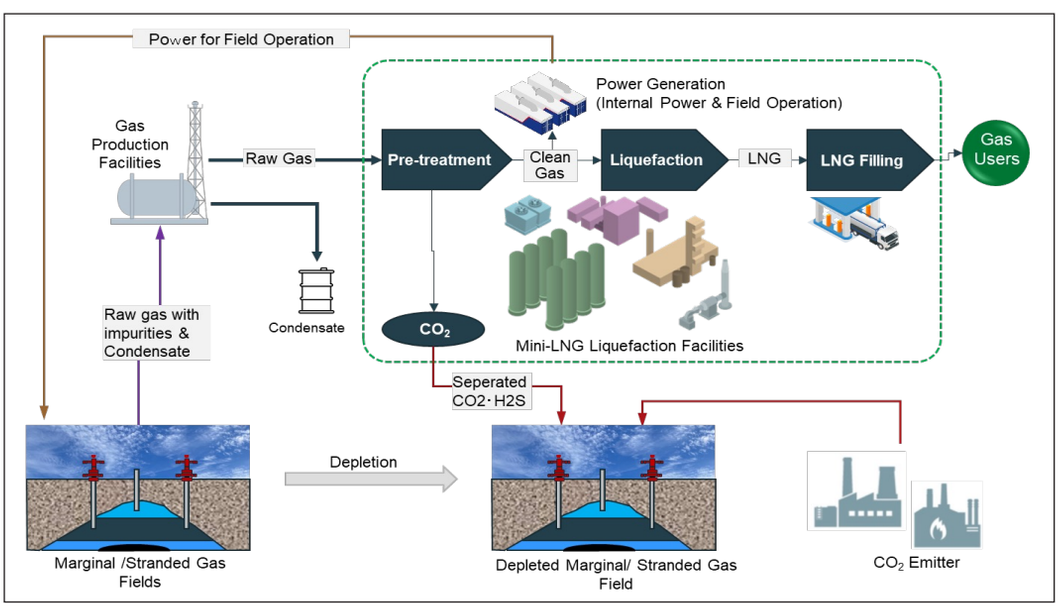


Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Feasibility Study on Monetization of Stranded Gas Fields, using Portable Mini-LNG Liquefaction Equipment and Conversion to CO_2 Storage After Depletion

- **Project outline:** Supporting diesel-to-gas conversion policy, this Feasibility Study conducts mapping of stranded gas fields, demand survey and business modeling including partnering with local gas field owner.
- **Organization Name:** KRC, Maxeed, MHI, PT.AMO, Bandung Institute of Technology
- **Funding organization:** METI 2023 Study on Business Opportunity of High-quality Energy Infrastructure to Overseas (Aug.2023 ~ Feb.2024)

Business Scheme Image



Expected Implementation Schedule

Aug. 2024	: mini-LNG pilot project agreement (FID)
Jan. 2027	: mini-LNG pilot project COD
Jul. 2027	: mini-LNG project expansion agreement (FID)
Jul. 2027	: pre-agreement on CO_2 storage service upon pilot project field depletion.*
Jul. 2030	: mini-LNG expansion COD
Dec. 2032	: CO_2 storage service COD

*CO_2 storage business implementation schedule will be reviewed based on law & regulation readiness.

Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

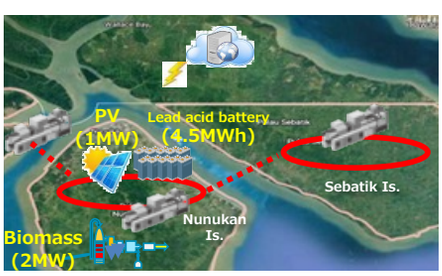
Demonstration and research on hybrid power generation for microgrids based on "EMS" technology to realize 100% renewable energy supply

Make Next. 九電工

- **Project outline:** To stabilize the local power grid and increase the ratio of renewable energy power generation through coordinated control of renewable energy and existing internal combustion power generation on a remote island with a population of tens of thousands of people located in the Malaysian border area of North Kalimantan.
- **Organization name, Partner organization name:** Kyudenko Corporation
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / June. 2023~Mar. 2024
- **URL:** https://www.kyudenko.co.jp/en/

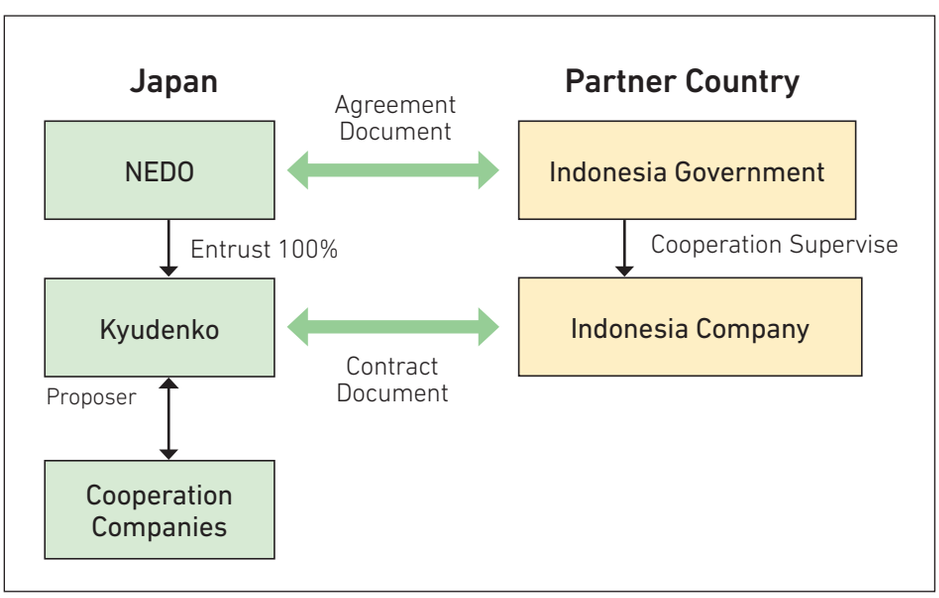
Project outline

- By using an in-house developed energy management system for renewable energy generation and large-scale storage batteries, combine biomass power generation and solar power generation using locally produced and locally consumed raw materials to provide stable power transmission to the local grid 24 hours a day.
- In the future, expand the scale for commercialization and achieve 100% renewable energy ratio.
- Stabilizing the grid through hybrid power generation on a remote island with a population of tens of thousands of people is unprecedented. Demonstration to be done with the cooperation of the partner country's government.



Conceptual Chart

Project scheme



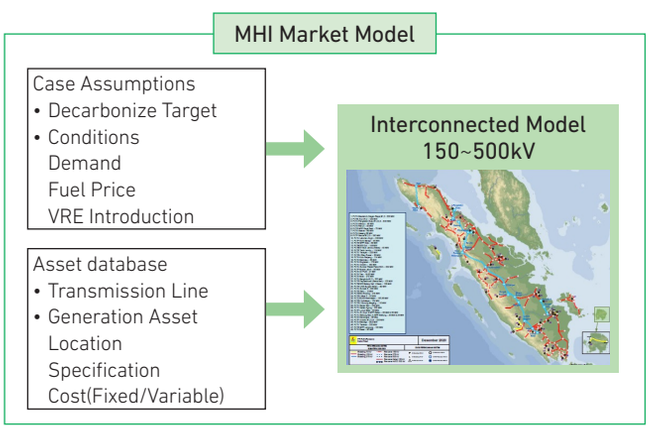
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

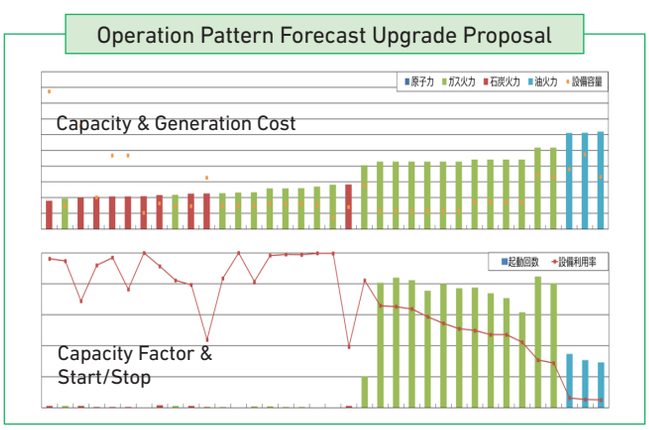

Feasibility study of power planning and operation optimization proposal service

MITSUBISHI HEAVY INDUSTRIES

- **Project outline:** In order to contribute to the achievement of the decarbonization goal, the feasibility of a power supply planning and operation optimization proposal service for Indonesia and other target countries utilizing power market simulation technology and knowledge will be investigated.
- **Organization name:** Mitsubishi Heavy Industries, Ltd (Associated with Institute of Technology in Bandung for Indonesia)
- **Funding organization:** 2023 METI Feasibility Study Projects for Overseas Deployment of High Quality Infrastructure
- **URL:** https://www.meti.go.jp/information/publicoffer/saitaku/2023/s230802001.html

Overview of activities





Schedule

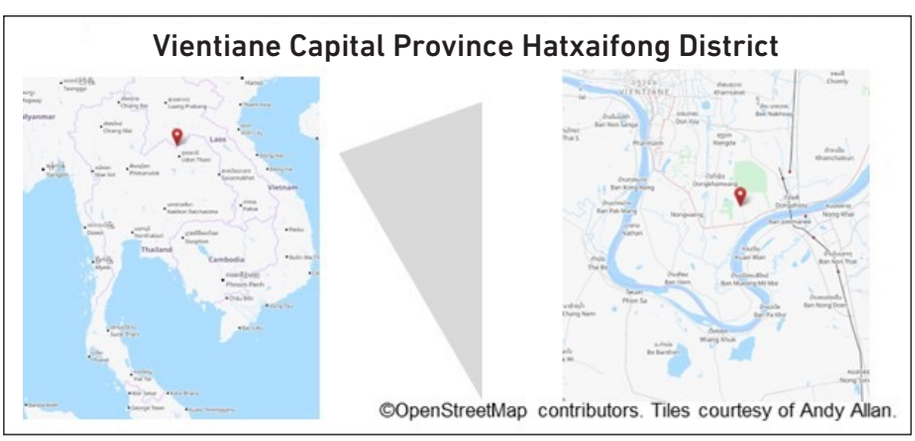
Implementation Items	September	October	November	December	January	February
1.Implementation item a Future power supply configuration and decarbonization strategy for achieving decarbonization targets						
a-1. ITB Consultation and Hearing						
a-2. Analysis, Evaluation and Decarbonization Strategy Planning						
a-3. ITB Consultation						
a-4. Hearing						
2.Implementation item b. Consideration of utilization policy of existing thermal power generation facilities						
b-1. Proposed target countries and remodeling services						
b-2. Analysis and Evaluation						
b-3 Hearing #1						
b-4. Analysis and Evaluation						
b-5. Hearing #2						
2.Implementation item c Consideration of utilization policy of existing thermal power generation facilities						
c-1. project formulation						
c-2. Analysis and Evaluation						
c-3. Hearing #1						
c-4. Analysis and Evaluation						
c-5. Hearing #2						

Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

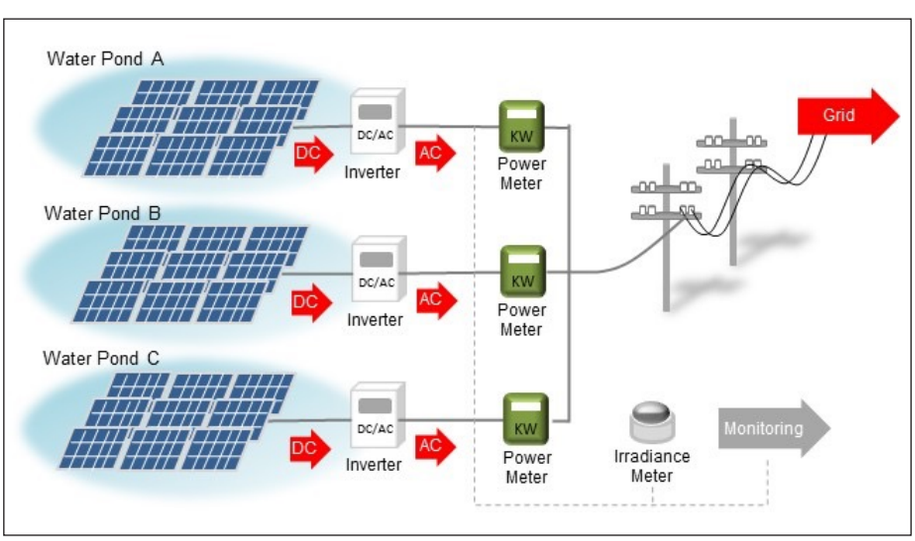
Introduction of 14MW floating solar power system in Vientiane

TSB

- **Project outline:** This project will install 14MW floating solar power system on three un-used water ponds in Vientiane. Lower temperature on water ponds enables more efficient power generation than on land. Electricity generated by solar system replaces grid electricity to reduce GHG emission (Expected GHG Emission Reductions: 6,838 tCO_2/year).
- **Organization name, Partner organization name in AZEC countries:** (Japan) TSB Co., Ltd (Lao PDR) TPG Lao Co., Ltd
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2017)
- **URL:** https://gec.jp/jcm/projects/17pro_lao_01/



Sites of JCM Model Project

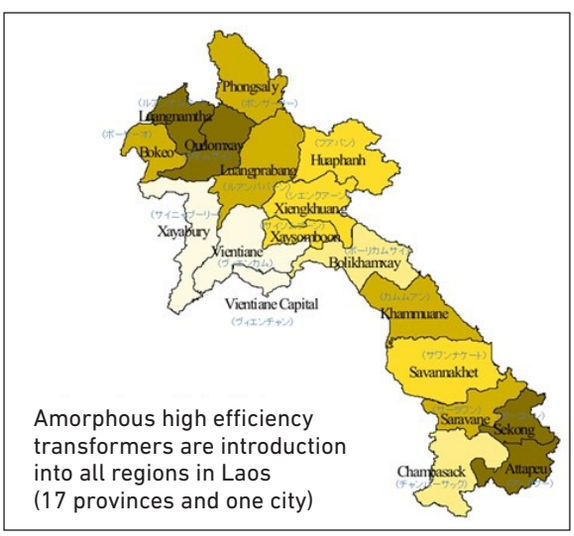


Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

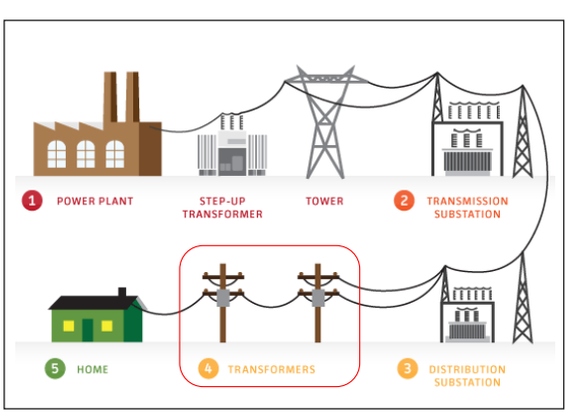
Introduction of Amorphous High Efficiency Transformers in Power Grid

Yuko-Keiso

- **Project outline:** The purpose of this project is to reduce CO_2 emission through the introduction of amorphous high efficiency transformers instead of transformers with silicon steel core in power grid. 1,307 transformers in total are introduced to Electricite Du Laos (Expected GHG Emission Reductions: 2,109 tCO_2/year).
- **Organization name, Partner organization name in AZEC countries:** (Japan) Yuko Keiso Co., Ltd., (Lao PDR) Electricite Du Laos
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2017)
- **URL:** https://gec.jp/jcm/projects/17pro_lao_02/



Sites of JCM Model Project



"④ TRANSFORMERS" in the above are the subjects of the project.

Amorphous High Efficiency Transformer

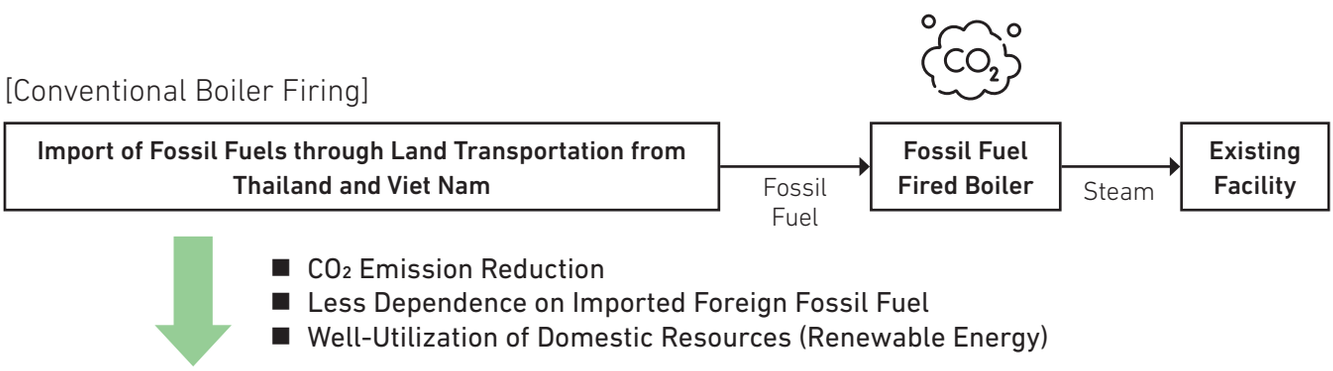
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

JCM feasibility study on decarbonization of steam by systemization of hydrogen generators and hydrogen boilers

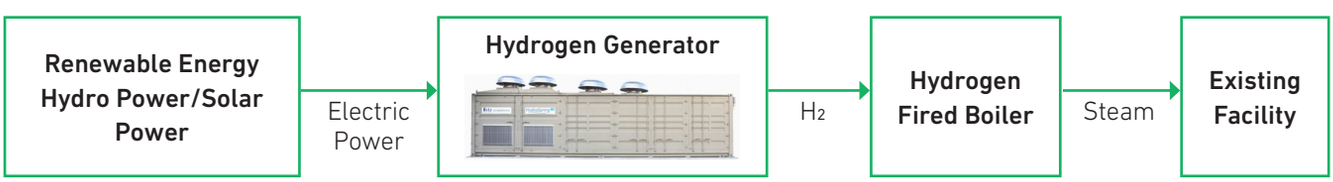
Hitz

- **Project outline:** We are conducting a JCM feasibility study using integrated systems of hydrogen generators and hydrogen boilers to reduce CO_2 emissions and achieve less dependence on imported fossil fuels, and utilize surplus renewable electricity.
- **Funding organization, Contents, Terms:** JCM Feasibility Study by METI, FY2023
- **URL:** https://www.meti.go.jp/information/publicoffer/kobo/2023/k230424002.html

[Conventional Boiler Firing]



[Hydrogen Fired Boiler]



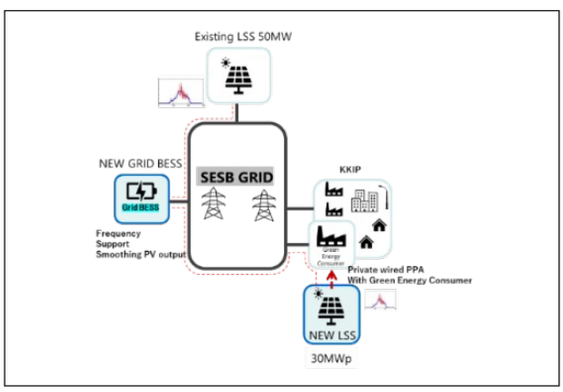
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Demonstration Project on the Smart Energy Technology to Realize Green Energy Supply

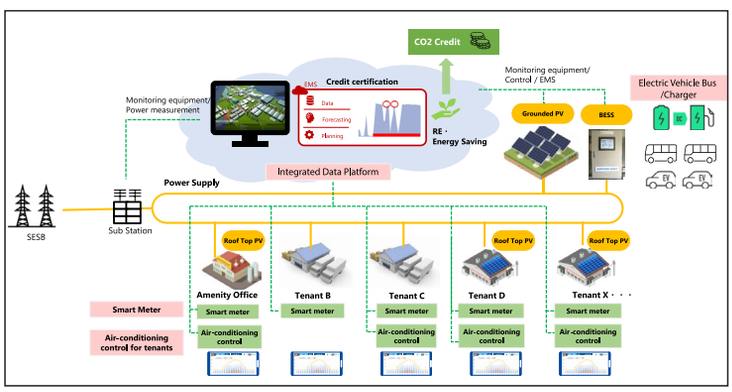
- **Project outline (Purpose, Strengthen point,Schedule):** This project aims to demonstrate the grid Battery Energy Storage System (BESS) + Large Scale Solar generation project (LSS), and the introduction of green power supply and the smart Energy Management System (EMS) in Kota Kinabalu Industrial Park (KKIP), in Sabah State.
- **Organization name, Partner organization name:** Nippon Koei Energy Solutions Co., Ltd., Nippon Koei Co., Ltd. ,iFORCOM Co.,Ltd.
- **Regions:** Sabah
- **Funding organization, Contents, Terms:** NEDO/International Demonstration Project for Japanese Technologies Contributing to Decarbonization and Energy Transition (Basic study: Dec. 2022~Sep. 2023)
- **URL:** https://www.n-koei.co.jp/energy/english/
  https://www.n-koei.co.jp/consulting/english/
  https://www.iforcom.jp/english/

Project Outline

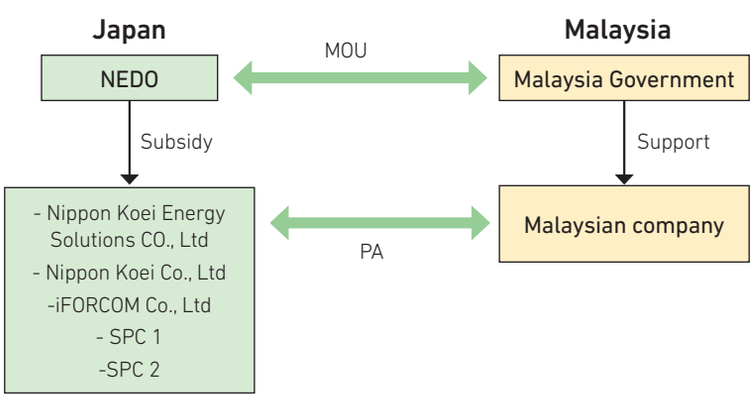
Business component (1) LSS + BESS



Business component (2) Green power supply and EMS in KKIP



Project scheme



Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

FS for Redevelopment of Power Plant with H_2 Ready System

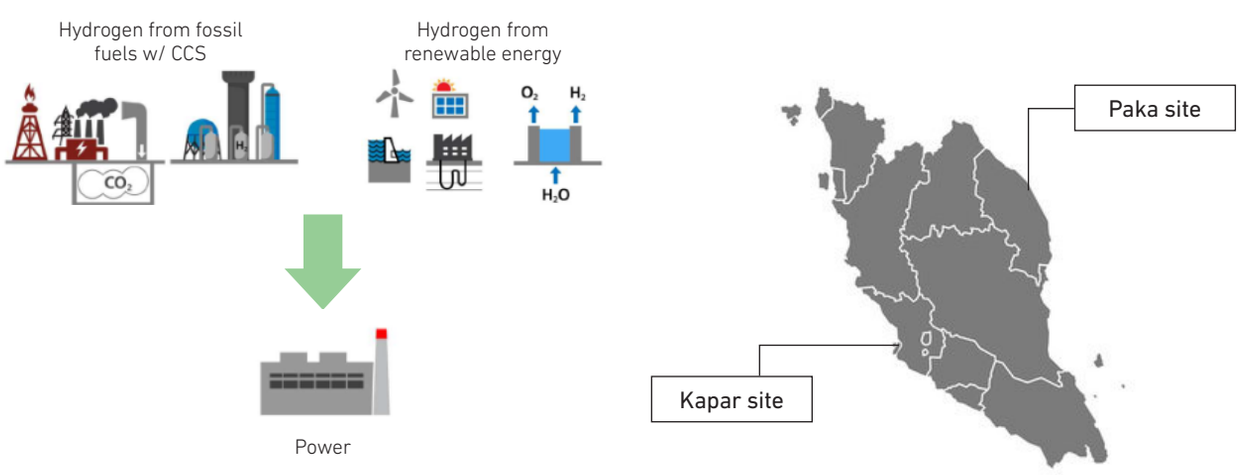
- **Project outline:** Study the development plan of gas turbine combined cycle plant with the future option of H_2 application as carbon neutral fuel including import facility and supply chain information.
- **Organization name:** PACIFIC CONSULTANTS CO., LTD./ TOKYO ELECTRIC POWER SERVICES CO., LTD.
- **Country or Regions:** Kapar site and Paka site
- **Funding organization, Contents, Terms:** Cooperation with TNB Genco (Plant Owner) from 2021.

<FS Item>

√ H_2 supply chain study (literature and hearing)
√ H_2 application study onto Peninsular power development plan (cost, H_2 import volume, CO_2 reduction impact)
√ H_2 & NH_3 safety and environmental consideration
√ Hearing to Malaysian Authorities about H_2-ready development

	2023	2024	2025	2026	2027	2028	2029	2030	2031
1. METI FS									
2. FEED, Basic Design, Detail Design, Fuel Supply Agreement									
3. ESIA									
4. EPC Selection									
5. Construction									
6. Commencement of Commercial Operation									

Paka Site
Kapar Site

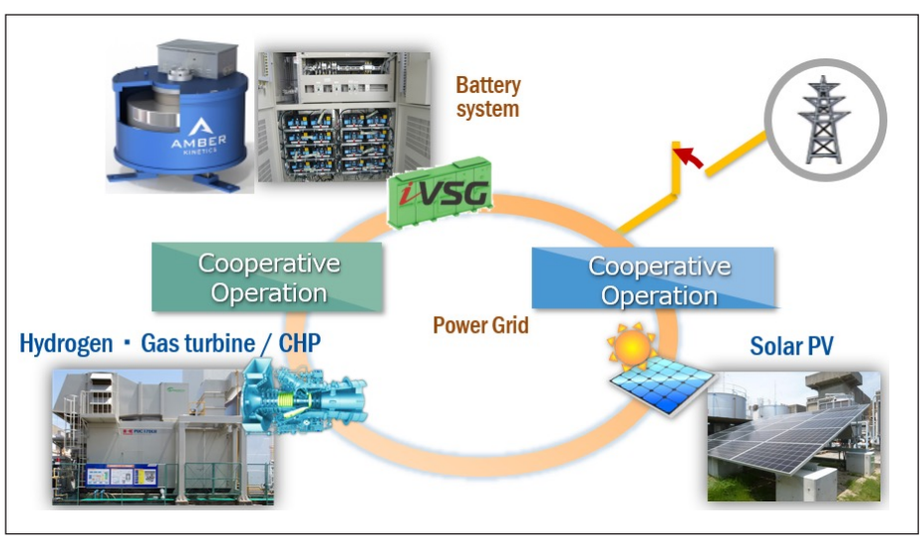


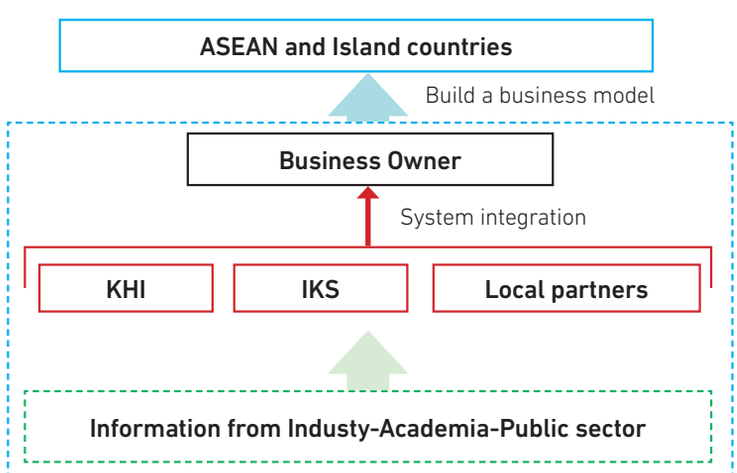
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector


Virtual Synchronous Generator Control (VSG) Study Project

Kawasaki Powering your potential IKS

- **Project outline (Purpose, Strengthen point, Schedule):** Low inertia problem will become an obstacle for huge deployment of renewable energy. Kawasaki's iVSG software with storage system can provide inertia instead of using power plants. The purpose of the project is to build a next generation renewable energy model and to expand it starting from the Philippines.
- **Organization name, Partner organization name:** Kawasaki Heavy Industries, IKS
- **Funding organization, Contents, Terms:** FY2023 Feasibility Study Project for Overseas Deployment of High Quality Infrastructure program
- **URL:** https://www.khi.co.jp/
  https://iks-jp.co.jp/



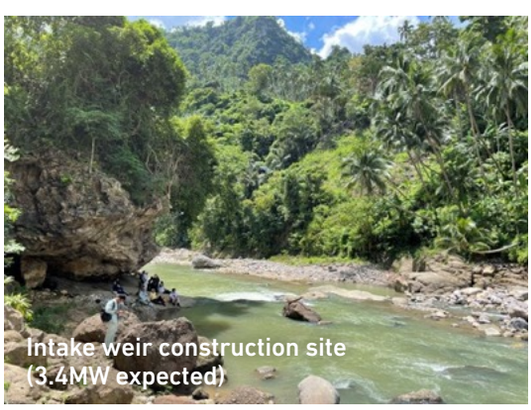


Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

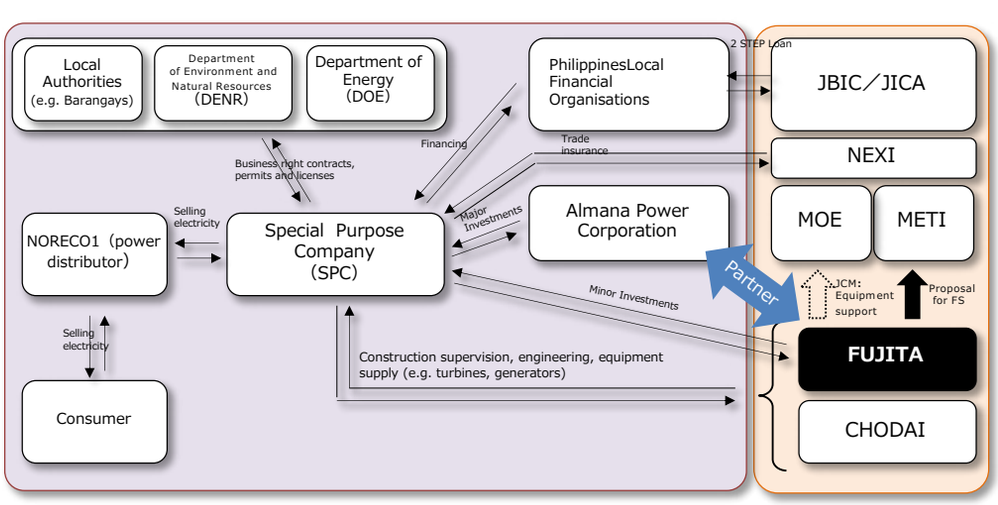
Feasibility Study of two mini hydropower projects in Negros Occidental

FUJITA
Daiwa House Group

- **Project outline:** This Feasibility Study aims to contribute to decarbonization and the solution of electricity shortages, as well as to mutually expand business through a partnership between the general contractors of Japan and Philippines.
- **Organization name:** Fujita Corporation
- **Partner organization name:** Philippine Almana Group companies (Almana C&D and Almana Power), local electricity distribution cooperatives, CHODAI CO., LTD. etc.
- **Regions:** Negros Occidental
- **Funding organization, Contents, Terms:** METI (Ministry of Economy, Trade and Industry)
- **URL:** https://www.meti.go.jp/information/publicoffer/saitaku/2023/s230802001.html



<FS schedule>
Flow observation and geological surveys are currently underway to develop the power generation plan and finalize the provisional design conditions.
Early 2024: Completion of the FS study.

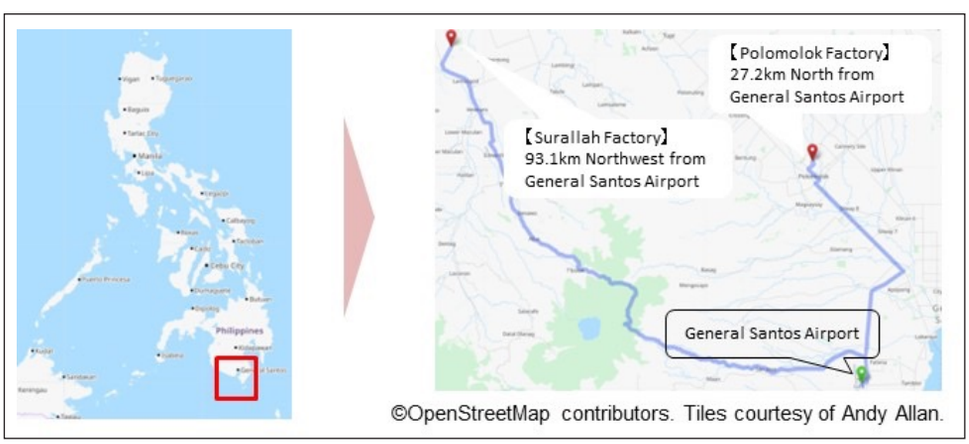


Business Image

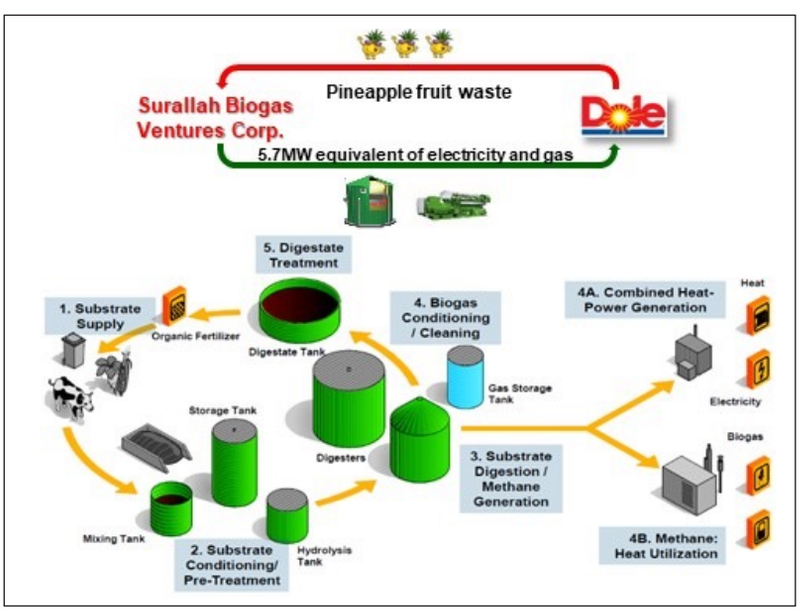
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Biogas Power Generation and Fuel Conversion Project in Pineapple Canneries

- **Project outline:** In this project, biogas derived from pineapple residue is utilized as fuel for gas engines and boilers to generate power and steam at the two pineapple canning factories (Surallah and Polomolok) of Dole Philippines, Inc. This project contributes to reducing GHG emissions as well as lowering electricity cost for Dole Philippines, Inc. (Expected GHG Emission Reductions: 54,167 tCO_2/year).
- **Organization name, Partner organization name in AZEC countries:** (Japan) ITOCHU Corporation (Philippines) METPower Venture Partners Holdings, Inc. / Surallah Biogas Ventures Corporation
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2019)
- **URL:** https://gec.jp/jcm/projects/19pro_phl_03/



Sites of JCM Model Project



Projects supported by the Government of Japan (GoJ)

Transitions in Power sector

Study on GHG Emission Reduction and Economic Feasibility by the Introduction of Combined Renewable DERs

- **Project outline:** Study for installation of roof-top solar panels and bioenergy systems with chicken manure and storage battery to replace grid electricity
- **Organization name:** Electric Power Development Co., Ltd.
- **Regions:** Province of Bataan
- **Funding organization, Contents, Terms:** FY2023 JCM Feasibility Study supported by METI
- **URL:** https://www.jpower.co.jp/english/news_release/pdf/news230929-2e.pdf

1. Survey site:

2. Survey period: Sep 2023 - Feb 2024

3. Business Scheme: Replacement of grid power and supply of surplus power to the grid by CO_2-free electricity

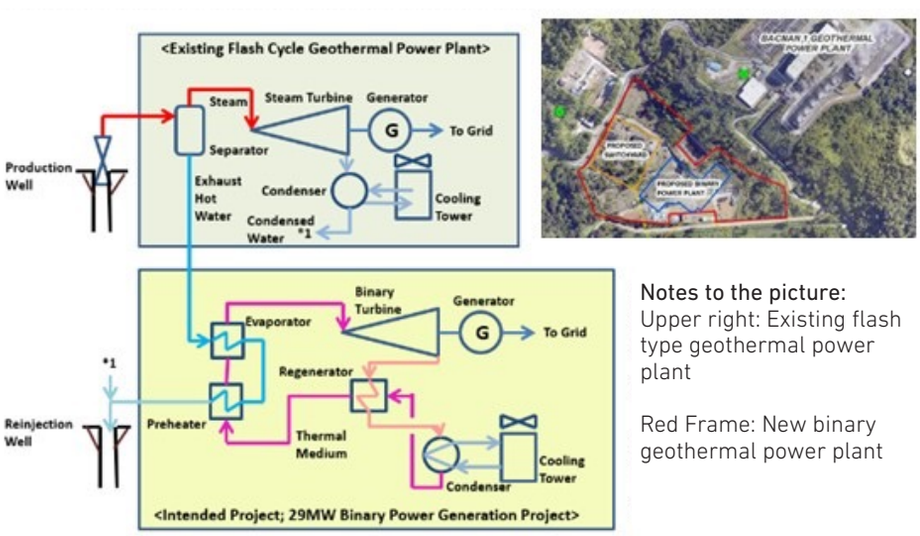
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

29MW Binary Power Generation Project at Palayan Geothermal Power Plant

MITSUBISHI HEAVY INDUSTRIES

- **Project outline:** This project introduces a new 29 MW binary geothermal power plant with the Organic Rankine Cycle (ORC) system to the existing 120MW flash type geothermal power plant owned and operated by Bac-Man Geothermal Inc. This project replaces the grid power produced by fossil fuel with renewable energy and reduces GHG emissions (Expected GHG Emission Reductions: 72,200 tCO_2/year).
- **Organization name, Partner organization name:** (Japan) Mitsubishi Heavy Industries, Ltd. (Philippines) Bac Man Geothermal Inc.
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2020)
- **URL:** https://gec.jp/jcm/projects/20pro_phl_01/

Sites of JCM Model Project



Notes to the picture:
Upper right: Existing flash type geothermal power plant

Red Frame: New binary geothermal power plant

Projects supported by the Government of Japan (GoJ)

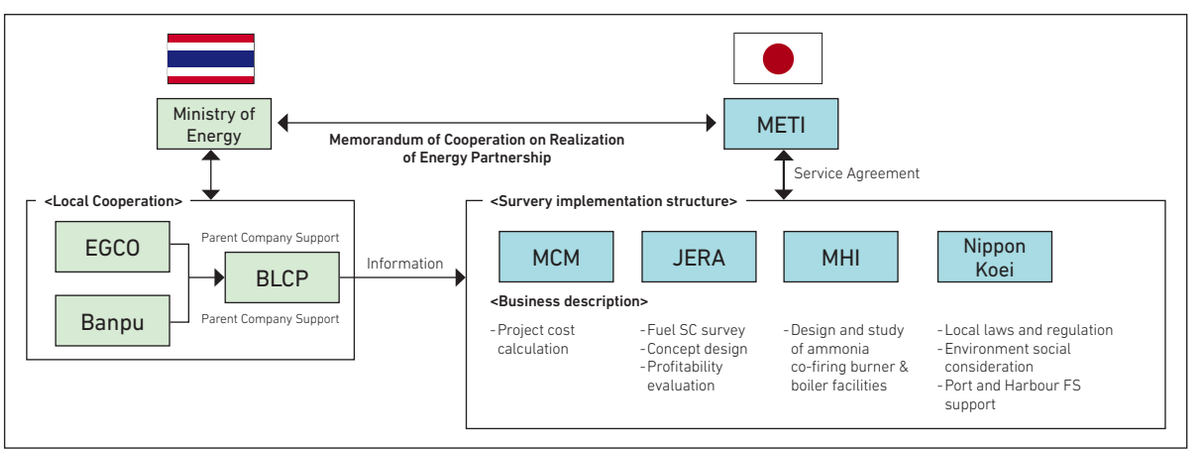
Transitions in Power sector

Feasibility Study on Ammonia Co-firing at coal power plant

- **Project outline:** Feasibility study including (1) Ammonia 20% co-firing at BLCP Power Plant (2)Establishment of supply chain for ammonia procurement (3) Economics and carbon reduction benefits of the entire ammonia value chain
- **Organization name:** JERA, MHI, MC Machinery (MCM), Nippon Koei, [1]EGCO, [2]Banpu, [3]BLCP
- **Funding organization, Contents, Terms:** FY2023 Feasibility Study for Overseas Development of High-Quality Energy Infrastructure (METI), Assistance with study expenses, October 2023 – February 2024
- **URL:** https://www.meti.go.jp/information/publicoffer/saitaku/2023/s230427003.html

[1] Electricity Generating Public Company Limited, [2] Banpu Power Public Company Limited, [3] BLCP Power Limited

Project Scheme



BLCP Coal-fired Power Plant

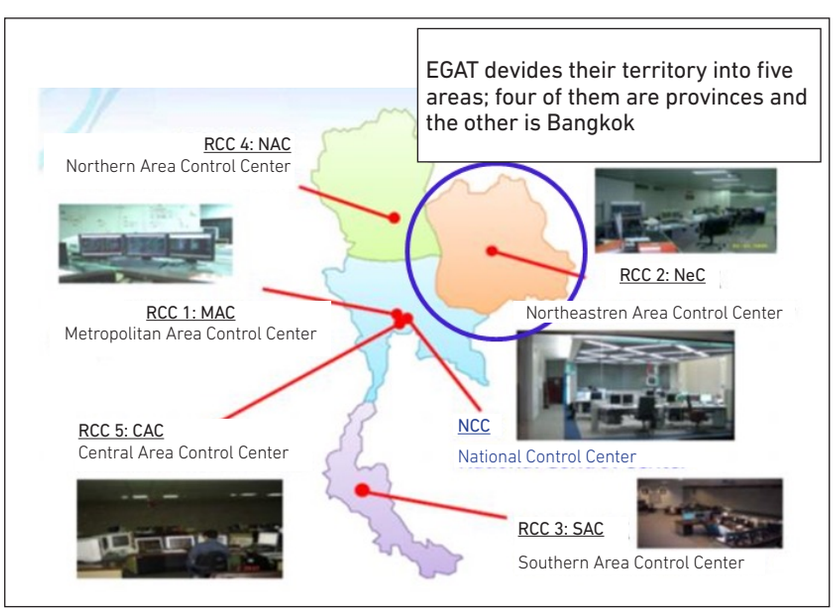
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Demonstration project on Low-carbonized Operation for Power Grid utilizing online voltage-var (Q) Optimal Control (OPENVQ) with ICT

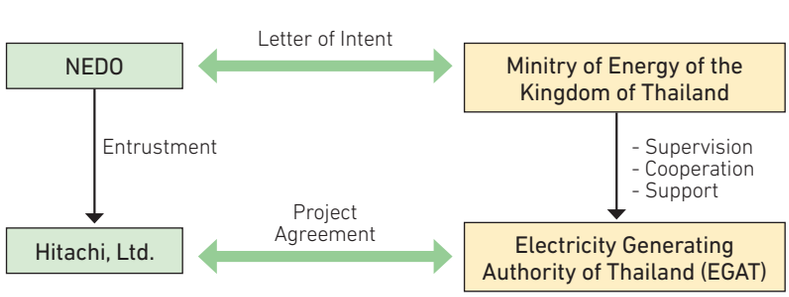
HITACHI
Inspire the Next

- **Project outline:** In order to reduce CO_2 emissions, the Project will introduce online optimal control system, named OPENVQ to the transmission system of the Electricity Generating Authority of Thailand (EGAT). OPENVQ can reduce CO_2 emissions by reducing transmission loss and contribute to an increase of renewable energy through increasing transmission capacity.
- **Project Participant:** HITACHI, Electricity Generating Authority of Thailand (EGAT)
- **Site:** Territory of Northeastern Control Center of EGAT grid
- **Funding organization, Contents Terms:** NEDO, JCM Low-carbon Demonstration Project. From October 2020 to March 2024

Demonstration site



Structure

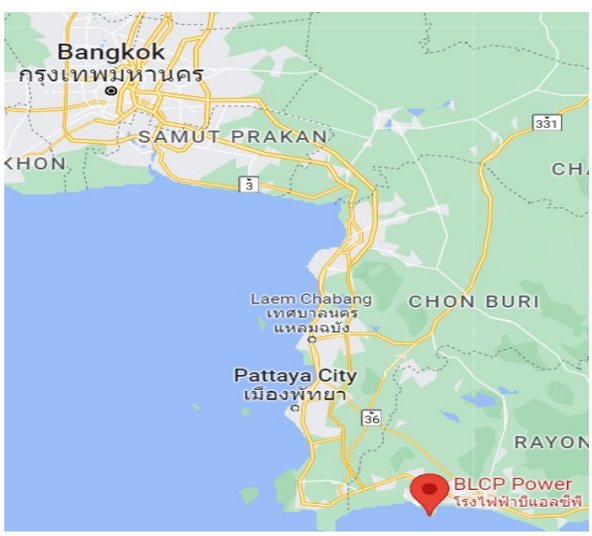


Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Feasibility Study for CCU project at BLCP Power Plant

三菱商事マシナリ株式会社 CHIYODA CORPORATION

- **Project outline:** Feasibility study for the incorporation of Chiyoda's CO_2 reforming technology at BLCP power plant and economic evaluation after calculating CAPEX/OPEX and revenue from selling CO_2 recycling methanol, which is an expected product after CCU process
- **Organization name:** Mitsubishi Corporation Machinery, Chiyoda Corporation
- **Funding organization, Contents, Terms:** "Feasibility Study Project for Overseas Deployment of High Quality Energy Infrastructure" by Ministry of Economy, Trade and Industry
- **URL:** https://www.meti.go.jp/information/publicoffer/saitaku/2023/s230802002.html



BLCP POWER

Provide Power Plant information

Mitsubishi Corporation Machinery, Inc. — CHIYODA CORPORATION

Calculation of CAPEX and OPEX

- Research and analysis on methanol market
- Research laws and regulations regarding carbon credits trading

<Feasibility Study Term>
Sep 14th, 2023 ~ Feb 29th, 2024

<Entire Project Schedule>

~ Feb 2024	This FS
2025~2026	Pre-FEED
2026~2027	FEED
2027~2030	EPC
2030	Commercial Operation

Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

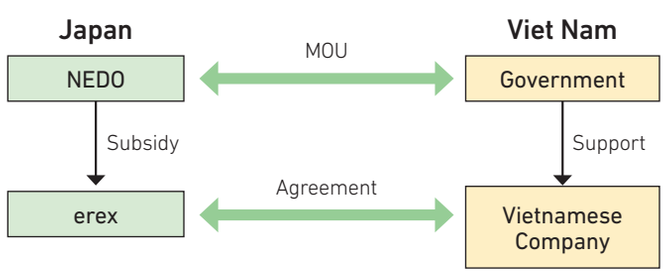
Demonstration Study on High-Ratio Co-firing of Biomass Fuel with Existing Coal-Fired Power Plants to Achieve Decarbonization

erex

- **Project outline:** Stable operation of the coal-fired circulating fluidized bed (CFB) boiler power generation facility with a high-ratio of biomass fuel co-firing will be achieved using erex's operation control technology and planning of facility optimization.
- **Organization name:** erex Co.,Ltd.
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Dec.2023-Sep.2024)
- **URL:** https://www.erex.co.jp/
  https://www.erex.co.jp/news/information/2537/

Applied technology:
(1) Operation and control technology for stable operation at high ratio co-firing by combining the measures against high temperature corrosion due to biomass co-firing with the maintenance of power generation efficiency.
(2) Optimization technology for facility planning to reduce the scope of additional biomass facilities and modification of existing facilities.

Project scheme



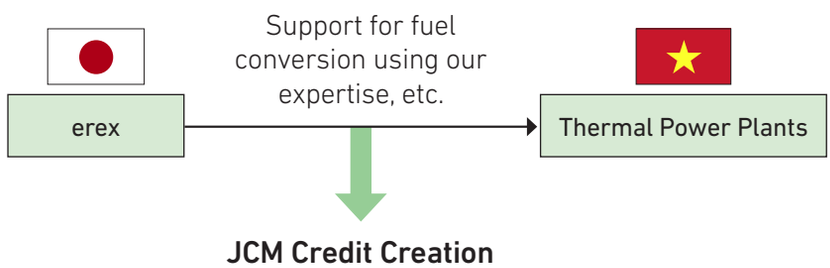
Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Feasibility Study on JCM Credit Creation Through Fuel Conversion

erex

- **Project outline:** Based on Viet Nam's PDP8, fuel conversion for thermal power generation is essential in order to balance the increase in power demand with economic growth and the achievement of carbon neutrality in 2050. In this project, fuel conversion of an existing thermal power plant using biomass fuels existing in Viet Nam will be implemented, and carbon credits will be generated through this project. Viet Nam plans to develop an ETS market from FY2028 onward, and the creation of carbon credits will contribute to the achievement of Viet Nam's NDC as well as to the revitalization of the ETS market.
- **Organization Name:** erex Co., Ltd.
- **Funding Organization, Contents, Terms:** JCM feasibility study by Ministry of Economy, Trade and Industry, FY2023
- **URL:** https://www.pacific.co.jp/news/2023/20230922-001143.html

Assumed Scheme



Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

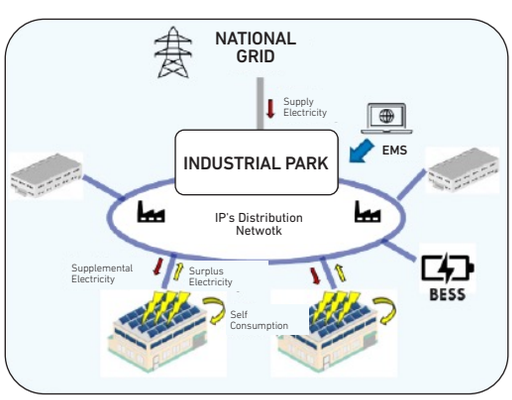
Demonstration study of storage batteries to achieve grid stabilization in an industrial park

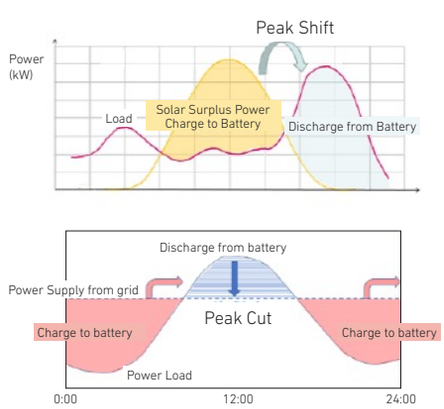
住友商事 Enriching lives and the world
NIPPON KOEI ENERGY SOLUTIONS
Thang Long Industrial Park II

- **Project outline:** Demonstrate and achieve grid stabilization, peak shift, adaptation to instantaneous voltage fluctuation, etc., by utilizing storage batteries in conjunction with the expansion of roof-mounted solar power generation in Thang Long Industrial Park II.
- **Organization name, Partner organization name:** Sumitomo Corporation / Thang Long Industrial Park II Corporation / Nippon Koei Energy Solutions Co., Ltd.
- **Regions:** Hung Yen Province
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Oct. 2023~Mar. 2024
- **URL:** https://www.sumitomocorp.com/ja/jp/news/topics/2022/group/20220309

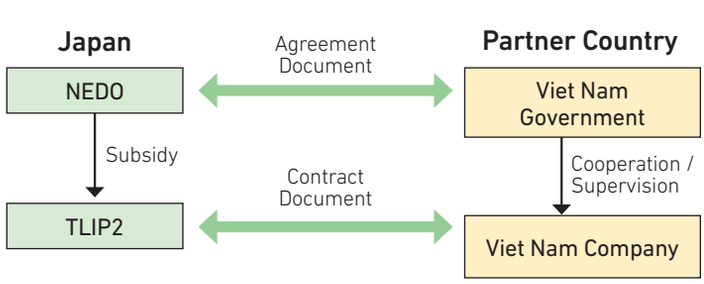
Project outline

- To establish a green industrial park by expanding rooftop solar power and utilizing storage batteries and realize stable operation of tenant companies during power shortages. To contribute to Viet Nam's electricity market by supporting peak shifts.
- Identify the details and frequency of system instability in a status of 100MWp solar power deployment. Consider the type and capacity of storage batteries that can accommodate this.





Project scheme

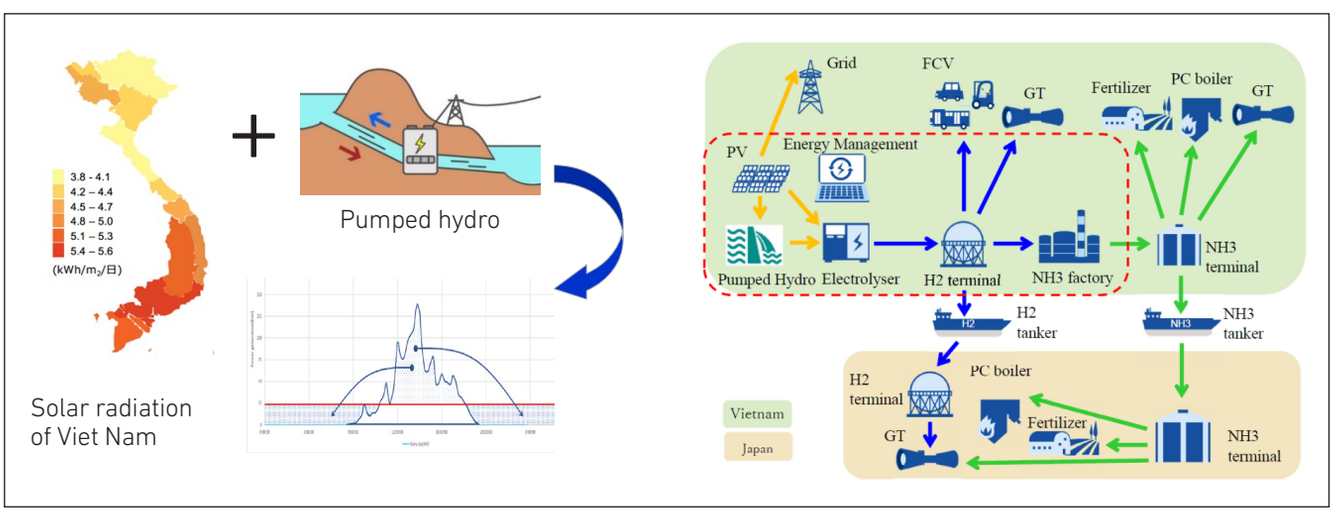


Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

Feasibility study on Green H_2 and Ammonia produced by Renewable energy

- **Project outline:** Investigation the technical and economic feasibility of stable production of green hydrogen and ammonia in Viet Nam by combining renewable energy, pumped mini-hydropower, and energy management.
- **Organization name, Partner organization name:** IHI Corporation, Maeda Corporation, Trung Nam group
- **Funding organization, Contents, Terms:** 2023 FS by METI subsidy, after 2024 Proposal for demonstration PJ

PJ image



PJ organization

(Renewable energy data, permits and licenses)

Trung Nam

(Energy management system, Ammonia process, System engineering)

IHI

(Permits and Market research, Pumped Hydro planning, Feasibility Study)

Maeda

Using Green Ammonia produced in Viet Nam from renewable energy in Viet Nam and exporting and using in Japan will be contributing to decarbonization in both countries.

Projects supported by the Government of Japan (GoJ)
Transitions in Power sector

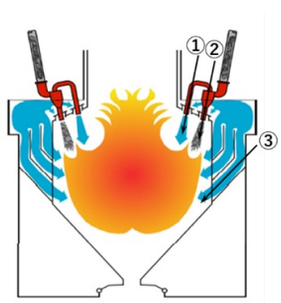
Demonstration of Ammonia firing to achieve decarbonization at anthracite coal fired power plant

IHI

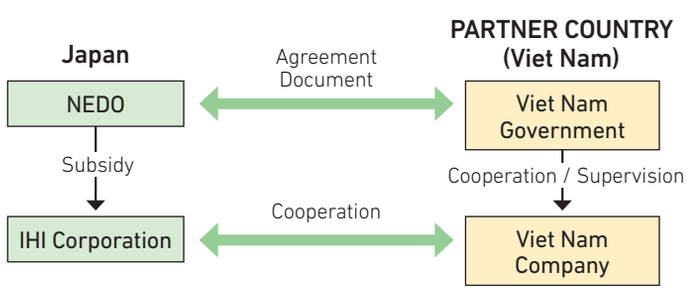
- **Project outline:** Demonstrate ammonia combustion at an anthracite-fired power plant owned by the state-run electricity company Viet Nam Electricity (EVN), for the contribution to the decarbonization of coal-fired power generation as outlined in Viet Nam's National Power Development Plan.
- **Organization name, Partner organization name:** IHI corporation
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Oct. 2023~Mar. 2024
- **URL:** https://www.ihi.co.jp/en/

Project outline

- To demonstrate ammonia combustion in the world's first anthracite-fired power plant by utilizing the ammonia combustion technology established by IHI, .In Viet Nam, different coal (anthracite) is used than in Japan (bituminous coal), and the core technology to be applied is ammonia combustion to the power plant specified to the anthracite coal.
- If this technology is applied to EVN's anthracite-fired power plant, a reduction of 2.75 million tons of CO_2/year is expected (5% ammonia combustion case).



Project scheme

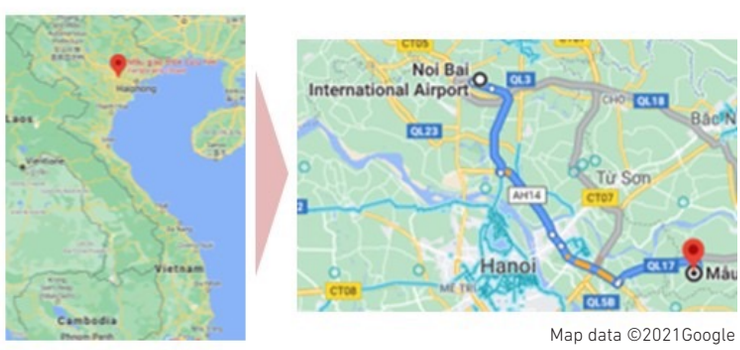


Projects supported by the Government of Japan
Transitions in Power sector

Waste to Energy project in Bac Ninh Province

- **Project outline:** In this project, a waste-to-energy plant is introduced in Bac Ninh province. This plant incinerates and generates electricity from 230 tons/day of municipal solid waste, which has been disposed of as landfill. The plant also incinerates and generates electricity from 120 tons/day of municipal solid waste and 150 tons/day of industrial solid waste, which were previously incinerated. This project reduces methane emissions from landfill sites and GHG emissions by replacing grid electricity (Expected GHG Emission Reductions: 41,804 tCO_2/year).
- **Organization name, Partner organization name:** (Japan) JFE Engineering Corporation (Viet Nam) T&J Green Energy Company Limited
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2021)
- **URL:** https://gec.jp/jcm/projects/21pro_vnm_01/

Project site:
Bac Ninh Province
(Approx. 30km east of Hanoi City)
Approx. 50km southeast of Noi Bai Airport



Sites of JCM Model Project

Waste to Energy Incinerator (Grate)

Processing Volume:
500t/day

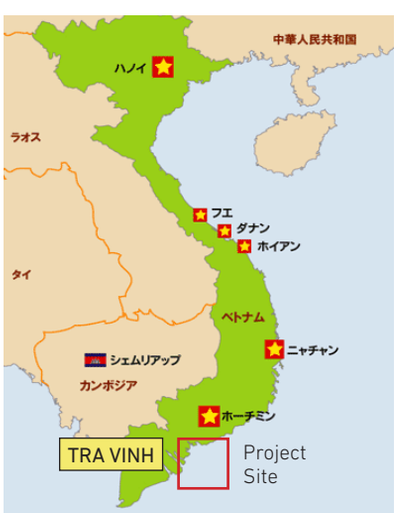
(Municipal solid waste 350t/day and industrial solid waste 150t/day

Projects supported by the Government of Japan
Transitions in Power sector

Study on Private Investment Scheme for Grid Interconnection Facilities

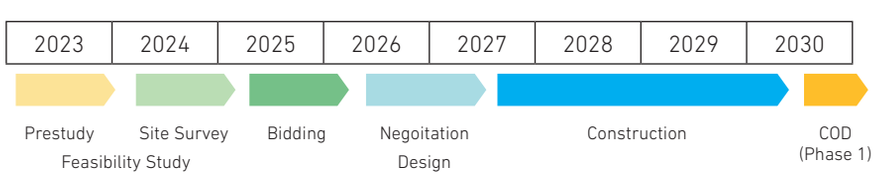
高める、つくる、そして、支える。
熊谷組

- **Project outline:** To study public-private partnerships and private investment schemes for grid-connected facilities in order to further promote renewable energy in Viet Nam, a country with a fragile power system.
- **Organization name, Partner organization name in AZEC countries:** Kumagai Gumi Co., Ltd.
  Partner: INPEX CORPORATION, Mitsubishi Research Institute,Inc. Truong Thanh Vietnam Group Joint Stock Company, Baker & McKenzie (Viet Nam) Ltd.
- **Regions:** Area around Tra Vinh province
- **Funding organization, Contents, Terms:** METI/"Feasibility Study for Overseas Development of High-Quality Energy Infrastructure"/ Until 29th Feb. 2024
- **URL:** https://www.meti.go.jp/policy/external_economy/cooperation/oda/r5_yosan_6.html

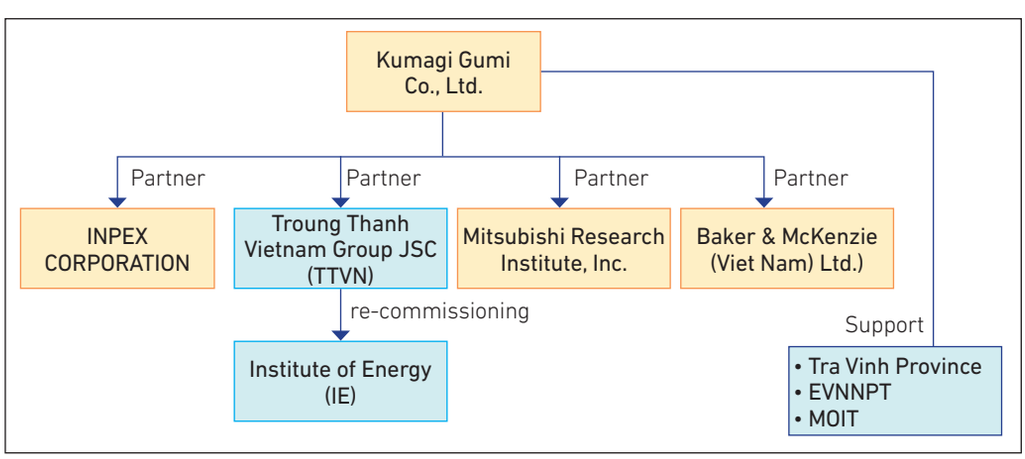


Location

Offshore Wind Power Project (Image)



Estimated Project Schedule



Organization chart

Projects supported by the Government of Japan (GoJ)

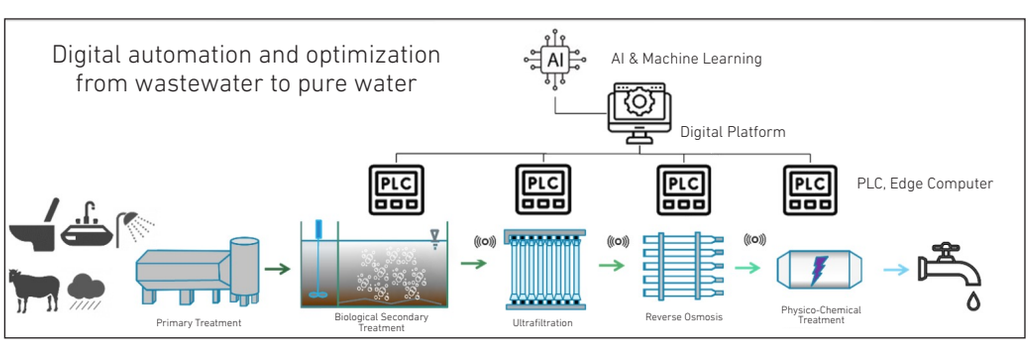
Transitions in Industry/Transport sector

Feasibility Study Project on Digital Business Model for Water Resources Development

YOKOGAWA

- **Project outline:** Evaluate the effects of reducing operation cost and CO_2 emissions through autonomous and optimization by AI, Machine learning and digital application technologies in Water Reuse Infrastructure.
- **Organization name, Partner organization name in AZEC countries:** Yokogawa Electric Corporation, Yokogawa Engineering of Asia Pte. Ltd., Yokogawa Australia Pty. Ltd.
- **Funding organization, Contents, Terms:** METI, FY2023 Subsidy-Based Infrastructure FS Project for Overseas Expansion.

- Collaborative studies with water utilities in New South Wales.
- Shifting to water reuse and evaluate CO_2 emission reduction.
- Develop the collaboration towards commercialization.



Timeline from Study to Commercialization

	FY23	FY24	FY25
Feasibility Study			
Off-line Demo			
Online Demo			
Commercialization			

Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Proof of Concept for On-demand Shared Mobility in Brunei

Mitsubishi Corporation

- **Project outline:** Mitsubishi Corporation conducted the PoC of on-demand shared mobility service from multiple different perspectives, with an aim to solve the social problems such as chronic traffic congestion and a shortage of parking spaces in Brunei.
- **Organization name, Partner organization name:** Mitsubishi Corporation, Dart Logistics Sdn. Bhd.
- **Regions:** The city center of Brunei
- **Funding organization, Contents, Terms:** JETRO, subsidy of "Asia Digital Transformation (ADX) Promotion Projects", August 2021 - January 2023
- **URL:** https://www.jetro.go.jp/ext_images/_News/announcement/2021/d38074f8efc798ae/Mitsubishi_Corporation_en.pdf

App logo and Initial registration screen

Operation overview

Grand launch ceremony

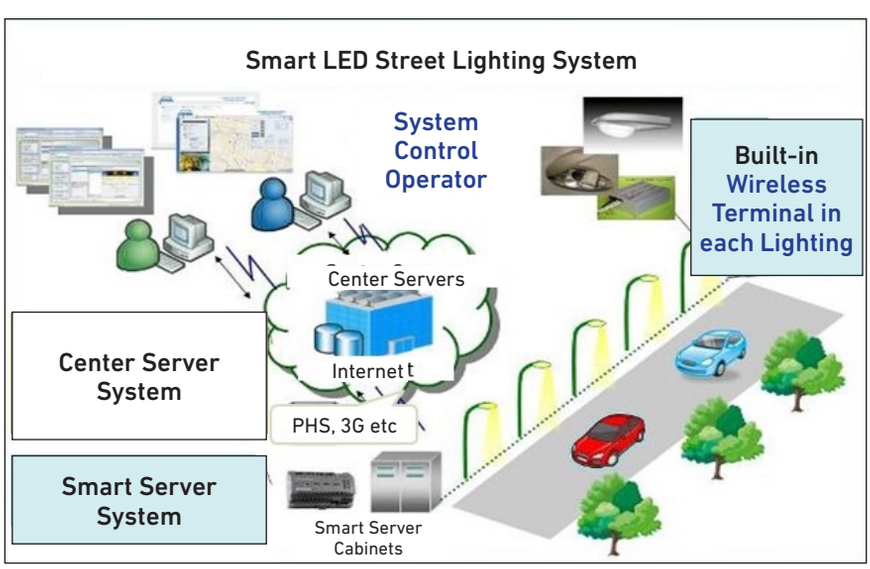
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Introduction of High Efficiency LED Lighting Utilizing Wireless Network

MinebeaMitsumi
Passion to Create Value through Difference

- **Project outline:** The project aims to reduce energy consumption and GHG emissions by introducing total of 5,672 units of high efficiency LED Lighting utilizing wireless network technology (Expected GHG Emission Reductions: 559 tCO_2/year). Also, using smart lighting system with wireless network reduces energy consumption.
- **Organization name, Partner organization name:** (Japan) MinebeaMitsumi Inc.(Cambodia) Overseas Cambodian Investment Corporation / Siem Reap Provincial Hall / APSARA
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2015)
- **URL:** https://gec.jp/jcm/projects/15pro_cam_01/

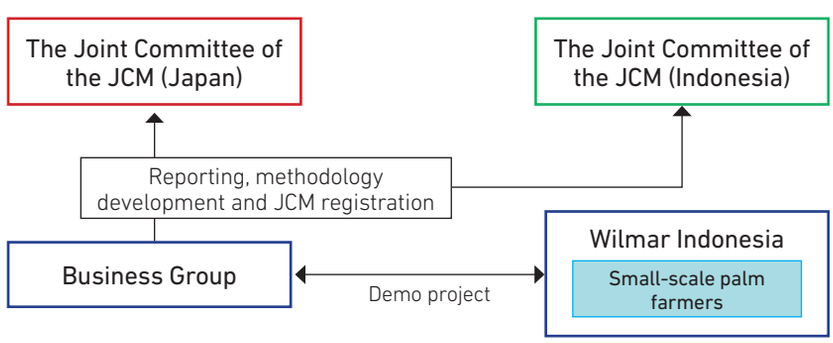
Sites of JCM Model Project



Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Program-type JCM feasibility study on practices to improve biodiesel yield from palm oil by utilizing AI

- **Project outline:** Though introducing AI technology that can judge and sort the maturity of palm FFB collected as raw material for biodiesel from the palm plantation to the biodiesel production plant in Indonesia, achieving CO_2 emission reduction by improving and increasing the yield of palm oil extraction quantity and biodiesel production. In the future, commercialization of the project as a programme-type JCM project will be considered (FY2025).
- **Organization name, Partner organization name:** Kanematsu Corporation, Kabuku Inc, Climate Experts CO., Ltd, PT. Daemeter Consulting, PT. Dharma Karyatama Mulia
- **Funding organization, Contents, Terms:** JCM Feasibility Study by METI
- **URL:** https://www.pacific.co.jp/news/2023/20230710-001117.html



Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

Experimental Study of "Production Technology of Bio Coke to Realize the Same Effect as Coal Coke"

アイシン高丘株式会社 AISIN TAKAOKA CO., LTD.

- **Project outline:** By focusing on coconut shells (PKS), which is a country of origin for palm plants but has few uses, to developed a fuel using PKS as a raw material (bio-briquette coal) to achieve carbon neutrality in cupola melting, and replace existing fuels (coal coke). In order to achieve, to conduct empirical research on producing bio-briquette coal that meets the required quantity and required quality for one cupola.
- **Organization name, Partner organization name:** Aisin Takaoka Co., Ltd.
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Dec. 2023~Mar. 2024
- **URL:** https://www.at-takaoka.co.jp/news/detail.php?id=111

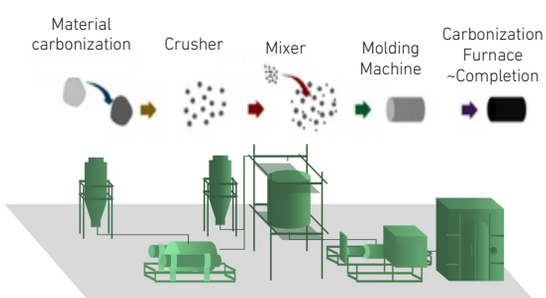
Project outline

- In Japan, approximately 800,000 t-CO_2/year is emitted through cupola melting for cast iron melting. (approximately 150,000 t-CO_2/year at our company)

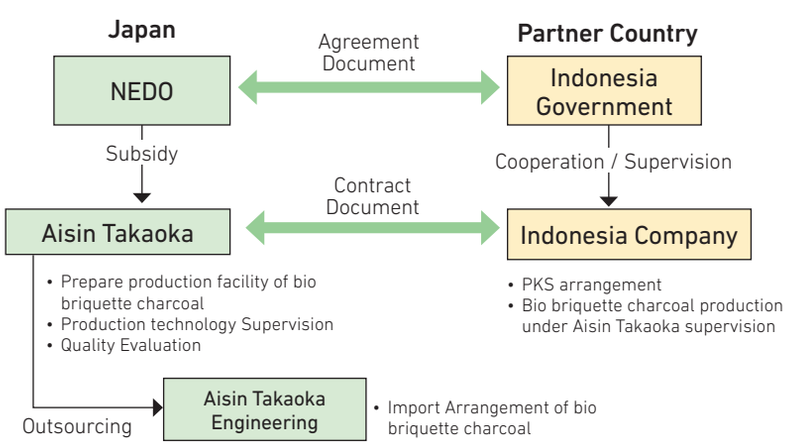
Required Quality

- Prevent damage when charging
  Cold Strength >95%
- Stable Heat
  More than 30MJ
- Sustaining combustion for carbon absorption into the molten metal
  Hot Strength 55-85%
- Volatile matter not present in the molten metal
  Below 3%

Production Technology



Project scheme



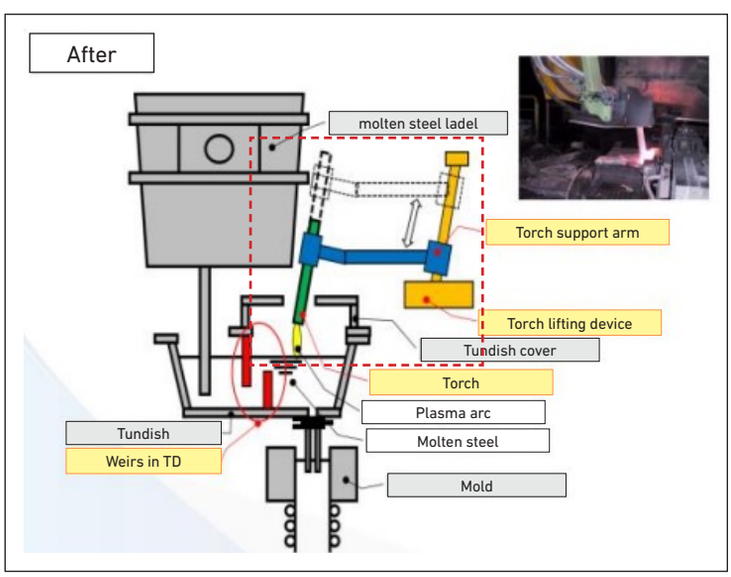
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Feasibility Study for Demonstration of Low carbon technology project by introducing plasma heating equipment

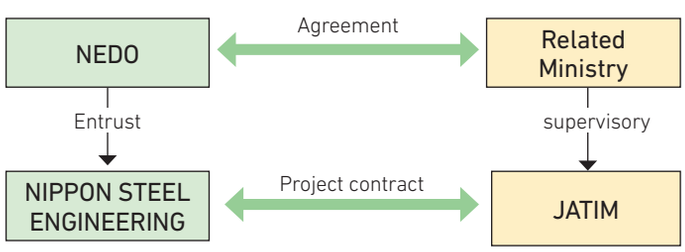
NIPPON STEEL ENGINEERING

- **Project outline:** This demonstration project will introduce a plasma heating device (TPH) to the tundish of a continuous casting machine at an electric furnace steel factory and demonstrate its effectiveness in reducing GHG emissions. Under the JCM system, this demonstration project will carry out JCM procedure toward issuance of JCM credit.
- **Organization name:** NIPPON STEEL ENGINEERING CO., LTD (JAPAN)
  PT. JATIM TAMAN STEEL MFG.(INDONESIA).
- **Funding organization, Contents, Terms:** NEDO. JCM Low-carbon Demonstration Project. From September 2023 to August 2024.

Project outline



Project scheme (Under consideration)



Projects supported by the Government of Japan (GoJ)

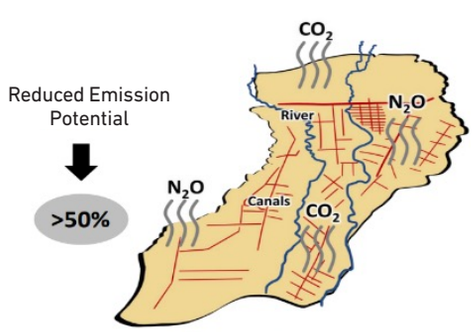
Transitions in Industry/Transport sector

The study of stock-based peatland water management technology for a stable supply of woody biomass

SUMITOMO FORESTRY

- **Project outline:**
  - SFC aims to significantly reduce CO_2 emissions from peatlands in Central Kalimantan province (former the Mega Rice Project site), caused by peat fires and improper peatland management, through its stock-based peatland water management technology. SFC will also show a peatland management model that not only ensures economic viability but also contributes to community development.
  - As part of the project, SFC will conduct a feasibility study which includes those activities such as peatland management and CO_2 emission reductions through a stable supply of woody biomass fuel. It will aim for various outputs including to develop a draft JCM methodology that will quantify CO_2 emission reduction.
- **Organization name:** Sumitomo Forestry Co.,Ltd. (SFC)
- **Regions:** Central Kalimantan Province
- **Funding organization, Contents, Terms:** JCM Feasibility Study by METI
- **URL:** https://www.pacific.co.jp/news/2023/20230922-001143.html

SFC's vision for a peatland management model in Central Kalimantan Province



The site, where peat fires occurs frequently, is required for environmental protections and CO_2 emissions reduction.

An image of harmony of economic activities and CO_2 emission reduction including peat fire prevention.

Afforestation and forest management based on stock-based peatland water management.

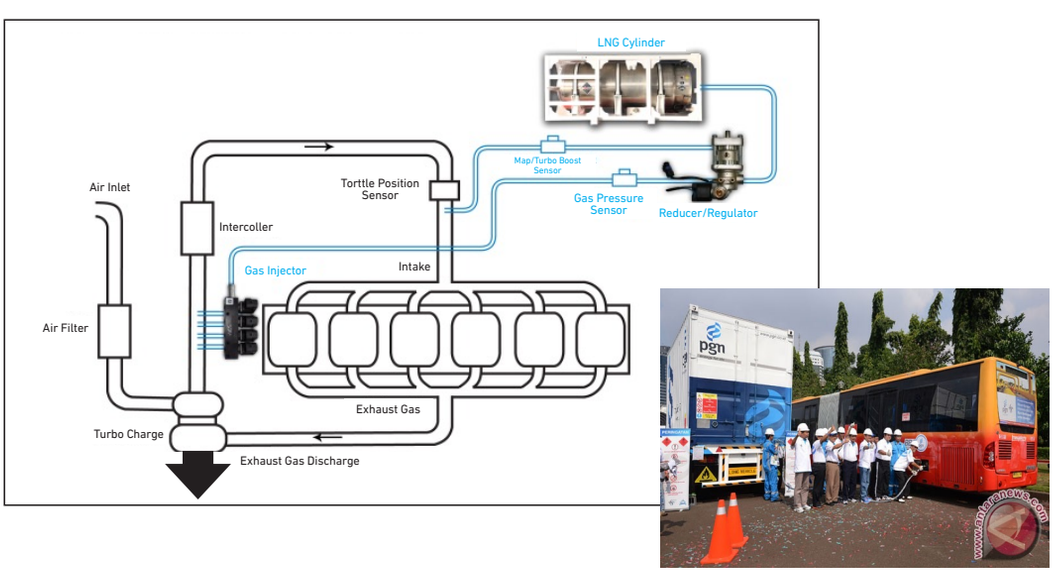
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Introduction of CNG-Diesel Hybrid Equipment to Public Bus in Semarang

HOKUSAN

- **Project outline:** Based on the cooperation agreement between Toyama city and Semarang city, this project aims to reduce GHG emissions through fuel switch from diesel to CNG. In the project, 72 diesel bases owned by Trans Semarang, including 25 large-sized buses and 47 mid-sized buses, are retrofitted from diesel engine to hybrid engine with CNG system available (Expected GHG Emission Reductions: 2,667 tCO_2/year).
- **Organization name, Partner organization name:** (Japan) Hokusan Co.,Ltd. (Indonesia) BLU UPTD Trans Semarang
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2018)
- **URL:** http://gec.jp/jcm/projects/18pro_ina_03/

Sites of JCM Model Project



Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

Feasibility study for decarbonization of LNG terminal in Malaysia and CCS hub concept

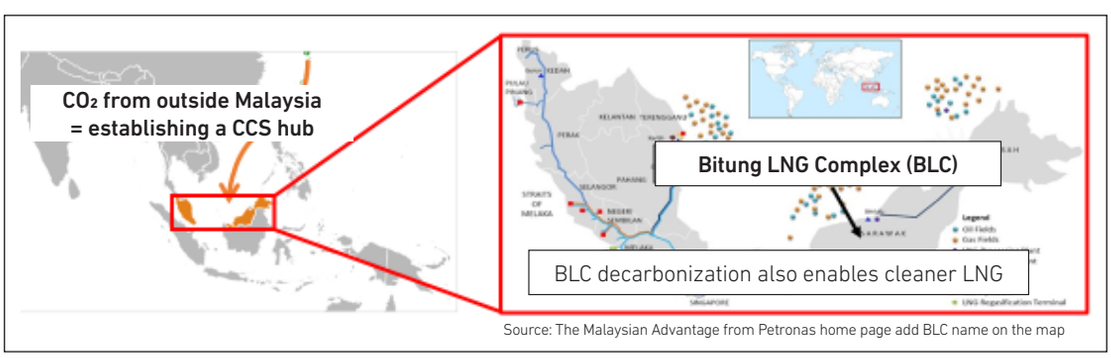
JAPEX

- **Project outline:** Contribute to decarbonization of the Asian region by realizing the CCS hub concept consisting of decarbonization of a Malaysian LNG terminal and receipt of CO_2 from domestic Malaysia and other countries including Japan and starting CO_2 storage in late 2028, the earliest in Asia.
- **Organization name, Partner organization name:** Petroliam Nasional Berhad (Petronas)
- **Funding organization, Contents, Terms:** METI Subsidy program (FY2022, FY2023)
- **URL:** https://www.enecho.meti.go.jp/appli/public_offer_result/2022/0617_01.html
  https://www.enecho.meti.go.jp/appli/public_offer_result/2022/0306_01.html

Project Background and Schedule

- Start a joint FS from 2022 by Petronas and a Japanese consortium (JAPEX, JGC, and Kline.)
- In September 2023, Petronas and the Japanese consortium signed a key principle agreement on early commercialization of CCS for a specific promising area, and FEED work is scheduled to start from April 2024 with the aim of starting CCS operations by the end of 2028.
- In addition to CO_2 from the LNG terminal in Malaysia, large scale CO_2 shipping is being considered for this CCS project with several CO_2 emitters in Japan, including JFE Steel.

Project Map



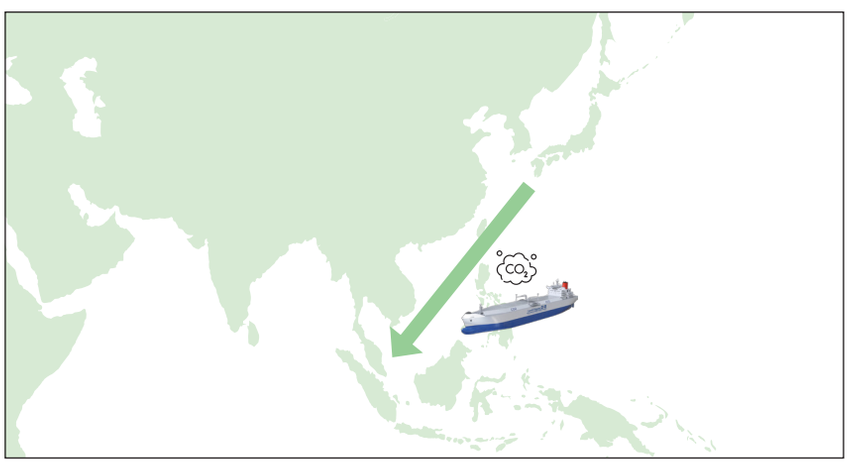
Source: The Malaysian Advantage from Petronas home page add BLC name on the map

Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Joint Development of Liquefied CO_2 Carrier for the CCS projects

- **Project outline:** Joint development of liquefied CO_2 carriers which play a key role in the Carbon Capture and Storage value chain, with the aim of enabling cross border collaboration in CCS and establishing Malaysia as a leading CCS hub in the region.
- **Organization name, Partner organization name:** Mitsui O.S.K. Lines, Ltd. , Petroliam Nasional Berhad (PETRONAS) and MISC Berhad
- **Funding organization, Contents, Terms:** METI Subsidy program (FY 2022, 2023)
- **URL:** https://www.mol.co.jp/en/pr/2022/22019.html
  https://www.mol.co.jp/en/pr/2023/23115.html

Outline of the Project (image)



Liquefied CO_2 Carrier at Terminal (image)

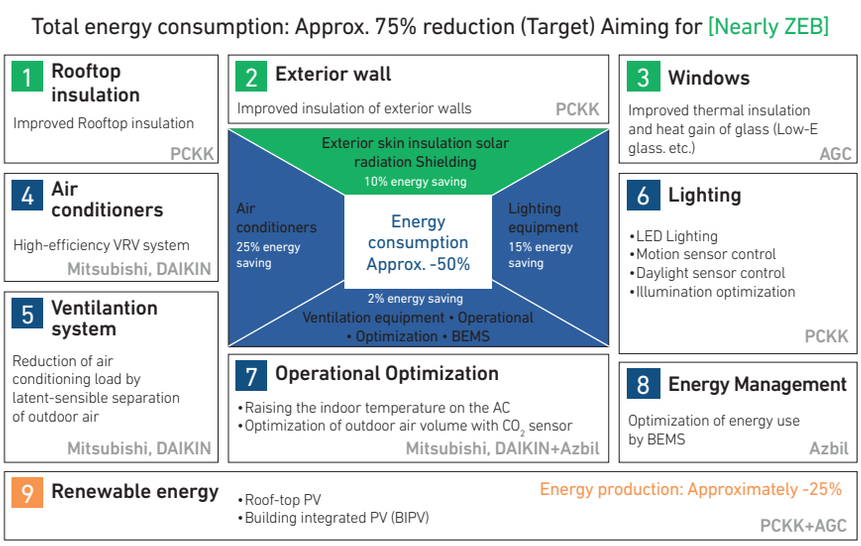
Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

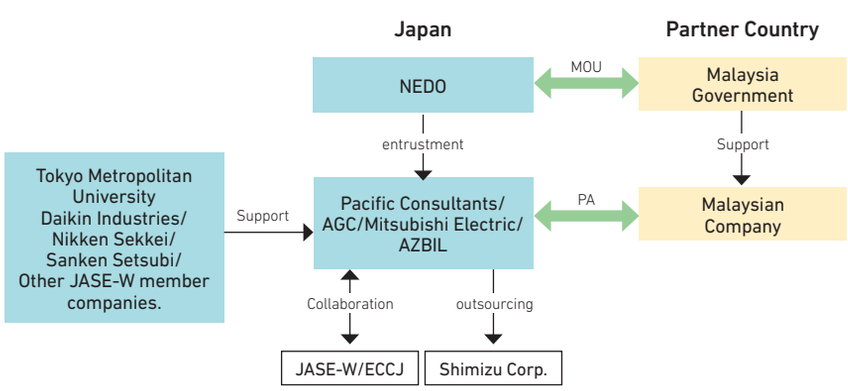
Demonstration project for ZEB to achieve carbon neutrality in the building sector

- **Project outline:** This project aims to demonstrate a Nearly ZEB in hot and humid area for an existing building of SEDA, a Malaysian government agency. The ZEB concept based on ISO/TS23764 will be applied to achieve both energy efficiency and comfort in air conditioning, and is expected to change user behavior by preventing overcooling, etc.
- **Organization name:** Pacific Consultants, Mitsubishi Electric, AGC, AZBIL
- **Funding organization, Contents, Terms:** International Demonstration Project on Japan's Technologies for Decarbonization and Energy Transition (Basic study: Dec 2022~Sep 2023)
- **URL:** https://www.pacific.co.jp/, https://www.agc.com/, https://www.mitsubishielectric.co.jp/, https://www.azbil.com/jp/

Project outline



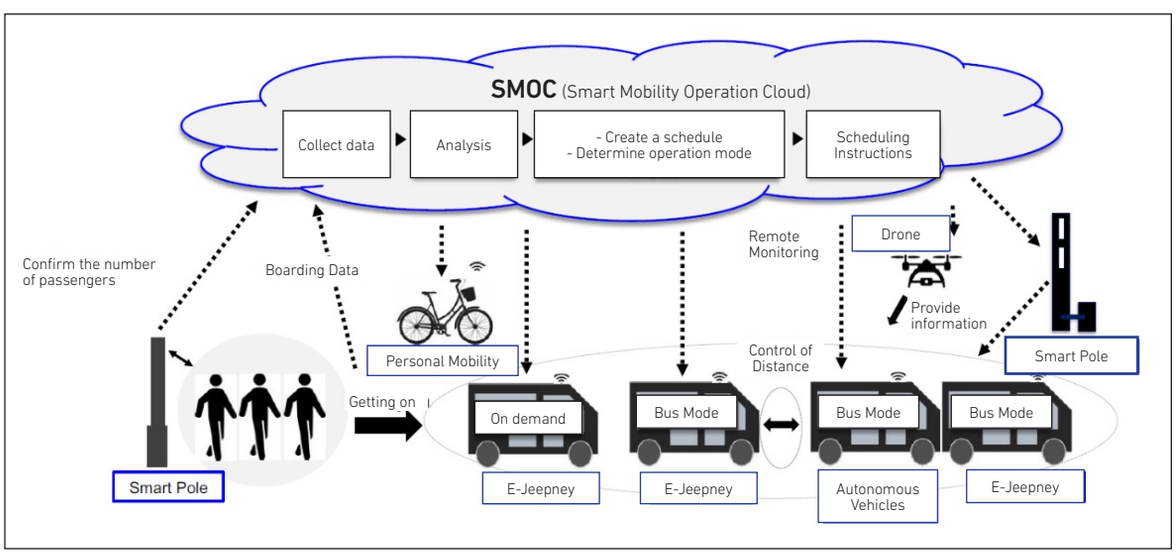
Project scheme



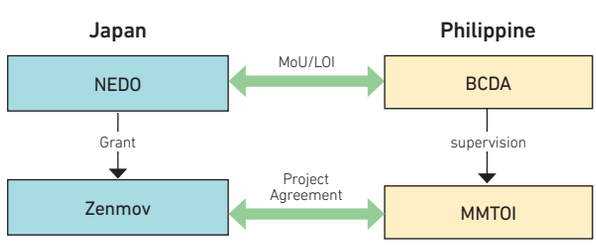
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Smart Mobility Technology using Energy Efficient Transportation Systems in Clark Area

- **Project outline:** The aim of this project is to contribute to solve issues which are inconvenience, economic losses, air pollution, and wasteful energy consumption through the Smart Mobility Operation Cloud (SMOC) system at Clark Area
- **Organization name:** Zenmov Inc.
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Demonstration) / Dec.2020-Mar.2025
- **URL:** https://zenmov.com/



Project Scheme



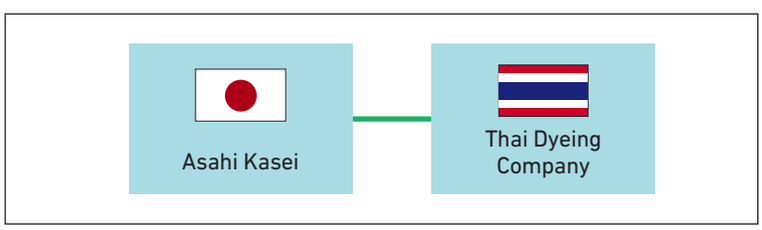
Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

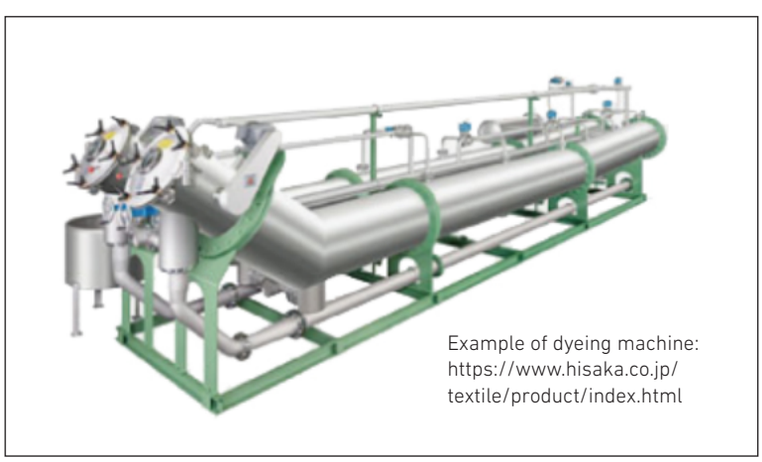
Private-sector JCM feasibility study on GHG emission reductions in textile dyeing process by utilizing highly efficient dyeing technology

AsahiKASEI

- **Project outline:** GHG reduction as much as 40% will be achieved by applying Asahi Kasei's New Dyeing Process in Thailand. Existing dyeing machine can mostly be used and the private-sector JCM will be perused.
- **Partner organization:** Asahi Kasei Corporation, collaboration with local dyeing companies
- **Funding organization, Contents, Terms:** JCM Feasibility Study by METI.



Private-sector JCM will be perused between Asahi Kasei and Thai dyeing company.



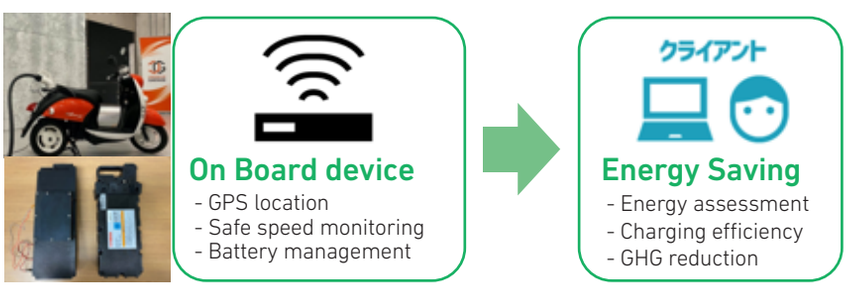
Existing dyeing machine such as Jetting type can mostly be used.

Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

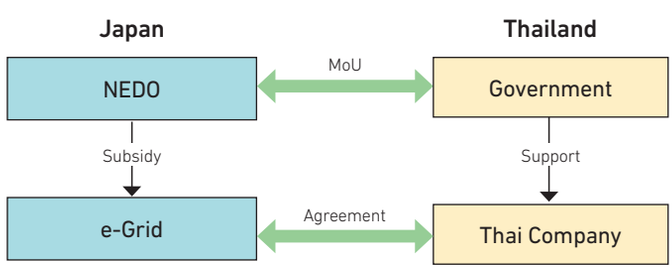
Demonstration research of driver behavior analysis and battery cell condition analysis to realize more efficient energy consumption of EV bikes (Bangkok)

e-GRiD

- **Project outline:** Contributing to Efficient Energy Consumption / Demonstration Research for the Compliance Requirements / Driver Behavior Analysis for Efficient Energy Consumption of Electric Motorcycles and Empirical Research on Battery Cell State Analysis.
- **Organization name:** e-Grid Inc.
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Dec. 2022-Sep. 2023 (Awaiting Stage Gate Screening)
- **URL:** https://www.e-grid.co.jp/pressrelease/20230214/



Project Scheme



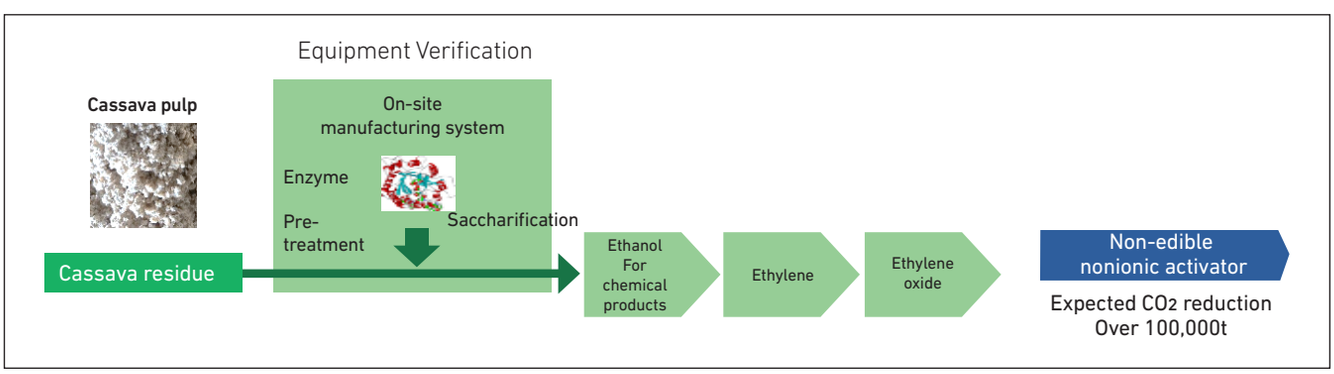
Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

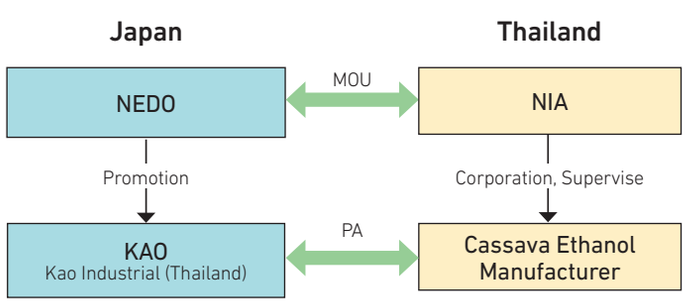
Manufacturing model project for bio-based nonionic surfactant from non-edible biomass using on-site production system of enzymes optimized for cassava residue

- **Project outline:** Demonstrate a low LC-CO_2 on-site production system for saccharification enzymes developed with a composition optimized for cassava pulp residue from Thai agricultural waste, and demonstrate an integrated production model up to non-edible bionononionic surfactant using economical utilization technology.
- **Organization name:** Kao, Kao Industrials (Thailand)
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Feasibility Study) / Sep. 2023-Feb. 2025
- **URL:** https://chemical.kao.com/content/dam/sites/kao/chemical-kao-com/jpja/topics/2023/20230906-001.pdf

Project outline



Project Scheme



Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

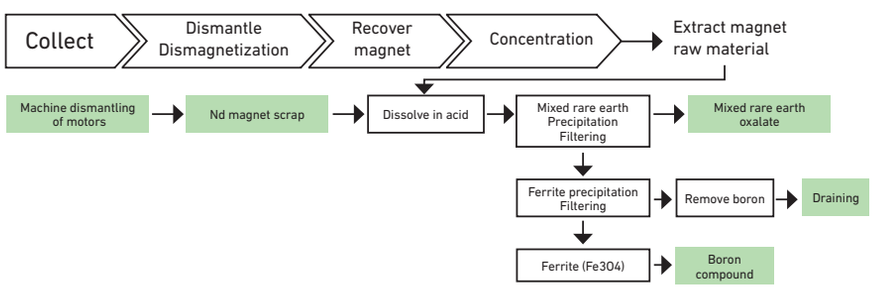
Empirical Study on Recovery and Purification Technology of Neodymium Magnets from Motor Scrap

- **Project outline:** Establish a technology to recover and purify neodymium magnets from used motor scraps received from Asia, EU, North America, and Japan in Thailand, and aim to spread the recovery technology to other countries in the world.
- **Organization name:** Suzuki Shokai, NTT Data Institute of Management Consulting
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Nov. 2023–Mar. 2024
- **URL:** https://www.suzuki-shokai.co.jp/, https://www.nttdata-strategy.com/

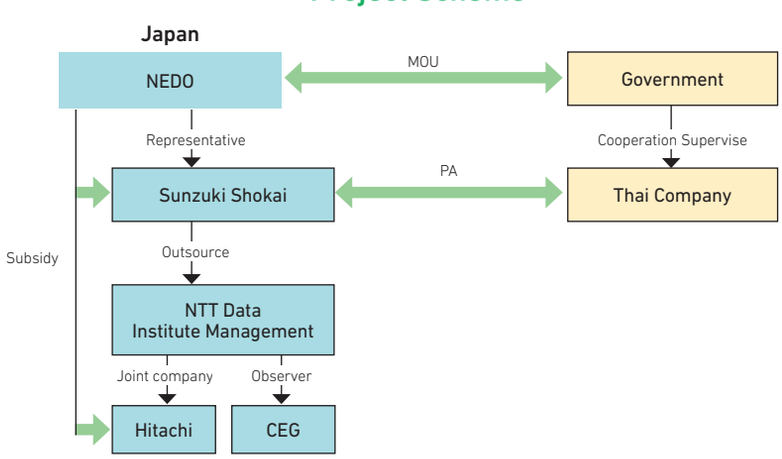
Project outline

The target technology is a series of processes to recycle and extract magnet raw materials to recover and concentrate rare metals by dismantling waste motors and extracting neodymium magnets.
Particularly important technologies are as follows.

- Establishment of demagnetization methods during dismantling to recover neodymium magnets.
- Establishment of safe processing technology based on the impact on heat treatment and chemical treatment of coated and plated materials, etc.
- Establishment of DX technology to ensure quality control (component stabilization) management and economic efficiency.



Project Scheme



Projects supported by the Government of Japan (GoJ)

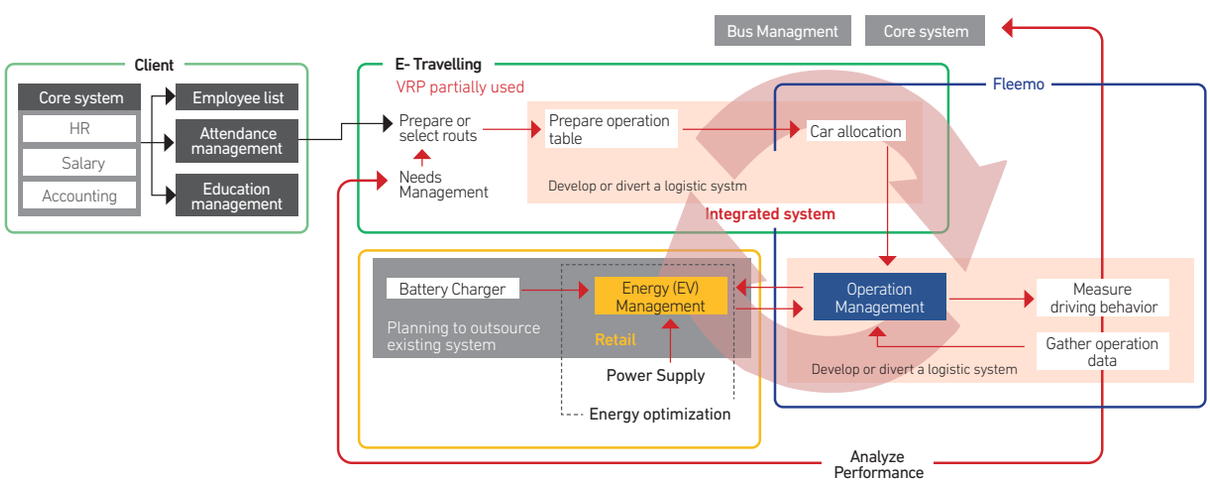
Transitions in Industry/Transport sector

Technical Demonstration Project on Smart Bus Systems to Promote Modal Shift in Commuter Transport

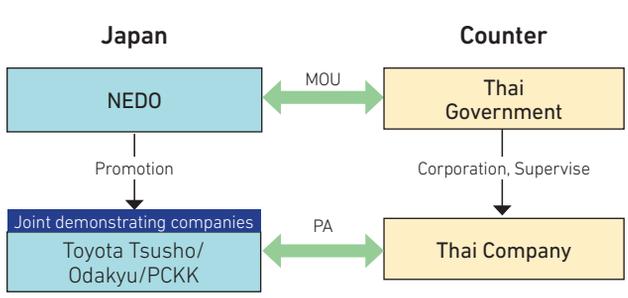
豊田通商株式会社
odakyu
Pacific Consultants

- **Project outline:** In the area centered on AMATA City Chonburi, a technical demonstration to promote modal shift to public transportation using advanced bus operation management system will be conducted to alleviate traffic congestion and to reduce CO_2 emissions in the future.
- **Organization name:** Toyota Tsusho Corporation, Odakyu Electric Railway, Pacific Consultants
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Nov. 2022–Sep. 2023 (Awaiting Stage Gate Screening)
- **URL:** https://www.toyota-tsusho.com/, https://www.odakyu.jp/, https://www.pacific.co.jp/

Project outline



Project scheme

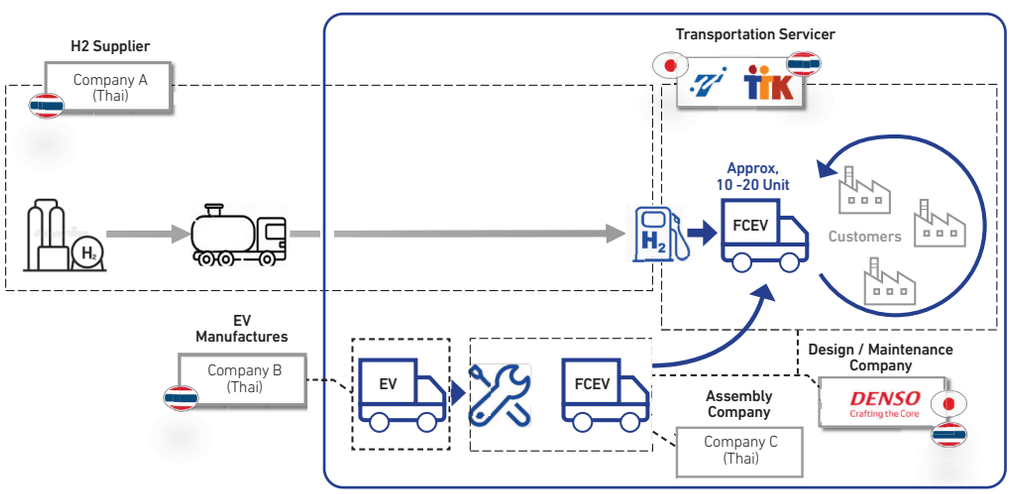


Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

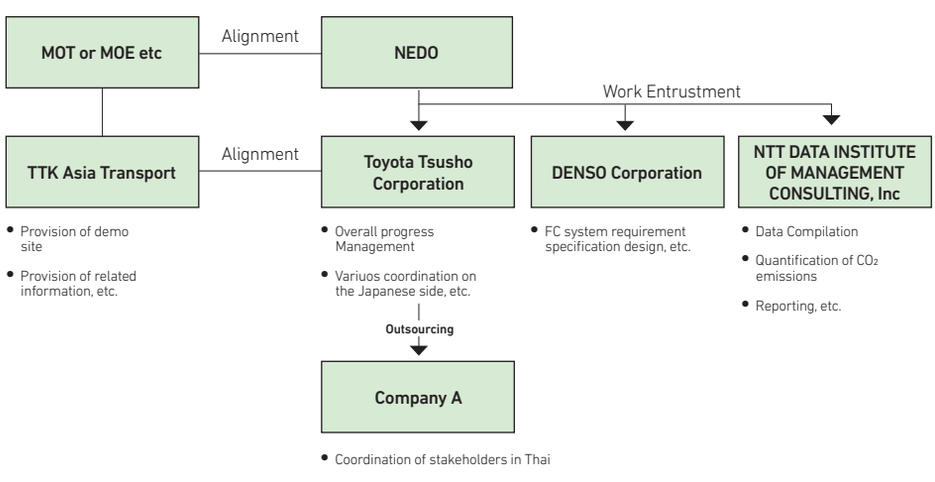
Feasibility Study for Demonstration of Fuel Cell (FC) Truck Technology for Low-Carbon Medium- and Long-Distance Overland Freight Transport

- **Project outline:** F/S for demo of FC trucks in Thai by installing FC modules and H_2 tank system on EV 6-wheel trucks. By converting EV trucks to FC trucks and extending the driving range, aiming for decarbonize medium- to long-distance transportation.
- **Organization name, Partner organization name:** Toyota Tsusho Corporation, DENSO Corporation, NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.
- **Funding organization, Contents, Terms:** NEDO, F/S for overseas demo using JCM. From August 2023 to July 2024

Image of demo (assumption)



Scheme of F/S for demo



Projects supported by the Government of Japan (GoJ)

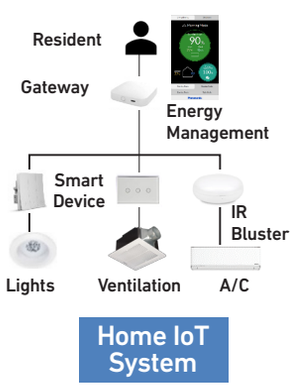
Transitions in Industry/Transport sector

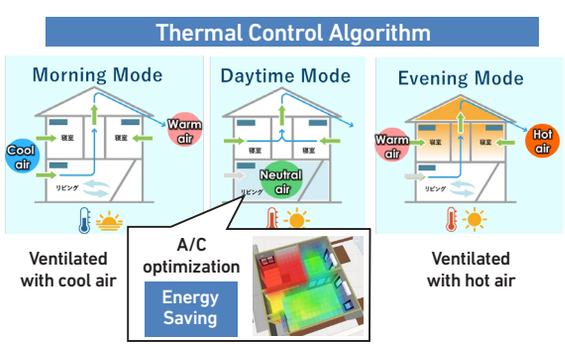
Actual proof of thermal control Home IoT system and living space design technology that achieves both comfort and energy saving in Thailand houses

Panasonic

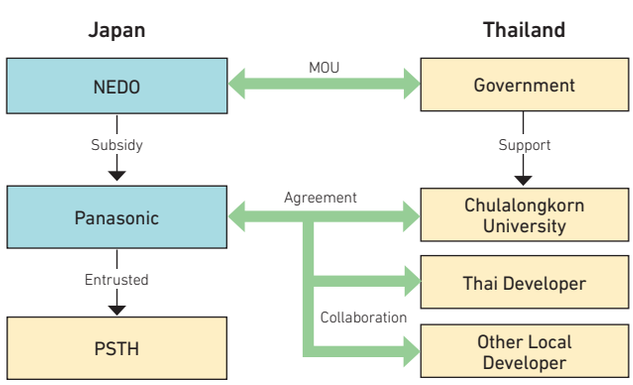
- **Project outline:** Demonstration experiments with the aim of implementing it in Home IoT and establishing spatial performance design technology.
- **Organization name:** Panasonic Corporation
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / July 2023-Sep. 2023 (Awaiting Stage Gate Screening)
- **URL:** https://www.panasonic.com/jp/about.html

An IoT system that predicts the thermal environment based on outside temperature and room temperature information, balances heat through coordinated control of air conditioners and ventilation and reduces cooling load while maintaining comfort.





Project scheme



Demonstration Site Facilities (Houses and Flats)

Projects supported by the Government of Japan (GoJ)

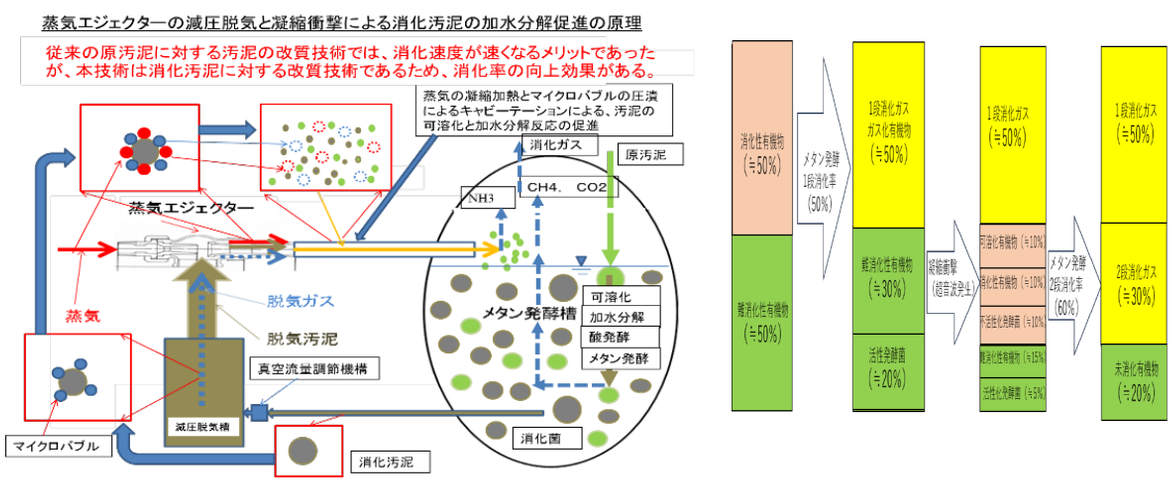
Transitions in Industry/Transport sector

Verification Survey to improve energy conversion efficiency related to existing methane fermentation

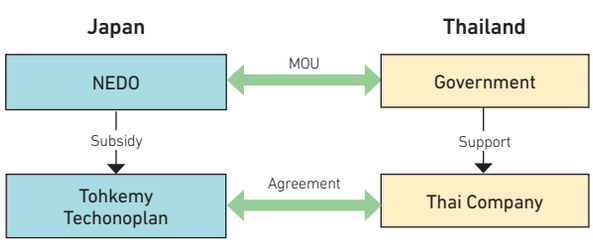
株式会社 トーケミ
TOHKEMY CORPORATION

- **Project outline:** demonstration study on a service business that allows rental of fermentation accelerators using steam ejectors at existing methane fermentation facilities in Thailand.
- **Organization name:** Tohkemy Corporation (prime), Technoplan Inc. (sub)
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) /Dec. 2023-Sep. 2024
- **URL:** https://www.tohkemy.co.jp/

By attaching a steam ejector to the existing methane fermentation tank and solubilizing the fermented digestive fluid, we can improve the organic matter gasification rate and fermentation speed through two-stage fermentation.



Project Scheme



Projects supported by the Government of Japan (GoJ)

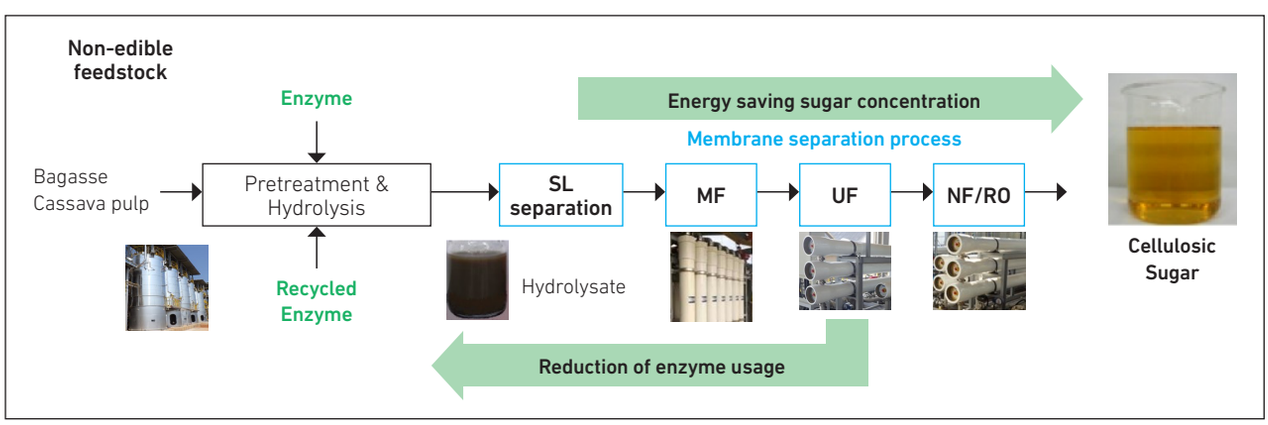
Transitions in Industry/Transport sector

The Demonstration Project for an Energy-Saving Cellulosic Sugar Production System Using Bagasse

TORAY
DM三井製糖

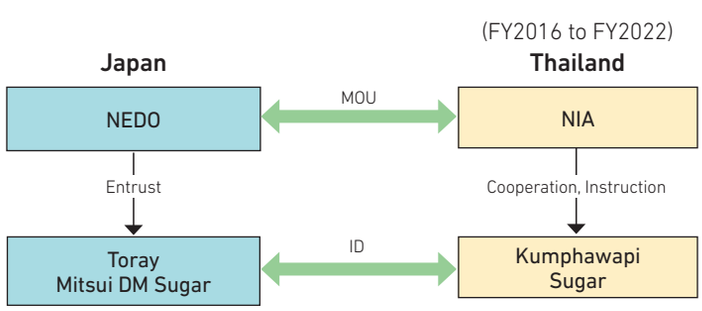
- **Project outline:** The demonstration project for the production of Cellulosic Sugar and high value-added products (Oligosaccharide and Polyphenol) from bagasse and the independent production of cellulosic sugars derived from cassava pulp as the other raw materials was conducted from FY 2016 to FY 2022. As a follow-up, a survey of Thai raw material companies, a cellulose sugar conversion technology, a cellulose sugar LCA evaluation, and a survey on obtaining external certification will be conducted.
- **Organization name:** TORAY
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Follow-up) / May 2023-Mar. 2024
- **URL:** https://www.toray.co.jp/news/details/20230410162320.html

Project outline



Plant owner: Cellulosic Biomass Technology Co., Ltd. (Toray and Mitsui Sugar Co., Ltd., set up)

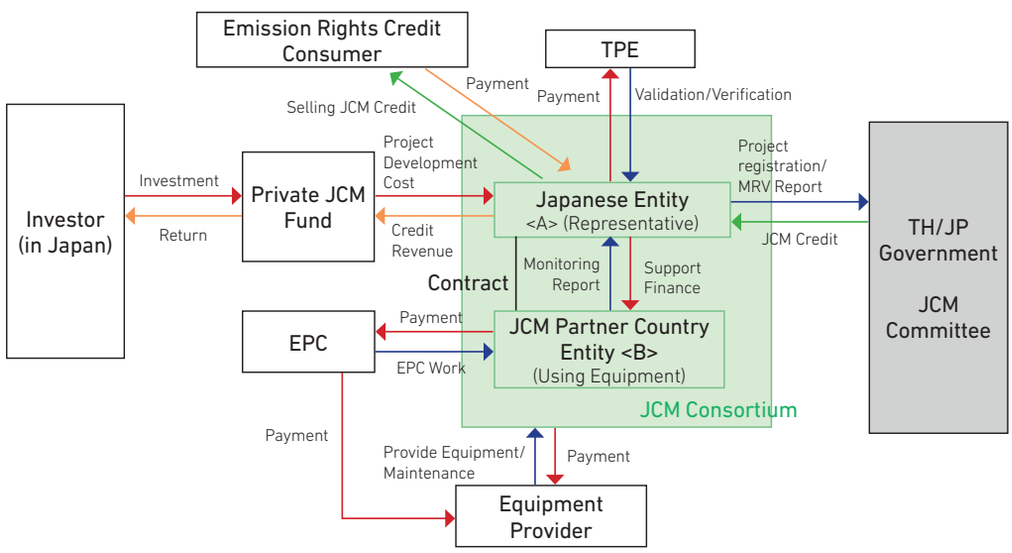
Project Scheme



Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Feasibility study for JCM project implementation of biomass boiler utilization with private sector funding

- **Project outline:** Introduce biomass boiler for factories with using a private sector funding JCM in Thailand. A JCM fund will be established by Japanese investors, providing financial support for the installation and operation of the equipment, as a part of contributions by Japan.
- **Organization name:** Tepia Corporation Japan, Company in Partner country (TBD)
- **Funding organization, Contents, Terms:** JCM Feasibility Study by METI
- **URL:** https://www.pacific.co.jp/news/2023/20230922-001143.html



The benefits of private sector JCM

- By assuming investment with private funds, possible to generate more projects.
- Allows for a higher degree of flexibility in project design, including the amount, methods, implementation period, and timing of fund allocation to partner-country companies.

Projects supported by the Government of Japan (GoJ)

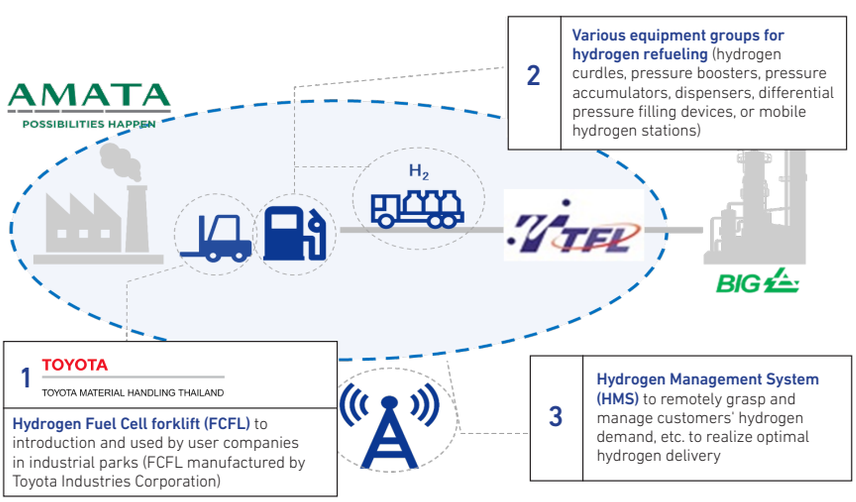
Transitions in Industry/Transport sector

Feasibility Study on the Optimal Hydrogen Distribution Method in Amata City Chonburi Industrial Estate to Promote the Use of Fuel Cell Forklift (FCFL)

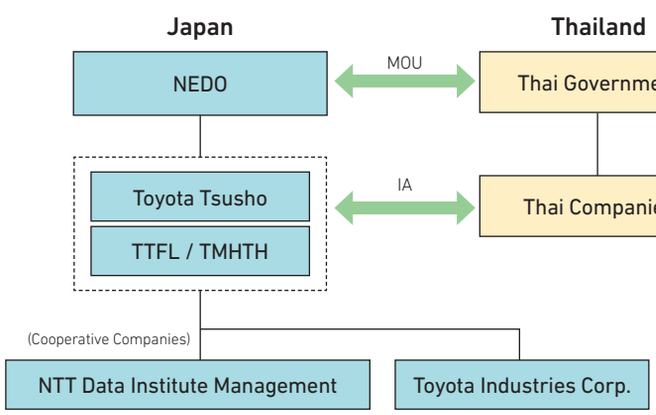
豊田通商株式会社
NTT DATA
株式会社 NTTデータ 経営研究所

- **Project outline:** In the Amata City Chonburi Industrial Estate in Thailand, we will (1) study the optimal method of hydrogen distribution to FCFLs and (2) conduct a demonstration study on the feasibility of establishing a hydrogen management system (HMS) that remotely assesses customer hydrogen demand and performs optimal hydrogen distribution.
- **Organization name:** Toyota Tsusho Corporation, NTT Data Institute of Management Consulting
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Jul. 2023–Sep. 2023 (Awaiting Stage Gate Screening)
- **URL:** https://www.toyota-tsusho.com, https://www.nttdata-strategy.com/

Project outline



Project Scheme



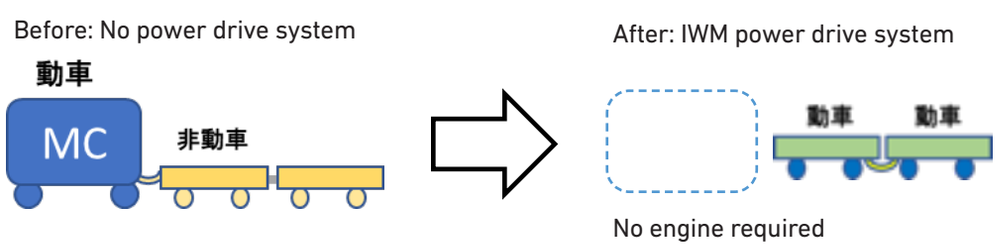
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

A basic study for applying in-wheel motor technology to railroad maintenance vehicle

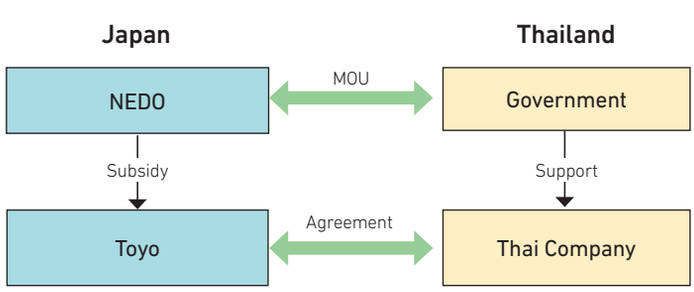
東洋機械株式会社

- **Project outline:** The introduction of an electric track maintenance vehicle, manufactured and sold in Thailand, could contribute to achieve energy savings and reduce greenhouse gas (GHG) emissions.
- **Organization name:** Toyo Machinery Corporation
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Oct. 2022–Sep. 2023 (Awaiting Stage Gate Screening)
- **URL:** https://www.toyo-kikai.co.jp/index.html

This study aims to investigate the feasibility of adopting individual drive technology, represented by in-wheel motors, to convert diesel engine-driven Track Maintenance Vehicles (TMVs) into electric vehicles (EVs).



Project scheme

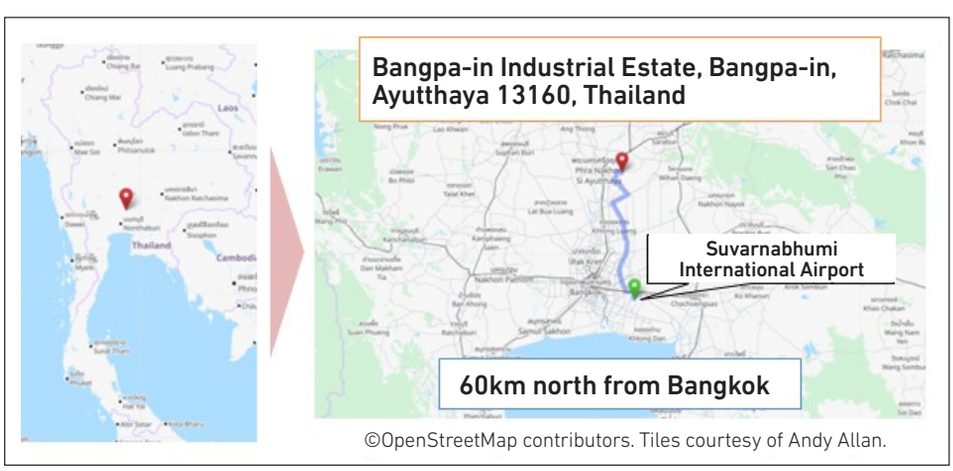


Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

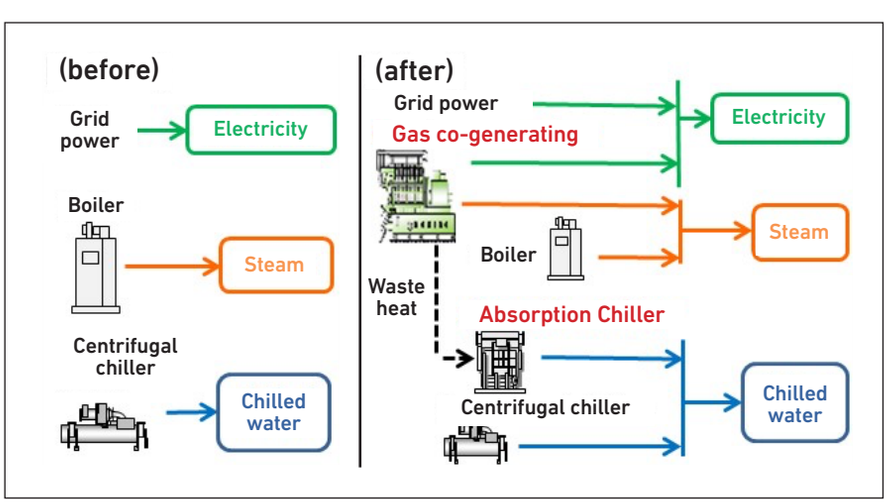
Introduction of Gas Co-generation System and Absorption Chiller to Fiber Factory

Kansai Electric Power
power with heart

- **Project outline:** This project reduces CO_2 emissions by introducing gas co-generation system (5 MW class x 2set) and absorption chiller (800 USRT class) to fiber factory. These gas co-generation system and absorption chiller contribute to energy saving and cost reduction, and can improve reliability for power supply (Expected GHG Emission Reductions: 16,158 tCO_2/year).
- **Organization name, Partner organization name:** (Japan) Kansai Electric Power Co., Inc., (Thailand) Kansai Energy Solutions (Thailand) Co., Ltd
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2018)
- **URL:** https://gec.jp/jcm/projects/18pro_tha_01/



Sites of JCM Model Project



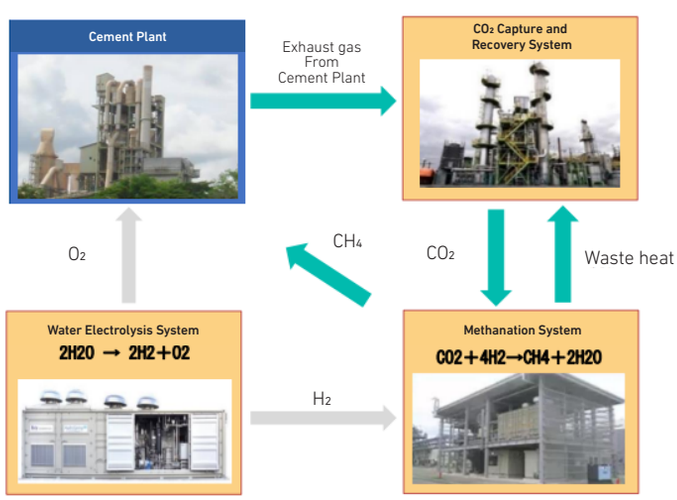
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Basic study to demonstrate the carbon capture and utilization from cement plants exhaust gas in Thailand and Southeast Asia, with the aim of promoting Japanese CCUS technology

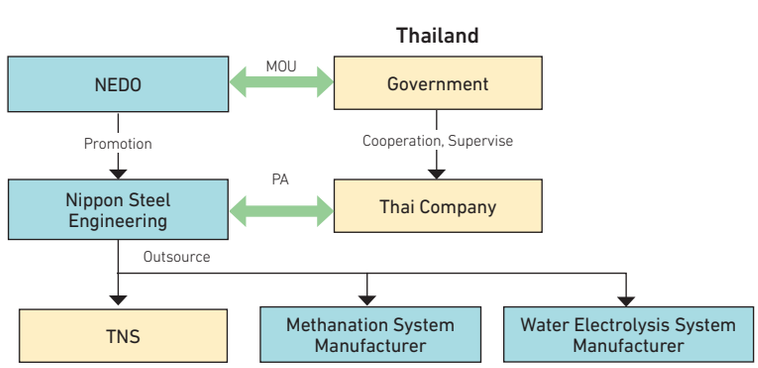
日鉄エンジニアリング

- **Project outline:** In Thailand, we will apply our CO_2 capture and recovery technology to build a CO_2 capture and utilization (methanation) model that can handle cement plant exhaust gas, as well as a CO_2 capture and utilization system that effectively uses waste heat from the methanation facility to save energy.
- **Organization name:** Nippon Steel Engineering
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Oct. 2022–Jul. 2023 (Awaiting Stage Gate Screening)
- **URL:** https://www.eng.nipponsteel.com/news/release_20230112.pdf

Project outline



Project Scheme



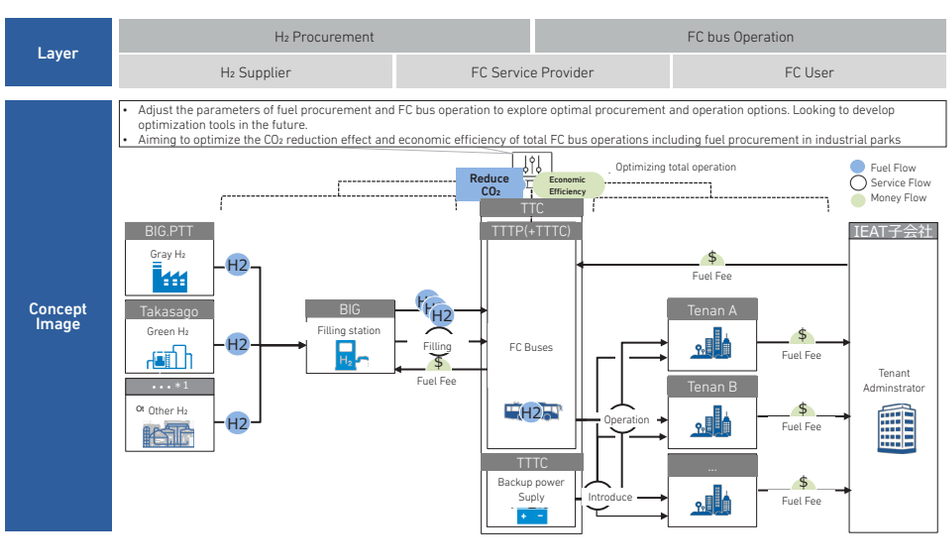
Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

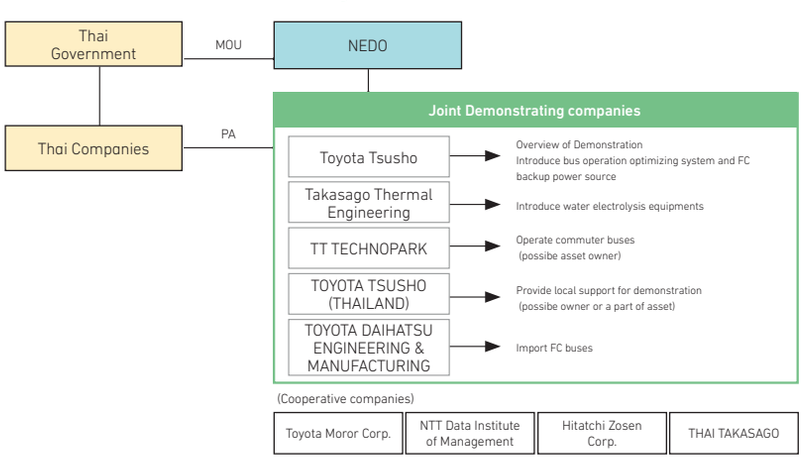
Demonstration study of fuel cell (FC) bus operation system for low-carbon industrial park

- **Project outline:** Construct a series of operation systems (from hydrogen generation and procurement to optimization of bus operation) for Thailand's first FC bus service at Map Ta Phut New Smart Industrial Estate, and verify performance, safety, and operation through long-term and continuous operation in the Thai environment.
- **Organization name:** NTT Data Institute of Management Consulting, Toyota Tsusho Corporation, Takasago Thermal Engineering
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Basic Study) / Jul. 2023–Mar. 2024
- **URL:** https://www.nttdata-strategy.com/, https://www.toyota-tsusho.com/, https://www.tte-net.com/index.html

Project outline



Project Scheme



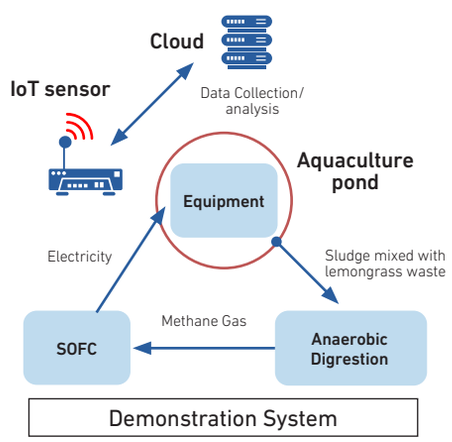
Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

CNA (Carbon Neutral Aquaculture) Project in Mekong

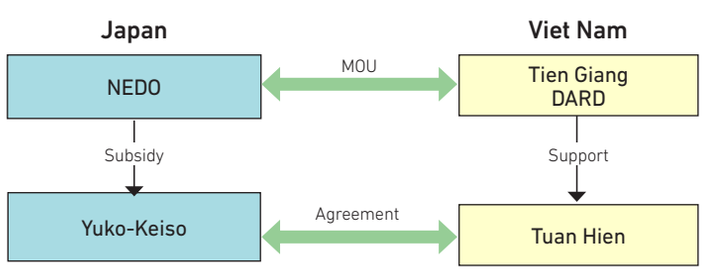
Yuko-Keiso

- **Project outline:** The demonstration examined the technological requirements and economic aspects of a packaged shrimp aquaculture pond system, assuming introduction in the Mekong Delta region of southern Viet Nam.
- **Organization name:** Yuko-Keiso Corporation Limited
- **Regions:** Tien Giang Province
- **Funding organization, Contents, Terms:** NEDO / International Demonstration Project on Japan's Energy Efficiency Technologies (Demonstration) / Jul.2020-Dec.2025
- **URL:** http://www.yukokeiso.com/, http://www.yukokeiso.com/news/3293/

The demonstration research would incorporate biogas-fed SOFC and IoT for enhancing productivity, whereby such biogas will be produced from the shrimp pond sludge mixed with lemongrass waste collected from local farms.



Project scheme



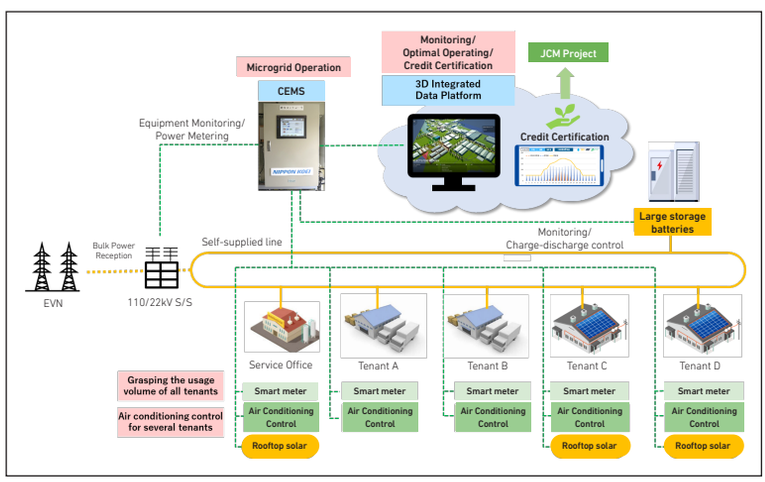
Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

Private-sector JCM feasibility study on integrated energy management and data platform in industrial parks

- **Project outline:** In an industrial park in Viet Nam, the project aims to realize integrated energy management by installing smart meters for all tenants, controlling air conditioning at individual tenants, operating micro-grids with expansion of rooftop solar panels, storage batteries, and CEMS, and integrating them into a data platform.
- **Organization name:** Sojitz Corporation, Nippon Koei Co., Ltd.
- **Region:** Dong Nai Province
- **Funding organization, Contents, Terms:** JCM Feasibility Study by METI
- **URL:** https://www.sojitz.com/en/business/infra_health.php

Image of Project Outline



Project Schedule

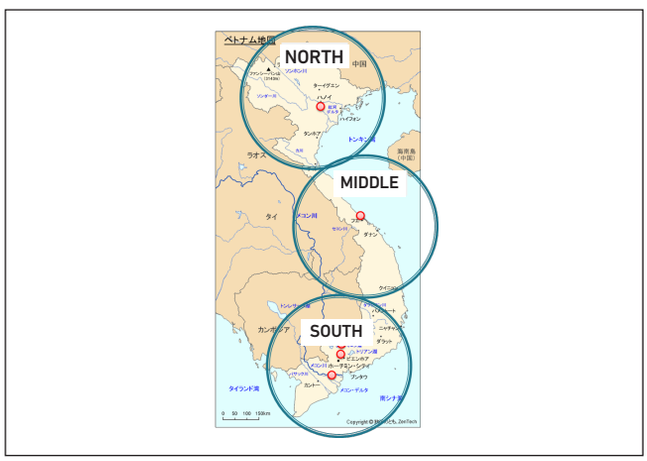
Project	2022	2023	2024	2025
1 Introduction of Smart meter/ Integrated Data PF		Business study/ Demonstration test	JCM project (Several tenants)	Business Expansion/ Collaboration with CEMS JCM project (All tenants)
2 Introduction of air conditioning control		Business study/ Candidate selection	JCM project (A few tenants)	Business Expansion/ JCM project (Several tenants)
3-1 Expand introduction of solar power 3-2 Microgrid Operating with Storage Battery/ CEMS	Solar power generation business (existing)	Business study		Expansion of existing business Introduction of storage batteries, CEMS JCM project (Several tenants)

Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

Feasibility Study for Demonstration of Wastewater Heat Recovery and Geothermal Heat Utilization Technology

- **Project outline:** Introducing Wastewater Heat Recovery and Geothermal Heat Utilization Technology into the food manufacturing factories (3 locations) in Viet Nam. Then applying the Joint Crediting Mechanism (JCM) to quantify the obtained GHG emission reduction effect.
- **Organization name, Partner organization name:** Asano Taiseikiso Engineering Co., Ltd., C.P.Vietnam Corporation
- **Funding organization, Contents, Terms:** NEDO, JCM Low-carbon Demonstration Project. From September 2023 to September 2024.

Planned Demonstration Sites



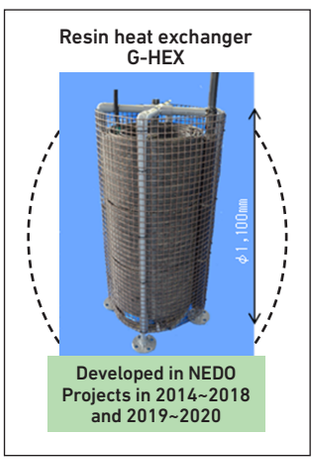
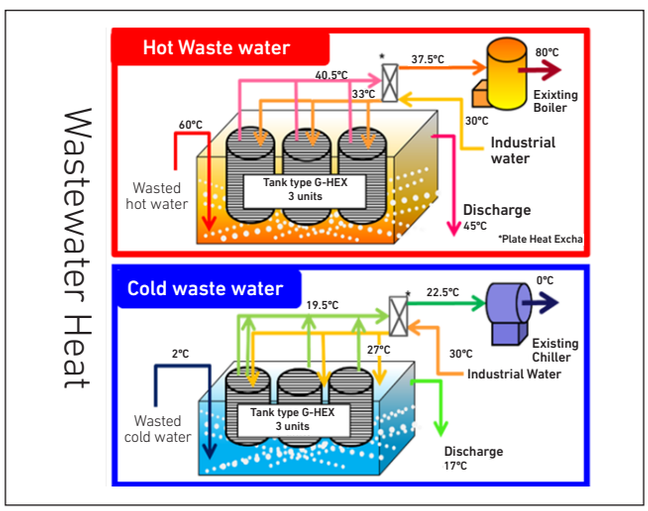
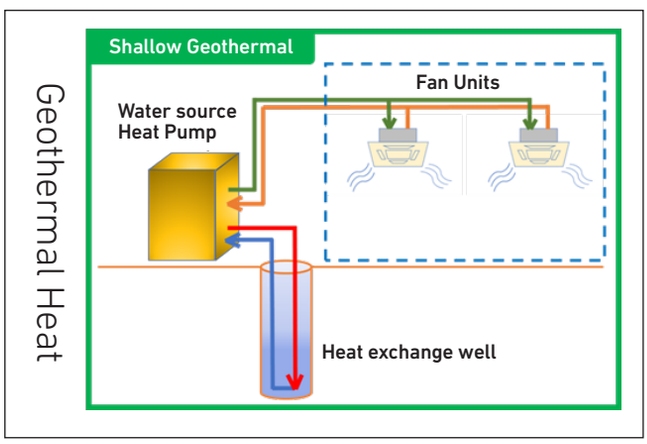


Image of Introduced Technology





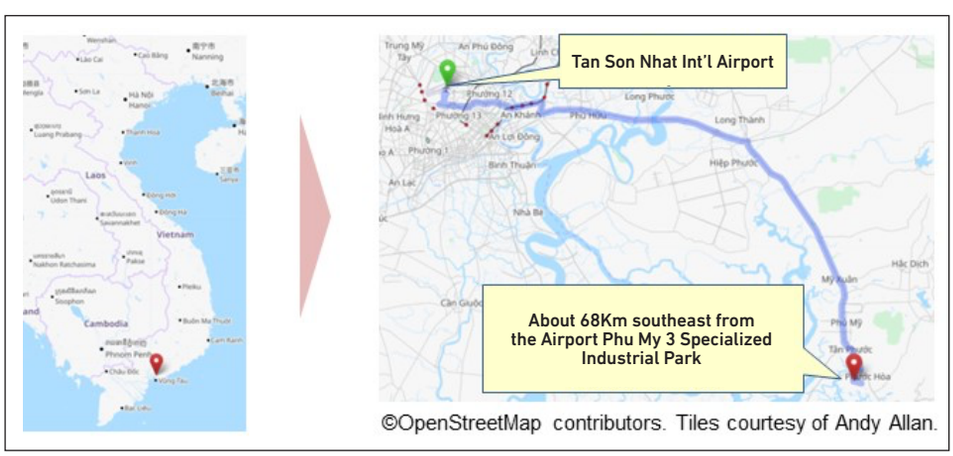
Projects supported by the Government of Japan (GoJ)

Transitions in Industry/Transport sector

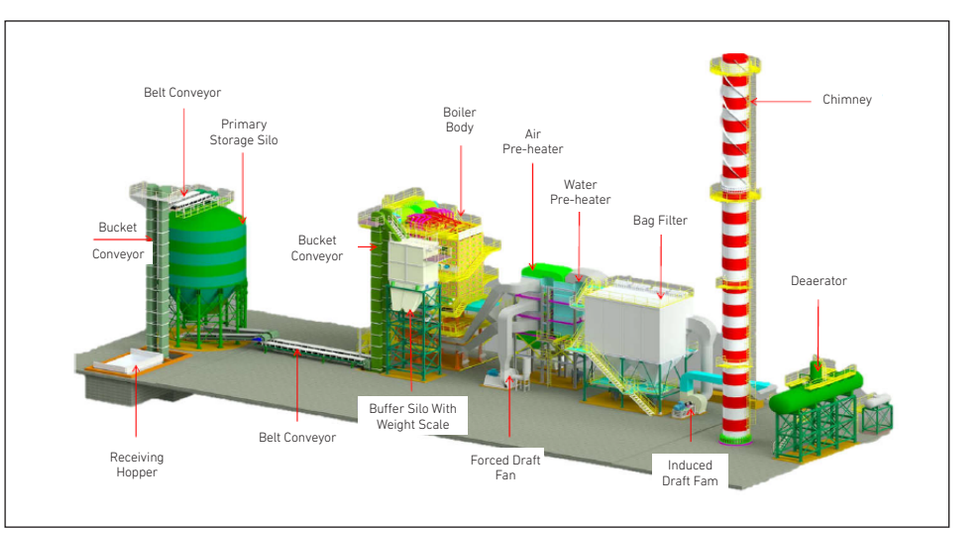
Introduction of Biomass Boiler to Chemical Factory

DAIICHI JITSUGYO CO., LTD.

- **Project outline:** This project introduces biomass (rice husk) -fueled steam boilers to supply steam to a chemical factory located in Phu My 3 Specialized Industrial Park in Ba Ria Vung Tau Province. The project contributes to the achievement of the country's Vision by 2030 and Green Growth Strategy through achieving decarbonization by introducing biomass-fueled steam boilers instead of fossil fuel-fired boilers (Expected GHG Emission Reductions: 12,086 tCO_2/year).
- **Organization name, Partner organization name:** (Japan) Daiichi Jitsugyo Co., Ltd. (Viet Nam) THUAN HAI CORPORATION
- **Funding organization, Contents, Terms:** Ministry of the Environment Japan: JCM Model Project (FY2019)
- **URL:** https://gec.jp/jcm/projects/19pro_vnm_03/



Sites of JCM Model Project



Projects supported by the Government of Japan (GoJ)
Transitions in Industry/Transport sector

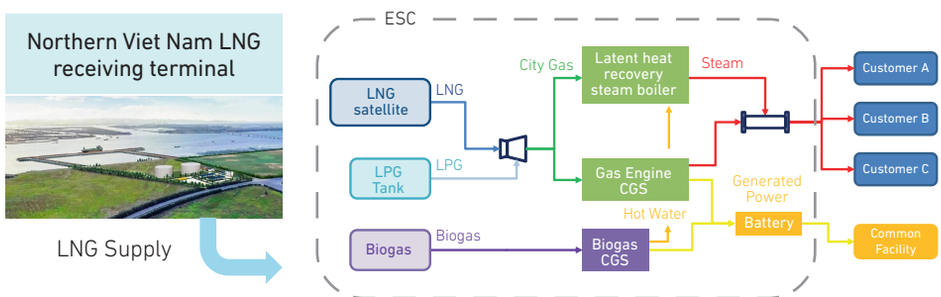
Feasibility Study on "energy service (ES) with BCP function" in an industrial park (IP) that enables the supply of high-quality LNG and the succession of operational and safety skills

- **Project outline:** To evaluate the feasibility of ES business at an IP, incl. high-quality LNG supply with HV* adjustments via LPG, and high-efficiency gas equipment introduction (also considering about energy saving and CO_2 reduction, inheritance of Japanese operational & safety skills, and BCP)
- **Organization name, Partner organization name:** Japan Petroleum Exploration Co. Ltd.
- **Funding organization, Contents, Terms:** "Feasibility Study Project for Overseas Deployment of High Quality Energy Infrastructure" by Ministry of Economy, Trade and Industry
- **URL:** https://www.japex.co.jp/en/news/detail/20230810_02/

* HV: Heat Value

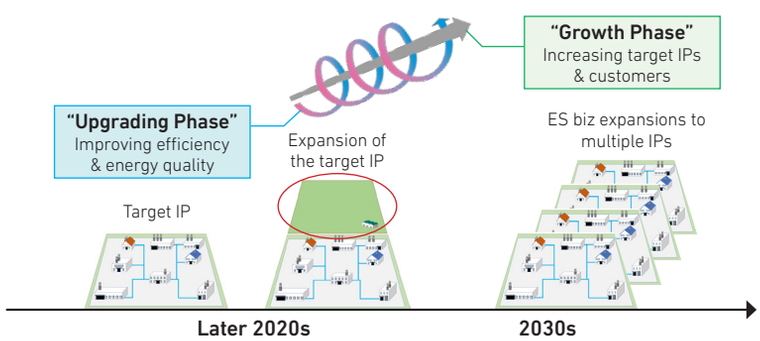
Project outline

- Targeting an IP in northern Viet Nam, an energy service center (ESC) within such park is established, and heat or city gas energy service is provided to multiple customers.



ES Project Growth

- To start ES business in the targeted industrial park(including its expansion area) in the late 2020s.
- To expand ES business to multiple IPs in the 2030s.



JCM Projects in AZEC partners by MOEJ

The Ministry of the Environment, Japan (MOEJ) provide financial support for 175 JCM projects in AZEC partners in the field of Energy Efficiency, Effective Use of Energy, Renewable Energy, Waste Handling and Disposal.

List of JCM Projects in AZEC partners by MOEJ

(As of November 17, 2023)

Project outline	Organization	URL
Cambodia / Introduction of 0.9MW Solar Power System at International School	Asian Gateway Corporation	https://gec.jp/jcm/projects/19pro_khm_02/
Cambodia / Introduction of High Efficiency LED Lighting Utilizing Wireless Network	MinebeaMitsumi Inc.	https://gec.jp/jcm/projects/15pro_cam_01/
Cambodia / Introduction of Ultra-lightweight Solar Panels for Power Generation at International School	Asian Gateway Corporation	https://gec.jp/jcm/projects/15pro_cam_02/
Cambodia / Introduction of 1MW Solar Power System and High Efficiency Centrifugal Chiller in Large Shopping Mall	AEON MALL Co., Ltd.	https://gec.jp/jcm/projects/16pro_cam_01/
Cambodia / Energy Saving by Inverters for Distribution Pumps in Water Treatment Plant	METAWATER Co., Ltd.	https://gec.jp/jcm/projects/16pro_cam_03/
Indonesia / Energy Saving for Air-conditioning and Process Cooling at Textile Factory 1	EBARA REFRIGERATION EQUIPMENT & SYSTEMS CO., LTD.	http://gec.jp/jcm/projects/13pro_ina_01_1/
Indonesia / Energy Saving for Air-conditioning and Process Cooling at Textile Factory 2	EBARA REFRIGERATION EQUIPMENT & SYSTEMS CO., LTD.	http://gec.jp/jcm/projects/13pro_ina_01_2/
Indonesia / Installation of Inverter-type Air Conditioning System LED Lighting and Separate Type Fridge Freezer Showcase to Grocery Stores in Republic of Indonesia	Lawson, Inc.	http://gec.jp/jcm/projects/13pro_ina_02/
Indonesia / Energy Efficient Refrigerants to Cold Chain Industry	Mayekawa Manufacturing Co., Ltd.	http://gec.jp/jcm/projects/13pro_ina_03/
Indonesia / Energy Saving by Installation of Double Bundle-type Heat Pump	Toyota Tsusho Corporation	http://gec.jp/jcm/projects/13pro_ina_04/
Indonesia / Power Generation by Waste-heat Recovery in Cement Industry	JFE Engineering Corporation	http://gec.jp/jcm/projects/14pro_ina_02/
Indonesia / Energy Saving through Introduction of Regenerative Burners to the Aluminum Holding Furnace of the Automotive Components Manufacturer	Toyotsu Machinary Corporation	http://gec.jp/jcm/projects/14pro_ina_03/
Indonesia / Energy Saving for Textile Factory Facility Cooling by High Efficiency Centrifugal Chiller	EBARA REFRIGERATION EQUIPMENT & SYSTEMS CO., LTD.	http://gec.jp/jcm/projects/14pro_ina_04/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Indonesia / Installation of Solar Power System and Storage Battery to Commercial Facility	Itochu Corporation	http://gec.jp/jcm/projects/14pro_ina_05/
Indonesia / Reducing GHG emission at textile factories by upgrading to air-saving loom	Toray Industries, Inc.	http://gec.jp/jcm/projects/14pro_ina_06/
Indonesia / Introduction of high efficient Old Corrugated Cartons Process at Paper Factory	KANEMATSU CORPORATION	http://gec.jp/jcm/projects/14pro_ina_07/
Indonesia / Energy Saving for Air-Conditioning at Shopping Mall with High Efficiency Centrifugal Chiller	NTT FACILITIES, INC.	http://gec.jp/jcm/projects/15pro_ina_01/
Indonesia / Energy Saving for Industrial Park with Smart LED Street Lighting System	NTT FACILITIES, INC.	http://gec.jp/jcm/projects/15pro_ina_02/
Indonesia / Introduction of High Efficiency Once-through Boiler System in Film Factory	Mitsubishi Chemical Corporation	http://gec.jp/jcm/projects/15pro_ina_03/
Indonesia / Installation of Gas Co-generation System for Automobile Manufacturing Plant	Toyota Tsusho Corporation	http://gec.jp/jcm/projects/15pro_ina_04/
Indonesia / Introduction of High Efficiency Once-through Boiler in Golf Ball Factory	Sumitomo Rubber Industries, Ltd.	http://gec.jp/jcm/projects/15pro_ina_05/
Indonesia / 1.6MW Solar PV Power Plant Project in Jakabaring Sport City	Sharp Energy Solutions Corporation	http://gec.jp/jcm/projects/15pro_ina_06/
Indonesia / 10MW Mini Hydro Power Plant Project in North Sumatra	Toyo Energy Farm Co., Ltd.	http://gec.jp/jcm/projects/16pro_ina_01/
Indonesia / Introduction of LED Lighting to Sales Stores	FAST RETAILING CO., LTD.	http://gec.jp/jcm/projects/16pro_ina_02/
Indonesia / Introduction High Efficiency Looms in Weaving Mill	Nisshinbo Textile Inc.	http://gec.jp/jcm/projects/16pro_ina_03/
Indonesia / Energy Saving in Industrial Wastewater Treatment System for Rubber Industry	EMATEC:Environmental Management and Technology Center	http://gec.jp/jcm/projects/16pro_ina_05/
Indonesia / Introduction of 0.5MW Solar Power System to Aroma and Food Ingredients Factory	Next Energy & Resources Co., Ltd.	http://gec.jp/jcm/projects/16pro_ina_06/
Indonesia / Introduction of Gas Co-generation System and Absorption Chiller to Motor Parts Factory	DENSO CORPORATION	http://gec.jp/jcm/projects/17pro_ina_03/
Indonesia / Introduction of Absorption Chiller to Chemical Factory	Tokyo Century Corporation	http://gec.jp/jcm/projects/17pro_ina_04/
Indonesia / Energy Saving by Introducing High Efficiency Autoclave to Infusion Manufacturing Factory1	Otsuka Pharmaceutical Factory, Inc.	http://gec.jp/jcm/projects/18pro_ina_02/
Indonesia / Introduction of CNG-Diesel Hybrid Equipment to Public Bus in Semarang	Hokusan Co., Ltd.	http://gec.jp/jcm/projects/18pro_ina_03/
Indonesia / Rehabilitation Project of Power Generation System at Karai 7 Mini Hydro Power Plant	Voith Fuji Hydro K. K.	http://gec.jp/jcm/projects/18pro_ina_05/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Indonesia / Introduction of High Efficiency Injection Molding Machine to Plastic Parts Factory	Tokyo Century Corporation	http://gec.jp/jcm/projects/18pro_ina_07/
Indonesia / 2MW Mini Hydro Power Plant Project in East Nusa Tenggara Province	AURA-Green Energy Co., Ltd.	http://gec.jp/jcm/projects/19pro_idn_01/
Indonesia / Introduction of High Efficiency Boiler System to Carton Box Factory	Japan Pulp and Paper Company Limited	http://gec.jp/jcm/projects/19pro_idn_02/
Indonesia / 10MW Hydro Power Project in Bengkulu Province	Voith Fuji Hydro K.K.	http://gec.jp/jcm/projects/19pro_idn_03/
Indonesia / 6MW Hydro Power Project in West Sumatera Province	Voith Fuji Hydro K.K.	http://gec.jp/jcm/projects/19pro_idn_04/
Indonesia / 6MW Mini Hydro Power Plant Project in West Pasaman, West Sumatra	NiX JAPAN Co., Ltd.	http://gec.jp/jcm/projects/20pro_idn_01/
Indonesia / 5MW Hydro Power Project in Bengkulu Province	Voith Fuji Hydro K.K.	http://gec.jp/jcm/projects/20pro_idn_02/
Indonesia / 4.2MW Rooftop Solar Power Project to Pharmaceutical Factories, Vehicles Dealers, and Timber Factories	Alamport Inc.	http://gec.jp/jcm/projects/20pro_idn_03/
Indonesia / 8MW Mini Hydro Power Plant Project in Maluku Province	AURA-Green Energy Co., Ltd.	http://gec.jp/jcm/projects/20pro_idn_04/
Indonesia / REDD+ project in Boalemo District	KANEMATSU CORPORATION	https://gec.jp/jcm/projects/16redd_ina_01/
Indonesia / Introduction of 3.3MW Rooftop Solar Power System in Woodworking Factories	Sumitomo Forestry Co., Ltd.	https://gec.jp/jcm/projects/21pro_idn_01/
Indonesia / Introduction of High-Efficiency Thermal Oil Heater System in Chemical Factory	FUMAKILLA LIMITED	https://gec.jp/jcm/projects/21pro_idn_02/
Indonesia / 6MW Mini Hydro Power Plant Project in Besay River, Lampung Province	WWS-JAPAN Co.	https://gec.jp/jcm/projects/21pro_idn_03/
Indonesia / Energy Saving by Introducing High Efficiency Autoclave to Infusion Manufacturing Factory 2	Otsuka Pharmaceutical Factory, Inc.	https://gec.jp/jcm/projects/21pro_idn_04/
Indonesia / 2.3 MW Mini Hydro Power Plant Project in Melesom River, Lampung Province	WWS-JAPAN Co.	https://gec.jp/jcm/projects/21pro_idn_05/
Indonesia / Introduction of High-efficiency Once-through Boiler System to Chemical Factory	DIC Corporation	https://gec.jp/jcm/projects/22pro_idn_01/
Indonesia / Introduction of 3.1MW Rooftop Solar Power System to Fast-Moving Consumer Goods and Printing Factories in Java Island	Alamport Inc.	https://gec.jp/jcm/projects/22pro_idn_03/
Indonesia / Introduction of 2.1MW Solar Power System to Steel Wire Products and Aluminum Factories	Tokyo Century Corporation	https://gec.jp/jcm/projects/22pro_idn_04/
Indonesia / 3.5MW Mini Hydro Power Plant at Pungga River in North Sumatra	SDG Impact Japan Inc.	https://gec.jp/jcm/projects/22pro_idn_05/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Indonesia / Installation of Energy Saving Equipment and Solar Power System to Complex Building in Jakarta	Yuko Keiso Co., Ltd.	https://gec.jp/jcm/projects/22pro_idn_06/
Indonesia / Introduction of 5MW Solar Power System to Vehicle and Engine Plants	Toyota Motor Corporation	https://gec.jp/jcm/projects/22pro_ind_02/
Indonesia / Patuha Unit-2 55MW Geothermal Power Generation Project	PT Geo Dipa Energi	https://gec.jp/jcm/projects/23jfjcm_idn_01/
Indonesia / 12MW Biomass Power Plant Project in Aceh Province, Sumatera	AURA Green Energy Co.,Ltd	https://gec.jp/jcm/projects/23pro_idn_01/
Indonesia / Improvement of Combustion Method and Furnace Shapes in Flat Glass Production Melting Furnace	AGC Inc.	https://gec.jp/jcm/projects/23pro_idn_02/
Indonesia / Introduction of 3MW Rooftop Solar Power System to Paper Factory in Java Island	Alamport Inc.	https://gec.jp/jcm/projects/23pro_idn_03/
Lao PDR / REDD+ project in Luang Prabang Province through controlling slush-and-burn	Waseda University	https://gec.jp/jcm/projects/16redd_lao_01/
Lao PDR / Introduction of 14MW floating solar power system in Vientiane	TSB Co., Ltd.	https://gec.jp/jcm/projects/17pro_lao_01/
Lao PDR / Introduction of Amorphous High Efficiency Transformers in Power Grid	Yuko Keiso Co., Ltd.	https://gec.jp/jcm/projects/17pro_lao_02/
Lao PDR / 11MW Solar Power Project in Savannakhet Province	Sharp Energy Solutions Corporation	https://gec.jp/jcm/projects/18pro_lao_01/
Lao PDR / 15MW Solar Power Project in Xiangkhouang Province	Liberal Solution Co., Ltd.	https://gec.jp/jcm/projects/21pro_lao_01/
Lao PDR / Introduction of Amorphous High Efficiency Transformers in Power Grid II	Yuko Keiso Co., Ltd.	https://gec.jp/jcm/projects/22pro_lao_01/
Philippines / Introduction of 1.53MW Rooftop Solar Power System in Auto Parts Factories	Tokyo Century Corporation	https://gec.jp/jcm/projects/17pro_phl_03/
Philippines / Introduction of 1MW Rooftop Solar Power System in Vehicle Assembly Factory	Toyota Motor Corporation	https://gec.jp/jcm/projects/17pro_phl_04/
Philippines / Installation of 1.2MW Rooftop Solar Power System in Refrigerating Warehouse	Tokyo Century Corporation	https://gec.jp/jcm/projects/17pro_phl_05/
Philippines / Introduction of 4MW Rooftop Solar Power System in Tire Factory	Sharp Energy Solutions Corporation	https://gec.jp/jcm/projects/18pro_phl_02/
Philippines / 9.6MW Solar Power Project in Collaboration with Power-supply Company	Tokyo Century Corporation	https://gec.jp/jcm/projects/19pro_phl_02/
Philippines / Biogas Power Generation and Fuel Conversion Project in Pineapple Canneries	ITOCHU Corporation	https://gec.jp/jcm/projects/19pro_phl_03/
Philippines / 29MW Binary Power Generation Project at Palayan Geothermal Power Plant	Mitsubishi Heavy Industries, Ltd.	https://gec.jp/jcm/projects/20pro_phl_01/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Philippines / Development of a Fluorocarbon Collection and Destruction Model Project in Metro Manila, Philippines Utilizing Mixed Combustion Technologies	Marubeni Corporation	https://gec.jp/jcm/projects/21fgas_phl_01/
Philippines / Tanawon 20MW Flash Geothermal Power Plant Project	Mizuho-Toshiba Leasing Company Ltd.	https://gec.jp/jcm/projects/21pro_phl_02/
Philippines / 28MW Binary Power Generation Project at Mahanagdong Geothermal Power Plant	JGC CORPORATION	https://gec.jp/jcm/projects/22pro_phl_01/
Philippines / 14.5MW Mini Hydro Power Plant Project in Siguil River in Mindanao	Toyota Tsusho Corporation	https://gec.jp/jcm/projects/22pro_phl_02/
Philippines / Energy Supply Project by 9MW Solar Power System to Ceramic Factory and Cement Plant	Marubeni Corporation	https://gec.jp/jcm/projects/22pro_phl_03/
Philippines / Introduction of 0.8MW Solar Power System to Aluminum Products, Packaging Materials and Automotive Parts Factories (JCM Eco Lease Scheme)	Tokyo Century Corporation	https://gec.jp/jcm/projects/22pro_phl_04/
Philippines / 5.6MW Geothermal Binary Power Generation Project in Northern Negros	JGC CORPORATION	https://gec.jp/jcm/projects/22pro_phl_05/
Philippines / Introduction of 6MW Power Generation System by Waste Heat Recovery for Cement Plant	Global Engineering Co., Ltd.	https://gec.jp/jcm/projects/23pro_phl_01/
Philippines / 27MW Solar Power Project in Dagohoy, Bohol Island	Kyuden International Corporation	https://gec.jp/jcm/projects/23pro_phl_02/
Philippines / Introduction of 1.2MW Rooftop Solar Power System to Electronic Equipment Assembly Factory (JCM Eco Lease Scheme)	Tokyo Century Corporation	https://gec.jp/jcm/projects/23pro_phl_03/
Thailand / Introduction of 2MW Rooftop Solar Power System to University	SHIZUOKA GAS CO., LTD.	http://gec.jp/jcm/projects/20pro_tha_06/
Thailand / Introduction of 32MW Rooftop and Floating Solar Power System to Factories	Shizen Energy Inc.	http://gec.jp/jcm/projects/20pro_tha_07/
Thailand / Energy Saving at Convenience Stores with High Efficiency Air-Conditioning and Refrigerated Showcase	FamilyMart Co., Ltd.	https://gec.jp/jcm/projects/15pro_tha_01/
Thailand / Reducing GHG Emission at Textile Factory by Upgrading to Airsaving Loom (Samutprakarn)	Toray Industries, Inc.	https://gec.jp/jcm/projects/15pro_tha_02/
Thailand / Energy Saving for Semiconductor Factory with High Efficiency Centrifugal Chiller and Compressor	Sony Semiconductor Manufacturing Corporation	https://gec.jp/jcm/projects/15pro_tha_03/
Thailand / Introduction of Solar PV System on Factory Rooftop	Pacific Consultants Co., Ltd.	https://gec.jp/jcm/projects/15pro_tha_04/
Thailand / Installation of Co-Generation Plant for On-Site Energy Supply in Motorcycle Factory	NIPPON STEEL & SUMIKIN ENGINEERING CO., LTD.	https://gec.jp/jcm/projects/15pro_tha_05/
Thailand / Installation of High Efficiency Air Conditioning System and Chillers in Semiconductor Factory	Sony Semiconductor Manufacturing Corporation	https://gec.jp/jcm/projects/15pro_tha_06/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Thailand / Energy Saving for Air-Conditioning in Tire Manufacturing Factory with High Efficiency Centrifugal Chiller	Inabata & Co., Ltd.	https://gec.jp/jcm/projects/15pro_tha_07/
Thailand / Introduction of High Efficiency Ion Exchange Membrane Electrolyzer in Caustic Soda Production Plant	AGC Inc.	https://gec.jp/jcm/projects/16pro_tha_01/
Thailand / Introduction of LED Lighting to Sales Stores	FAST RETAILING CO., LTD.	https://gec.jp/jcm/projects/16pro_tha_02/
Thailand / Introduction of High Efficiency Chilled Water Supply System in Milk Factory	TEPIA Corporation Japan Co., Ltd.	https://gec.jp/jcm/projects/16pro_tha_03/
Thailand / Introduction of 12MW Power Generation System by Waste Heat Recovery for Cement Plant	NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.	https://gec.jp/jcm/projects/16pro_tha_04/
Thailand / Introduction of Co-generation System to Motor Parts Factory	DENSO CORPORATION	https://gec.jp/jcm/projects/16pro_tha_05/
Thailand / Introduction of Energy Saving Refrigerator and Evaporator with Mechanical Vapor Recompression in Amino Acid Producing Plant	KYOWA HAKKO BIO CO., LTD.	https://gec.jp/jcm/projects/16pro_tha_06/
Thailand / Introduction of 3.4MW Rooftop Solar Power System to Air-conditioning Parts Factories	Sharp Energy Solutions Corporation	https://gec.jp/jcm/projects/16pro_tha_07/
Thailand / Introduction of 2MW Rooftop Solar Power System for Power Supply in Factory	Finetech Co., Ltd.	https://gec.jp/jcm/projects/16pro_tha_08/
Thailand / Introduction of Energy Efficient Refrigeration System in Industrial Cold Storage	KANEMATSU CORPORATON	https://gec.jp/jcm/projects/16pro_tha_09/
Thailand / Introduction of Heat Recovery Heat Pumps to Food Processing Factory	CPF JAPAN CO., LTD.	https://gec.jp/jcm/projects/16pro_tha_10/
Thailand / Introduction of 5MW Floating Solar Power System on Industrial Water Reservoir	TSB Co., Ltd.	https://gec.jp/jcm/projects/16pro_tha_11/
Thailand / Introduction of 30MW Rooftop Solar Power System to Large Supermarkets	Sharp Energy Solutions Corporation	https://gec.jp/jcm/projects/16pro_tha_12/
Thailand / Introduction of High-efficiency Boiler System to Rubber Belt Plant	BANDO CHEMICAL INDUSTRIES, LTD.	https://gec.jp/jcm/projects/16pro_tha_13/
Thailand / Energy Saving by Air-Conditioning Control System in Precision Parts Factories	YUASA Trading CO., Ltd.	https://gec.jp/jcm/projects/16pro_tha_14/
Thailand / Introduction of Biomass Co-Generation System to Food Factory	Fuji-Foods Corporation	https://gec.jp/jcm/projects/17pro_tha_01/
Thailand / Project on Introduction of Scheme for Fluorocarbons Recovery and Destruction with Utilization of Existing Waste Incineration Plant	DOWA ECO-SYSTEM CO., LTD.	https://gec.jp/jcm/projects/18fgas_tha_01/
Thailand / Introduction of Gas Co-generation System and Absorption Chiller to Fiber Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/18pro_tha_01/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Thailand / 17.8MW Rooftop and Floating Solar Power Project in Industrial Park	Tokyo Century Corporation	https://gec.jp/jcm/projects/18pro_tha_02/
Thailand / Introduction of 3.4 MW Rooftop Solar Power System in Technical Center and Office Buildings	Toyota Motor Corporation	https://gec.jp/jcm/projects/18pro_tha_03/
Thailand / Introduction of Biomass Boiler to Cooking Oil Factory	TEPIA Corporation Japan Co.,Ltd.	https://gec.jp/jcm/projects/18pro_tha_04/
Thailand / Introduction of 0.8MW Solar Power System and High Efficiency Refrigerator to Food Factory	Kanematsu KGK Corp.	https://gec.jp/jcm/projects/18pro_tha_05/
Thailand / Introduction of 37 MW Solar Power System and High Efficiency Melting Furnace in Vehicle & Engine Factory	Toyota Motor Corporation	https://gec.jp/jcm/projects/19pro_tha_01/
Thailand / Efficiency Improvement of Co-generation System by Installation of Heat Exchanger in Fiber Factory	NIPPON STEEL ENGINEERING CO., LTD.	https://gec.jp/jcm/projects/19pro_tha_02/
Thailand / Introduction of 8.1MW Rooftop Solar Power System in Motorcycle Factory and Fiber Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/20pro_tha_01/
Thailand / Introduction of Energy Saving Centrifugal Chillers to Machinery Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/20pro_tha_02/
Thailand / Introduction of 5MW Rooftop Solar Power System to Aluminum Building Materials Factory	Sumitomo Mitsui Finance and Leasing Company, Limited	https://gec.jp/jcm/projects/20pro_tha_03/
Thailand / Introduction of 2.6MW Rooftop Solar Power System to Semiconductor Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/20pro_tha_04/
Thailand / 2.7MW Solar Power Project with Blockchain Technology in Chiang Mai University Town Community	Inabata Co., Ltd.	https://gec.jp/jcm/projects/20pro_tha_05/
Thailand / Introduction of High Efficiency Once Through Boiler to Garment Factory	Osaka Gas Co., Ltd.	https://gec.jp/jcm/projects/21pro_tha_01/
Thailand / 35MW Solar Power and Storage Battery Project in Suphanburi Province	Kanematsu KGK Corp.	https://gec.jp/jcm/projects/21pro_tha_03/
Thailand / Introduction of 23MW Rooftop Solar Power System to Tire Factories	Sharp Energy Solutions Corporation	https://gec.jp/jcm/projects/21pro_tha_04/
Thailand / Introduction of High Efficiency Boiler, High Efficiency Chiller, and Solar PV System to Textile Factory and Food Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/21pro_tha_05/
Thailand / Introduction of 2MW Rooftop Solar Power System to Non-ferrous Metal Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/21pro_tha_06/
Thailand / Introduction of 1.3MW Solar Power System to Food Factories (JCM Eco Lease Scheme)	Tokyo Century Corporation	https://gec.jp/jcm/projects/21pro_tha_07/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Thailand / Introduction of 0.13MW Solar Power System to Auto Parts Factory (JCM Eco Lease Scheme)	Tokyo Century Corporation	https://gec.jp/jcm/projects/21pro_tha_08/
Thailand / Introduction of Gas Co-generation System and 22MW Rooftop Solar Power System to Tire Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/22pro_tha_01/
Thailand / Introduction of ORC Waste Heat Recovery Power Generation System to Flat Glass Factory	AGC Inc.	https://gec.jp/jcm/projects/22pro_tha_02/
Thailand / Energy Supply Project by 4.0MW Rooftop Solar Power System to Parts and Tools Factories	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/22pro_tha_03/
Thailand / Energy Supply Project by 2.9MW Rooftop Solar Power System to Metal Factories and Refrigerating Warehouse	Osaka Gas Co., Ltd.	https://gec.jp/jcm/projects/22pro_tha_04/
Thailand / Energy Supply Project by 0.9MW Rooftop Solar Power System to Metal Recycling and Automotive Parts Factories	Marubeni Corporation	https://gec.jp/jcm/projects/22pro_tha_05/
Thailand / Thermal Energy Supply and Methane Avoidance Project Utilizing Biomass mixed with Biogas from Wastewater in Fruit Processing Factory	Dole Japan, Inc.	https://gec.jp/jcm/projects/22pro_tha_06/
Thailand / Introduction of 1.6MW Solar Power System to Plastic Bottles and Cosmetics Factories (JCM Eco Lease Scheme)	Tokyo Century Corporation	https://gec.jp/jcm/projects/22pro_tha_07/
Viet Nam / Energy Saving in Acid Lead Battery Factory with Container Formation Facility	Hitachi Chemical Company, Ltd.	http://gec.jp/jcm/projects/15pro_vie_03/
Viet Nam / Energy Saving in Factories with Air-Conditioning Control System	Yuko Keiso Co., Ltd.	http://gec.jp/jcm/projects/15pro_vie_04/
Viet Nam / Installation of High Efficiency Kiln in Sanitary Ware Manufacturing Factory	TOTO LTD.	http://gec.jp/jcm/projects/15pro_vie_06/
Viet Nam / Introduction of High Efficiency Water Pumps in Da Nang City	Yokohama Water Co., Ltd.	http://gec.jp/jcm/projects/16pro_vie_01/
Viet Nam / Installation of Energy Saving Equipment in Lens Factory	HOYA CORPORATION	http://gec.jp/jcm/projects/16pro_vie_02/
Viet Nam / Introduction of Amorphous High Efficiency Transformers in Northern, Central and Southern Power Grids	Yuko Keiso Co., Ltd.	http://gec.jp/jcm/projects/16pro_vie_03/
Viet Nam / Introduction of Energy Saving Equipment to Automotive Wire Production Factory	YAZAKI PARTS CO., LTD.	http://gec.jp/jcm/projects/16pro_vie_04/
Viet Nam / Introduction of 2MW Solar Power System for Pellet Factory	Idemitsu Kosan Co., Ltd.	http://gec.jp/jcm/projects/20pro_vnm_06/
Viet Nam / Eco-Driving by Utilizing Digital Tachograph System	Nippon Express Co., LTD.	https://gec.jp/jcm/projects/14pro_vie_02/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Viet Nam / Introduction of Amorphous high efficiency transformers in power distribution systems	Yuko Keiso Co., Ltd.	https://gec.jp/jcm/projects/14pro_vie_03/
Viet Nam / Introduction of High Efficiency Air-conditioning in Hotel	NTT DATA INSTITUTE OF MANAGEMENT CONSULTING, Inc.	https://gec.jp/jcm/projects/15pro_vie_01/
Viet Nam / Introduction of Energy-Efficient Air Conditioners in a Lens Factory	Ricoh Company, Ltd.	https://gec.jp/jcm/projects/15pro_vie_02/
Viet Nam / Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids	Yuko Keiso Co., Ltd.	https://gec.jp/jcm/projects/15pro_vie_05/
Viet Nam / Introduction of Solar PV System at Shopping Mall in Ho Chi Minh City	AEON RETAIL Co., Ltd.	https://gec.jp/jcm/projects/15pro_vie_08/
Viet Nam / Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids II	Yuko Keiso Co., Ltd.	https://gec.jp/jcm/projects/17pro_vie_01/
Viet Nam / Introduction of High Efficiency Centrifugal Chiller to Rubber Products Factory	YUASA Trading CO., Ltd.	https://gec.jp/jcm/projects/17pro_vie_02/
Viet Nam / Introduction of Energy Saving Equipment to Brewery	Sapporo International Inc.	https://gec.jp/jcm/projects/17pro_vie_03/
Viet Nam / Development of Collection Scheme and Introduction of Dedicated System for Destruction of Used Fluorocarbons	Marubeni Corporation	https://gec.jp/jcm/projects/18fgas_vie_01/
Viet Nam / Modal Shift from Truck to Cargo Ship with Freshness Preservation Reefer Container	Nihon Crant Co. Ltd.	https://gec.jp/jcm/projects/18pro_vie_01/
Viet Nam / Energy Saving by Introduction of Inverters for Raw Water Intake Pumps	Yokohama Water Co., Ltd.	https://gec.jp/jcm/projects/18pro_vie_02/
Viet Nam / Introduction of Biomass Boiler to Chemical Factory	DAIICHI JITSUGYO CO., LTD.	https://gec.jp/jcm/projects/19pro_vnm_03/
Viet Nam / Introduction of Air Cooled Chiller to Office Building	Hitachi-Johnson Controls Air Conditioning, Inc.	https://gec.jp/jcm/projects/19pro_vnm_04/
Viet Nam / 49MW Solar Power Project in An Giang Province	Kanematsu KGK Corp.	https://gec.jp/jcm/projects/19pro_vnm_05/
Viet Nam / 57MW Solar Power Project in An Giang Province	Kanematsu KGK Corp.	https://gec.jp/jcm/projects/20pro_vnm_01/
Viet Nam / Introduction of Biomass Boiler to Soluble Coffee Manufacturing Plant	Marubeni Corporation	https://gec.jp/jcm/projects/20pro_vnm_03/
Viet Nam / Introduction of High Efficiency Boiler System to Food Factory	Acecook Co., Ltd.	https://gec.jp/jcm/projects/20pro_vnm_04/
Viet Nam / Introduction of High Efficiency Air-conditioning System to Hotel in Ho Chi Minh City	Hitachi-Johnson Controls Air Conditioning, Inc	https://gec.jp/jcm/projects/20pro_vnm_05/
Viet Nam / Development of Fluorocarbons collection scheme and installation of mixed combustion decomposition facility in Viet Nam	Marubeni Corporation	https://gec.jp/jcm/projects/21fgas_vnm_01/

JCM Projects in AZEC partners by MOEJ

Project outline	Organization	URL
Viet Nam / Waste to Energy Project in Bac Ninh Province	JFE Engineering Corporation	https://gec.jp/jcm/projects/21pro_vnm_01/
Viet Nam / Introduction of 9MW Rooftop Solar Power System to Factories	Sharp Energy Solutions Corporation	https://gec.jp/jcm/projects/21pro_vnm_03/
Viet Nam / Introduction of High Efficiency LED Lighting with Dimming and Tunable Function to Office Building in Ho Chi Minh City	ENDO Lighting Corporation	https://gec.jp/jcm/projects/21pro_vnm_04/
Viet Nam / Introduction of 12MW Rooftop Solar Power System to Commercial and Industrial Customers	Marubeni Corporation	https://gec.jp/jcm/projects/21pro_vnm_05/
Viet Nam / Introduction of 9.8MW Rooftop Solar Power System in Industrial Park	Osaka Gas Co., Ltd.	https://gec.jp/jcm/projects/21pro_vnm_06/
Viet Nam / Introduction of 5.8MW Rooftop Solar Power System to Beverage Factory	Asian Gateway Corporation	https://gec.jp/jcm/projects/21pro_vnm_07/
Viet Nam / Introduction of 2.5MW Rooftop Solar Power System to Food Factory and Garment Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/21pro_vnm_08/
Viet Nam / Introduction of High Efficiency Chiller and High Efficiency LED Lighting with Dimming Function to Shopping Center	Tokyu Corporation	https://gec.jp/jcm/projects/21pro_vnm_09/
Viet Nam / 20MW Biomass Power Plant Project in Hau Giang Province	eREX Co.,Ltd.	https://gec.jp/jcm/projects/22pro_vnm_01/
Viet Nam / 16MW Mini Hydro Power Plant Project in Binh Thuan Province	Kanematsu KGK Corp.	https://gec.jp/jcm/projects/22pro_vnm_02/
Viet Nam / Energy Supply Project by 7.9MW Rooftop Solar Power System to Automotive and Garment Factories	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/22pro_vnm_03/
Viet Nam / Introduction of 0.4MW Rooftop Solar Power System to Aluminum Wheel Manufacturing Factory (JCM Eco Lease Scheme)	Sumitomo Mitsui Trust Panasonic Finance Co., Ltd.	https://gec.jp/jcm/projects/22pro_vnm_04/
Viet Nam / Introduction of 5.7MW Rooftop Solar Power System to Fastener and Aluminum Factories	Marubeni Corporation	https://gec.jp/jcm/projects/22pro_vnm_05/
Viet Nam / 48MW Offshore Wind Power Generation Project in Duyen Hai District, Tra Vinh Province	Shizen Energy Inc.	https://gec.jp/jcm/projects/22pro_vnm_06/
Viet Nam / Energy Supply Project by 1.8MW Rooftop Solar Power System to Automotive Parts Factory and Construction Materials Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/22pro_vnm_07/
Viet Nam / Energy Supply Project by 0.8MW Rooftop Solar Power System to Chemical Factory	The Kansai Electric Power Company, Incorporated	https://gec.jp/jcm/projects/22pro_vnm_08/

Projects related to MOUs in March 2023

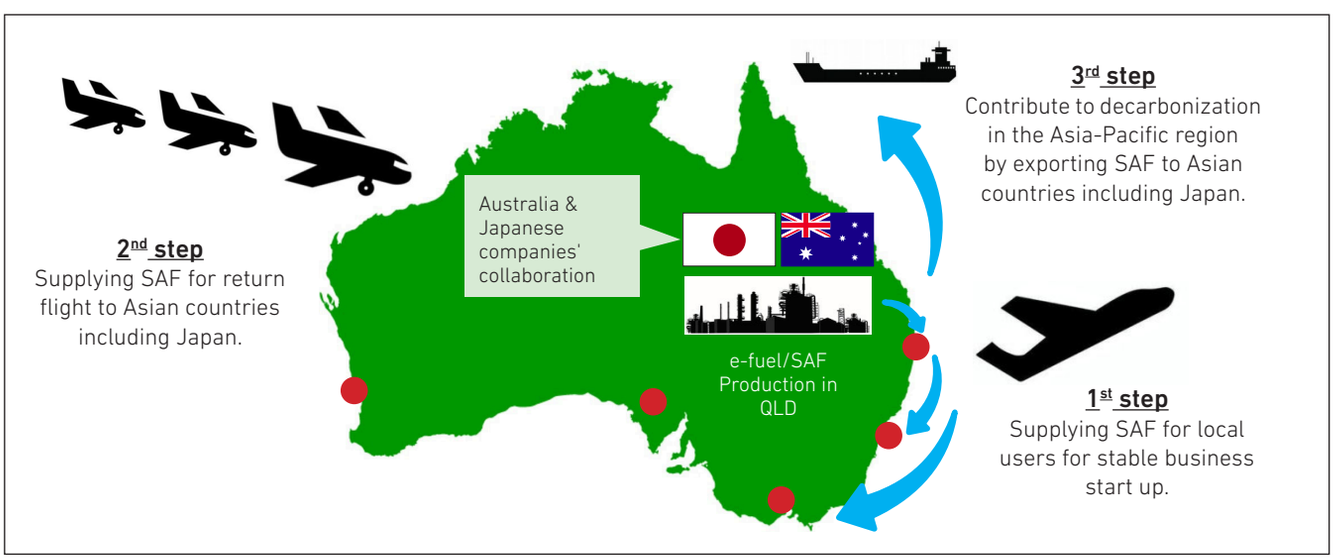
Projects related to 28 MOUs signed on the occasion of the AZEC Ministerial Meeting are also presented as of March, with a colored square on a slide showing the progress, if any, since March.

MOU for establishment of e-fuel/SAF value chain in Queensland, Australia

- **Overview:** CS Energy (Queensland government-owned corporation, Australia), Toyo Engineering Corporation (Japan), and Sojitz Corporation (Japan) have agreed to cooperate on establishing an e-fuel/SAF value chain in Queensland, Australia (QLD), with the aim of realizing carbon neutrality in the aviation industry and decarbonization in the Asia-Pacific region.
- **Purpose and Goals:** (1) To realize synthetic fuel (e-fuel/SAF) production from renewable hydrogen and carbon dioxide. (2) To establish a competitive e-fuel/SAF value chain in QLD, a region with immense potential for renewable hydrogen production. (3) To contribute to decarbonization in the Asia-Pacific region through the stable supply of e-fuel/SAF.

Updated Progress: In July 2023, we promoted the project at a panel discussion at the Decarbonising Australia Business Summit. Following site visits, we assessed potential locations and scenarios and have now begun our Pre-Feasibility Study (Pre-FS). This Pre-FS is scheduled to be completed within the next few months.

Conceptual Scheme

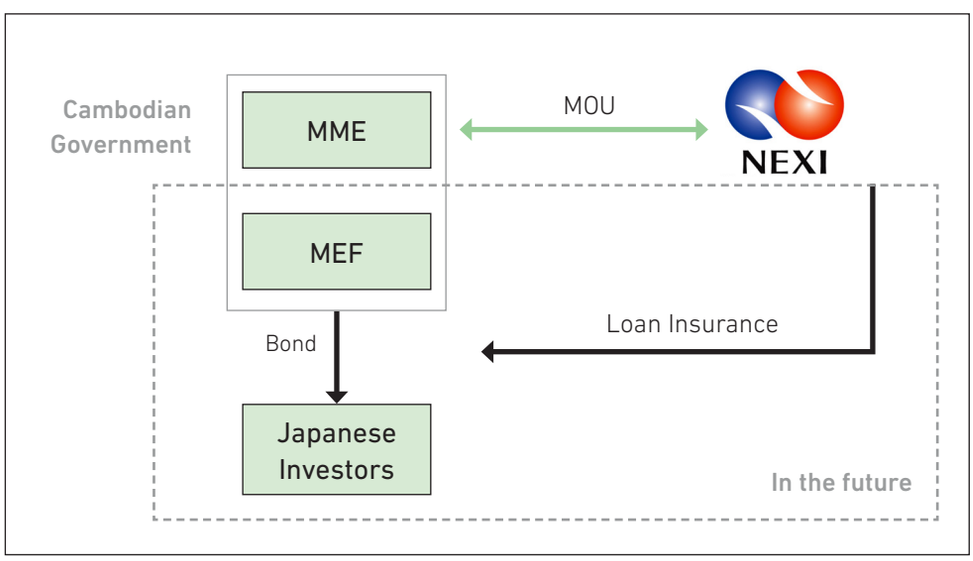


Projects related to MOUs in March 2023

NEXI signs MOU with Ministry of Mines and Energy (MME)

- **Summary:** Nippon Export and Investment Insurance (NEXI) has concluded a Memorandum of Understanding (MOU) with Ministry of Mines and Energy (MME) in Kingdom of Cambodia.
- **Purpose:** This MOU further strengthens the cooperation in the power sector between NEXI and MME in Cambodia.
- **Miscellaneous:** NEXI will contribute to supporting MME's efforts in achieving realistic energy transitions and to creating potential business opportunities for Japanese companies in Cambodia.

Probable Scheme

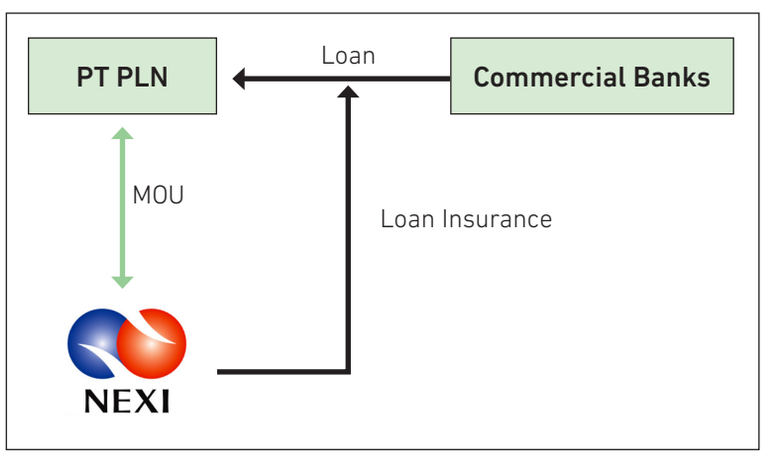


Projects related to MOUs in March 2023

NEXI signs MOU with PT PLN

- **Summary:** Nippon Export and Investment Insurance (NEXI) will provide financing support of a maximum of USD 500 million for PT PLN, state-owned utility company in the Republic of Indonesia, as a part of Asian Zero Emissions Community (AZEC) Concept. Furthermore, NEXI will introduce Japanese technologies to PT PLN.
- **Purpose:** This MOU further strengthens the cooperation in the power sector between NEXI and PT PLN in Indonesia.
- **Miscellaneous:** NEXI has signed the MOU with PT PLN in April 2022, and has amended it in November. In March 2023, NEXI and PT PLN will amend this MOU again along with the progress on their discussion.

Scheme



Projects related to MOUs in March 2023

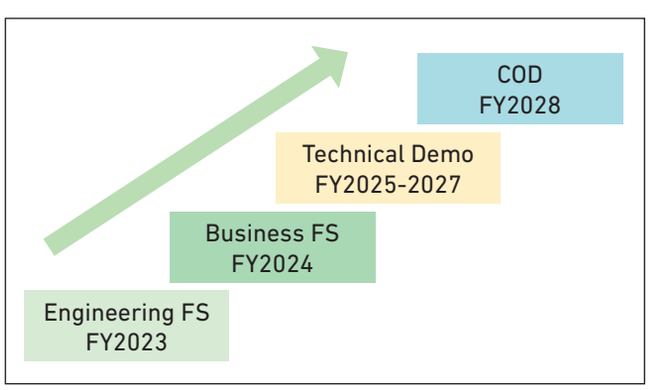
MOU on Renewable Energy Business Development between PT. Indonesia Power and Kyudenko Corporation

- **Summary:** In Indonesia, to increase the ratio of renewable energy generation is important policy. Through "Kyudenko EMS" which is an Energy management system of renewable energy, Indonesia power and Japan companies can try together for achievement.
- **Scope:** PT. Indonesia Power is a group company of PT. PLN and is core company of domestic power business area. They are best partner for the business of Stabilization technology for renewable energy.
- **Others:** As pilot project, co-working at remote islands of North Kalimantan is under discussing base on the MoU.

Updated Progress: Feasibility Study on the NEDO Project on hybrid power generation targeting 100% supply by Renewable energy in North Kalimantan has been started from July 2023. In the future, Kyudenko and PT. Indonesia power will work together to Demonstration in FY2025 and commercialize this project (COD2028).

Image of Big scale Lead-acid Battery for stabilization

Targeting Milestone



Projects related to MOUs in March 2023

MOU on decarbonization cooperation between PT. PLN Nusantara Power and Mitsubishi Heavy Industries, Ltd.

- **Overview:** Toward decarbonization of energy in Indonesia, PT. PLN Nusantara Power (PNP), a subsidiary of Indonesia's state-owned electricity company, and Mitsubishi Heavy Industries, Ltd. (MHI) will commence discussions on feasibility studies co-firing less carbon intensive fuels at power plants owned and operated by PNP.
- **Aim of the cooperation:** This MOU will allow us to explore innovative solutions by MHI decarbonization technology in order to achieve sustainable environmental goals, while responding to the country's critical energy demand.
- **Detail of the cooperation:** To discuss the potential collaboration for materializing hydrogen co-firing in gas turbines, ammonia co-firing in gas-fired boilers, and biomass co-firing in coal-fired boilers at two existing power plants in Indonesia.

Updated Progress: Discussions are ongoing with PNP regarding the implementation of feasibility study at the power plants covered by the MOU.

Location of Power Plant to be covered in MOU

Muara Karang Power Plant

1. Hydrogen co-firing in gas turbines
2. Ammonia co-firing in gas-fired boilers

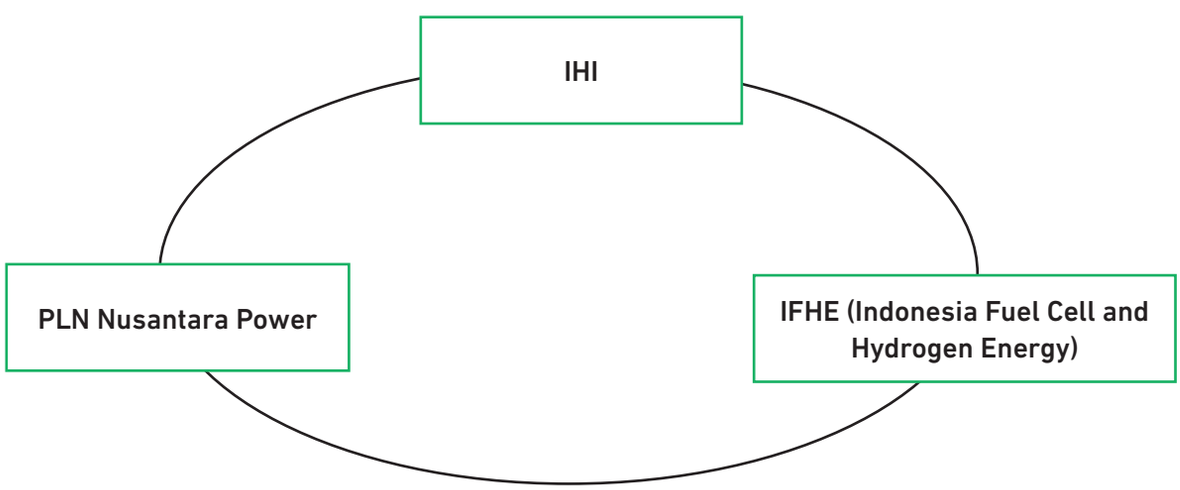
Paiton Power Plant

3. Biomass co-firing in coal-fired boilers

Projects related to MOUs in March 2023

MoU on cooperation between PLN Nusantara Power/IFHE/IHI

- **Partners:** PLN Nusantara Power, IFHE (Indonesia Fuel Cell and Hydrogen Energy)
- **Outline:** To form a comprehensive cooperative framework for the construction of a clean energy-based power system in Indonesia. Contents include the production and utilization of hydrogen & ammonia, biomass co-firing & mono-firing, and performance improvements of existing thermal power plants.
- **Purpose/Aims:** To pursue realistic, economical solutions by involving utility companies and research institutes on the consideration of utilizing new energy sources such as hydrogen, ammonia and biomass, and for the improvement of existing power plants.

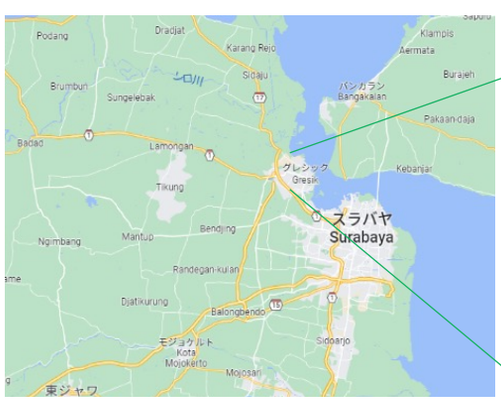


Projects related to MOUs in March 2023

MoU for Green Ammonia Production and Co-firing between IHI and Pupuk Indonesia

IHI

- **Partner:** PT Pupuk Indonesia (Persero)
- **Outline:** Conduct technical study and feasibility assessment for the construction of a stand-alone green ammonia production plant on the site of an existing fertilizer facility, and for a technical study on ammonia co-firing in the same facility's existing coal-fired power plant.
- **Purpose/Aims:** To promote the production and utilization of new fuel ammonia contributing to the decarbonization of Indonesia and abroad.
- **Other:** Conduct the Feasibility Study by March, 2024.



Study to introduce the green ammonia production and ammonia co-firing in existing fertilizer company (Petrokimia Gresik, subsidiary company of Pupuk Indonesia.

(Reference)
In Oct.2022, IHI conducted ammonia co-firing in Gresik Power Plant, PLN Nusantara Power, which is located near to Petrokimia Gresik.

Projects related to MOUs in March 2023

Chiyoda Corporation and PT Pertamina (Persero) Joint Study Agreement for Developing of Carbon Recycle Technology

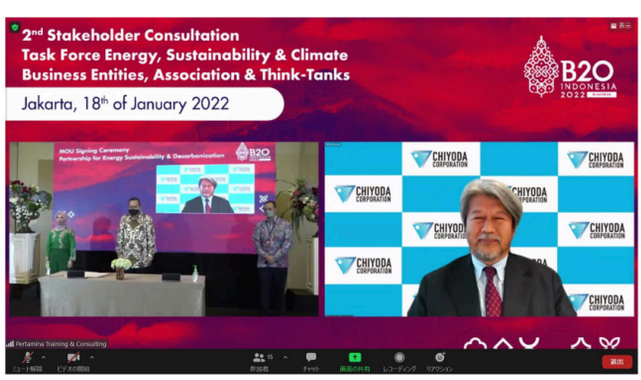
- **Overview:** Joint Study Agreement between Chiyoda Corporation and PT Pertamina (Persero) regarding developing of decarbonization Technology – CO_2 Reforming of Methane and CCU Technology in Pertamina's Upstream Field to produce value added chemical products. This Joint Study is a concrete development from the memorandum of understanding regarding cooperation in the field of decarbonization toward the realization of net zero with PT Pertamina (Persero) in January 2022.
- **Purpose and Goals:** Propose a CCU or carbon recycling technology for utilizing Gas from Pertamina's stranded fields with high CO_2 content and Conduct a Feasibility Study on the applicability of Chiyoda's CO_2 Reforming Technology.
- Chiyoda and Pertamina executed a Feasibility Study of CCS in South Sumatra jointly in 2022 as well.

Updated Progress: Pertamina and Chiyoda started Joint Feasibility Study in April 2023 supported by FY 2023 JCCP's Project Formation Study scheme.

Corporation history between Chiyoda and Pertamina

Jan 2022	Signed MOU of collaboration for decarbonization technologies (photo shown in right)
Sep 2022	Signed JSA for CCS project in South Sumatra
Mar 2023	Concluded JSA for carbon recycling technology (CCU/CO_2 Reforming of Methane)

MOU with PT Pertamina, Indonesia to Collaborate in Technical Development Aiming for Net Zero Carbon Emissions



Online signing ceremony at Task Force event in Business 20* Indonesia 2022

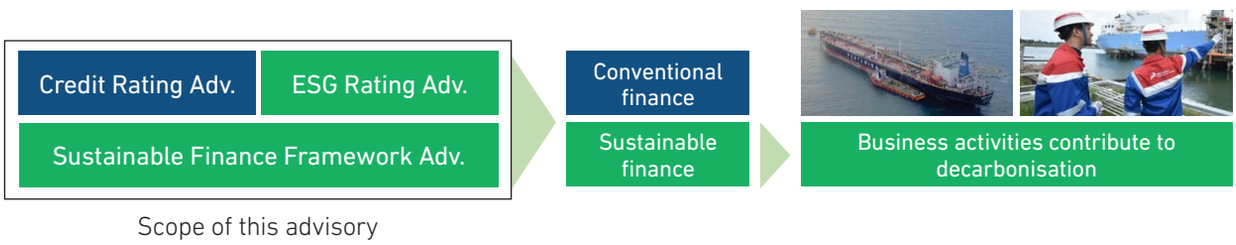
Projects related to MOUs in March 2023

Mizuho Bank and Pertamina International Shipping: Credit Rating and ESG Advisory

- **Outline:** Mizuho assists Pertamina International Shipping ("PIS") in its decarbonisation initiative by broadening its capital sources including sustainable finance through ESG advisory. Specifically, improving transparency of governance through advice on credit rating accreditation, and strengthening ESG initiatives through advice on ESG rating accreditation and setting sustainable finance framework.
- PIS is the group company of Indonesia state owned oil & gas company, PT Pertamina (Persero), and strives to decarbonise its business.
- **Significance:** This advisory aims to contribute to the decarbonisation of Pertamina Group and Indonesia from financial side by leveraging Mizuho's expertise on the corporate finance, decarbonisation and ESG.

Updated Progress: Mizuho commenced and is close to completion for the advisory work for PIS over accreditation of credit rating and ESG rating. The process is progressing steadily for setting PIS' sustainable finance framework.

Contribute to the decarbonisation of Pertamina Group from financial side



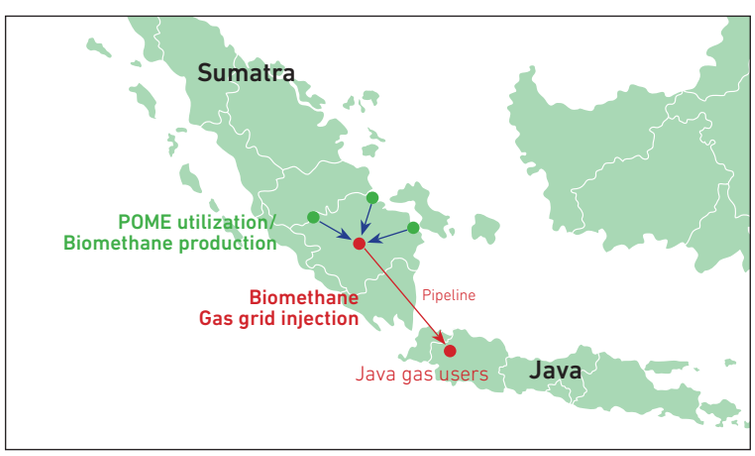
Projects related to MOUs in March 2023

MOU on feedstock supply for decarbonizing Indonesia gas grid

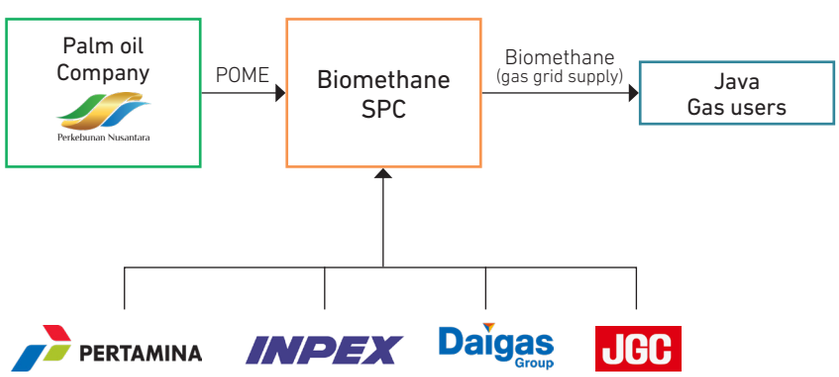
- **Outline:** PGN, JGC HD, Osaka Gas, and INPEX, together with PTPN, a major state-owned palm oil company in Indonesia, will pursue an opportunity to collaborate toward the realization of a biomethane fuel supply via gas grid by utilizing biomass resources.
- **Aim of Cooperation:** Contributing to carbon neutrality by recovering methane emitted from the palm oil industry, a key sector in Indonesia, and promoting the use of clean biomethane fuel.
- **Schedule:** A detailed feasibility assessment will be concluded by the end of 2023 and a decision will be made on SPC establishment, etc.

Updated Progress: The joint detailed study to conclude a raw materials transaction agreement was initiated.

Project outline



Business scheme



Projects related to MOUs in March 2023

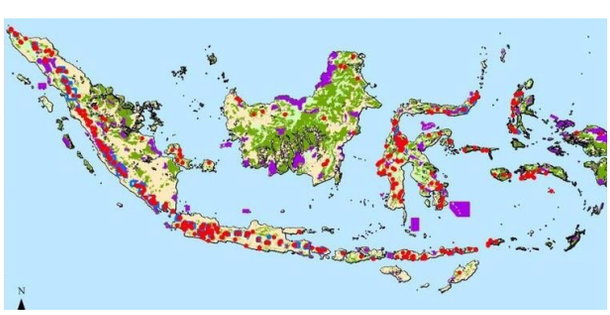
MoU on Commercial Development of Green Hydrogen and Green Ammonia

- **Outline:** In order to achieve energy transition and net zero emissions in Asia, TEPCO HD and Pertamina New and Renewable Energy (PNRE) will explore the commercial production, transportation and sale of green hydrogen and green ammonia using renewable energy (mainly geothermal power generation) in Indonesia.
- **Significance/Aim:** In promoting this project, we have already concluded a Joint Study Agreement with PNRE, and are proceeding with the NEDO "International Demonstration Project on Japan's Energy Efficiency Technologies". Under this MOU, using the results of the NEDO demonstration project, TEPCO's hydrogen production technology and electric power business know-how will be combined with PNRE's geothermal interests and technology to realize cost-competitive green hydrogen and green ammonia business, and help achieve net zero emissions in Asia.

Updated Progress: Feasibility Study on the NEDO Project on hydrogen from geothermal power generation started on September 1, 2023. In the future, TEPCO and PNRE will work together to commercialize the findings from this joint research in accordance with the Memorandum of Understanding.

https://www.tepco.co.jp/en/hd/newsroom/press/archives/2023/20230906_01.html

Illustration

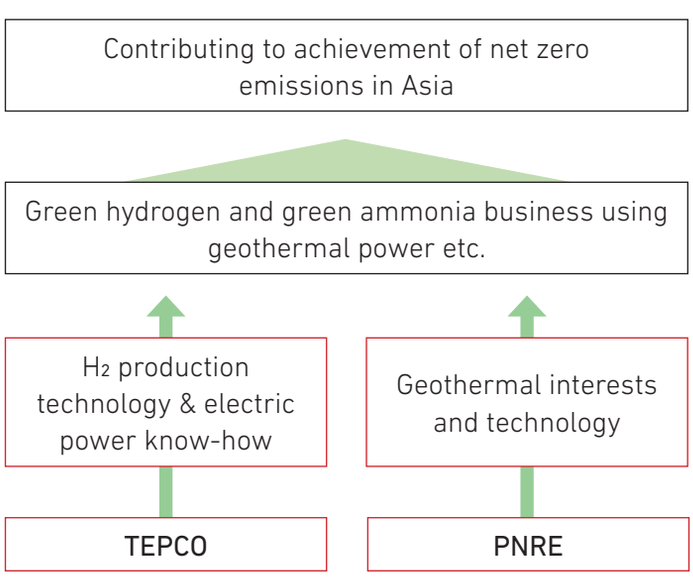


High geothermal potential in Indonesia

+

TEPCO's H_2 production technology

Scheme



Projects related to MOUs in March 2023

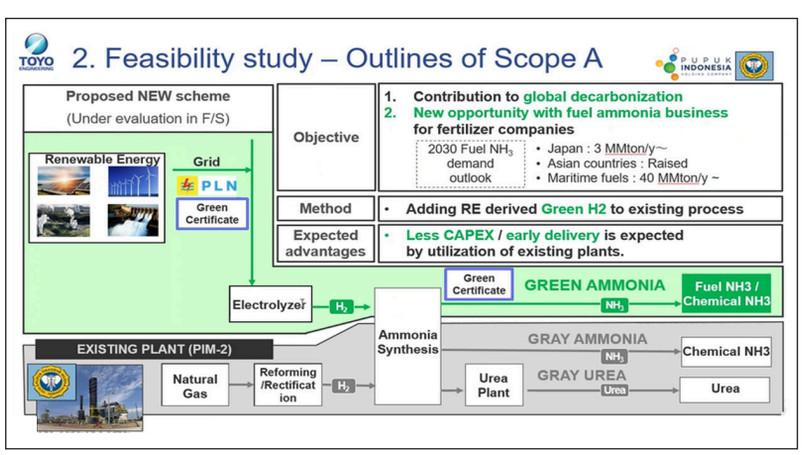
Green Ammonia Project at Pupuk Iskandar Muda (PIM) under Pupuk Indonesia Holding Co. (PIHC)

- **Outline:** TOYO proposed the concept to produce green ammonia by utilizing the existing facilities of ammonia process plant, and got award from METI to implement the Feasibility Study through its energy infrastructure support program. TOYO accordingly implemented the Feasibility Study and generally agreed with PIHC to jointly pursue the project development.
- **Purpose and Aim by the collaboration:** By adopting the aforementioned concept, it becomes possible to produce the green ammonia in prompt and competitive manner, which will contribute to the carbon neutralization in Japan and Asian countries, and to the development of clean industry in Indonesia. TOYO, PIHC and PIM would like to jointly proceed the project development with targeting the production start in year 2025. Furthermore, Toyo and PIHC will pursue to extend the green ammonia production by applying same methodology to the other plants under PIHC group.

Updated Progress: (1) Agreed on Mitsui & Co.'s participation in the project, as a partner for off-taking the product. (2) CAPEX and electricity price reduction studies, bidding for electrolyzer, major procurement item, are ongoing. (3) Started the discussion for gaining ISCC certificate. (4) Business expansion to Gresik, Kujang, etc. has been discussed with Mr. Rahmad Pribadi, the new president of PIHC, on 21 Aug.

Location of the site (PIM)

PIM existing plant



Project scheme

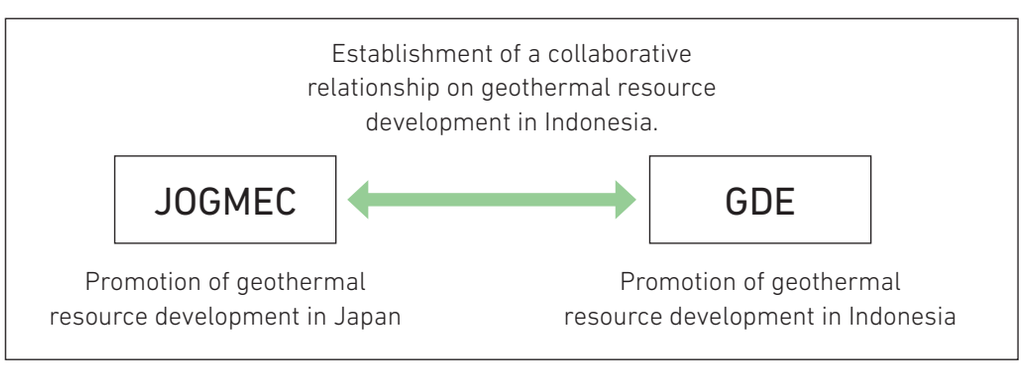
Projects related to MOUs in March 2023

MOU between JOGMEC and Geo Dipa Energi (GDE) Concerning Cooperation on Geothermal Resource Development

- **Outline:** JOGMEC and GDE will work on an establishment of a collaborative relationship in the technical field of geothermal resource survey and exploration in Indonesia.
- **Objectives:** To establish a collaborative relationship between JOGMEC and GDE on geothermal resource development in Japan and Indonesia for the promotion of energy transition to secure the stable supply of energy which is crucial in realization of sustainable economic growth, and implementing measures against climate change simultaneously.

Image of geothermal resource development

Scheme

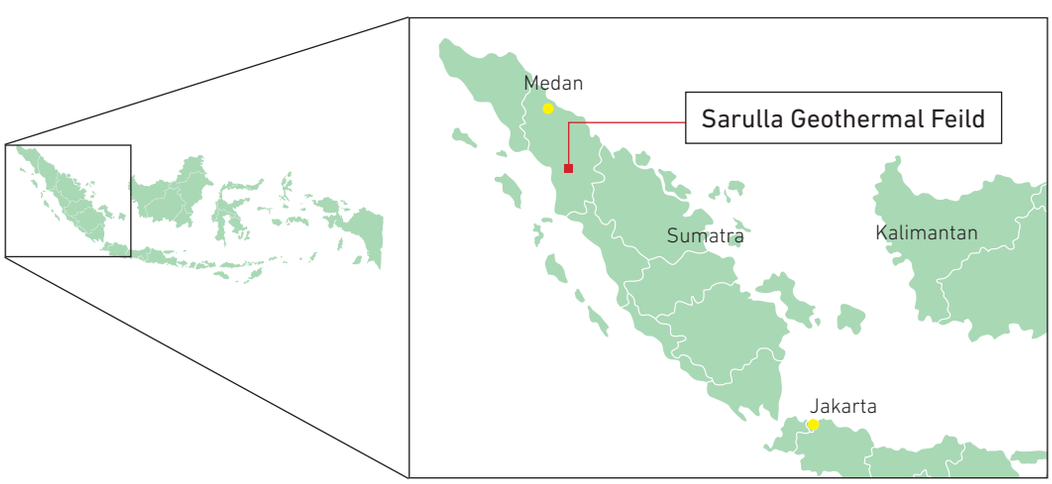


Projects related to MOUs in March 2023

MOU for the expansion of Sarulla Geothermal Project

- **Outline:** ITOCHU Corporation, Kyushu Electric Power Co., Inc.,INPEX CORPORATION , Medco Power Indonesia, Ormat Geothermal Indonesia will collaborate to engage in discussions and to explore on the possibility of expansion of the Sarulla Geothermal, considering also the successful recovery of the financial and operational conditions of the existing project.
- **Significance of collaboration:** Through the development of the geothermal project which has a high contribution to the GHG reduction as base load renewable energy and both Indonesia and Japan have resources for geothermal, it will lead the energy transition in Indonesia and serve as parts of the AZEC concept.

Project Site



Existing Project

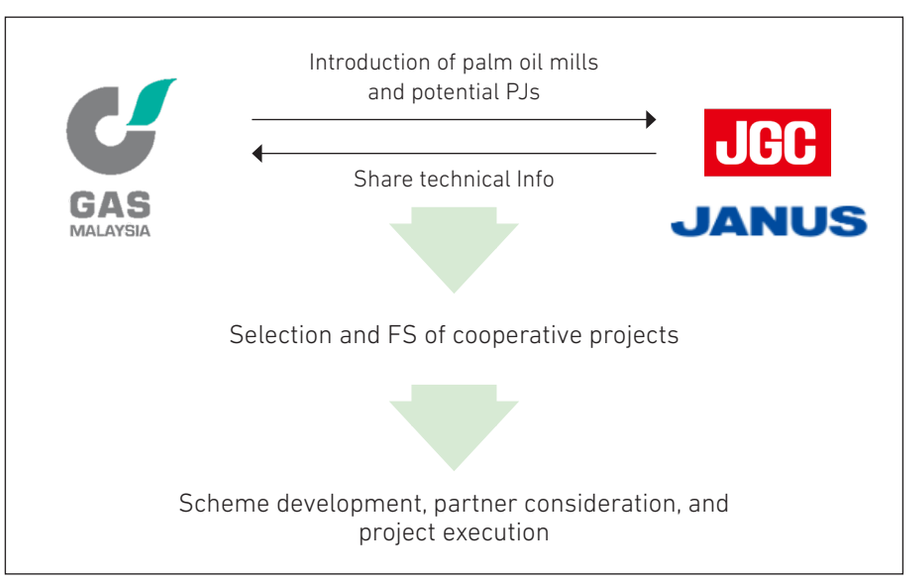
Projects related to MOUs in March 2023

MOU on the Promotion of Carbon Neutrality using Palm Oil Derived Waste

- **Outline:** JGC and Gas Malaysia have agreed to conduct to Feasibility Study on the production and sales of biofuels and biochemicals through the effective utilization of unused waste materials (POME, EFB, wood waste, etc.) generated from the palm oil industry.
- **Aim of Cooperation:** JGC and Gas Malaysia will cooperate to explore joint business opportunities and conduct joint studies with a view to future commercialization, thereby contributing to making the palm oil industry sustainable and the country carbon neutral.
- **Other:** A detailed project plan and scheme will be developed by the end of 2023, with a view to establishing an SPC.

Updated Progress:
1. Held workshop for opportunity of unutilized waste generated by the palm oil industry
2. Study for commercialization started through workshops

Scheme



Projects related to MOUs in March 2023

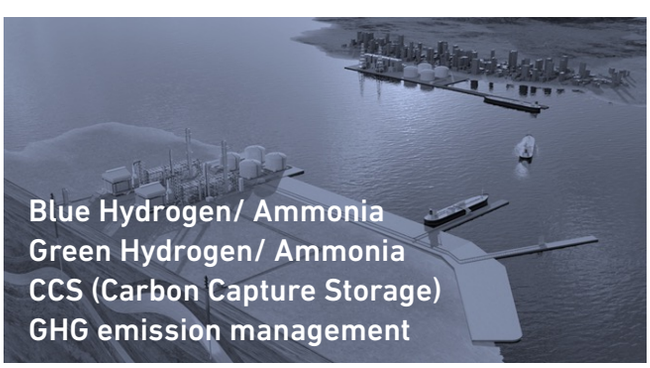
PETRONAS and JOGMEC MOC in Energy Transition Initiatives Towards Achieving Net Zero Carbon Emission Targets

- **The Outline:** PETRONAS and JOGMEC have agreed to conduct joint research on projects targeting carbon-neutral fields such as clean energy such as hydrogen/ammonia, GHG emissions management in energy projects, and various CCS projects.
- **The Significance of the collaboration:** To enhance PETRONAS and JOGMEC collaboration to promote and develop sustainable energy sources and technologies to achieve respective mutual energy transition and decarbonization targets. This joint-effort also aims to spur business opportunities and provide technical and financial supports for Japanese companies to participate in PETRONAS projects, both inside and outside of Malaysia.

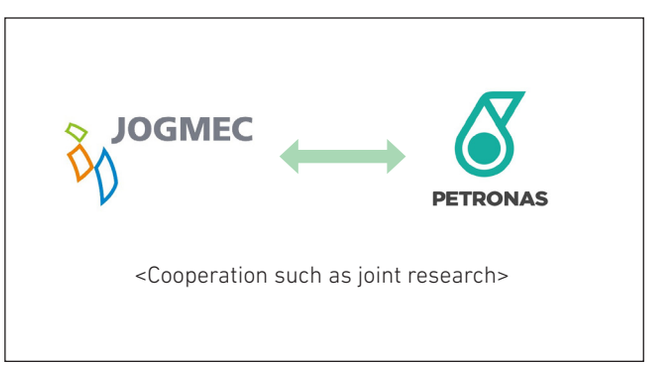
Updated Progress: Discussions was held in June 2023 the details of the collaboration. Methane reduction flagship project has been launched covering quantitative methane surveys and viable solutions towards achieving zero routine flaring.

https://www.petronas.com/media/media-releases/petronas-collaborates-partners-accelerate-methane-emissions-reduction

Area of Cooperation



Scheme



Projects related to MOUs in March 2023

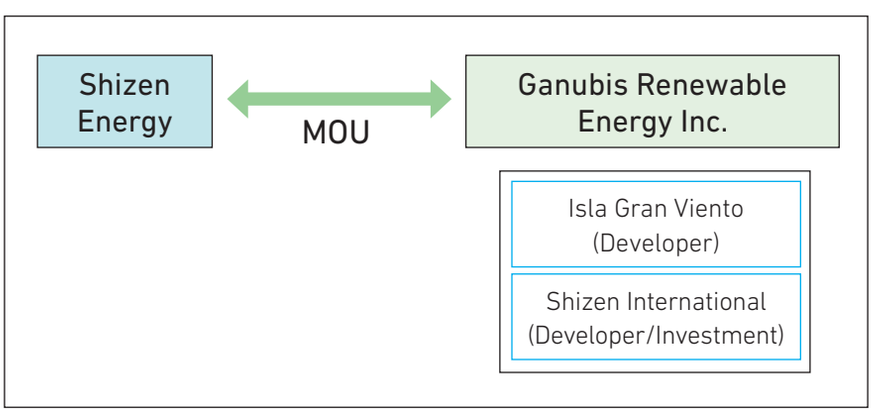
Shizen Energy and Ganubis Renewable Energy Inc. Agree to Jointly Develop a 96MW On-shore Wind Power Plant in the Philippines

SHIZEN ENERGY

- **Summary:** Shizen Energy will agree with Ganubis Renewable Energy Inc., which is a partnership between Shizen International and Isla Gran Viento, outlines a joint effort to develop an on-shore wind power plant in the Philippines with a capacity of up to 96 MW.
- **Significance and Aim of the Cooperation:** The successful execution of the project outlined in the MOU will make the Philippines the proud host of one of the largest on-shore wind power plant in Southeast Asia. This landmark achievement will contribute the country's green technology initiatives and the nation's zero-carbon goals.

Project Map

Scheme



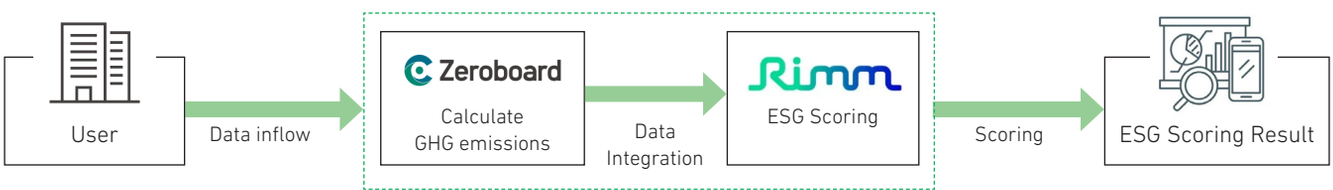
Projects related to MOUs in March 2023

Zeroboard (Japan)/RIMM (Singapore) MoU

- **Summary:** Zeroboard, provider of a cloud service for calculating and visualizing GHG emissions, has formed a business alliance with RIMM, a provider of ESG scoring services, to build an advanced ESG management support service.
- **Aim:** RIMM will integrate with and leverage Zeroboard's carbon calculating function to provide an advanced ESG scoring service, aimed at promoting ESG management in Asia.

Updated Progress: From November 2023, Zeroboard / RIMM implements "customer referral scheme" and begins sending referrals to other company.

Project Scheme



Projects related to MOUs in March 2023

MOU between Kyushu Electric Power, PTT and INPEX for cooperation in LNG business

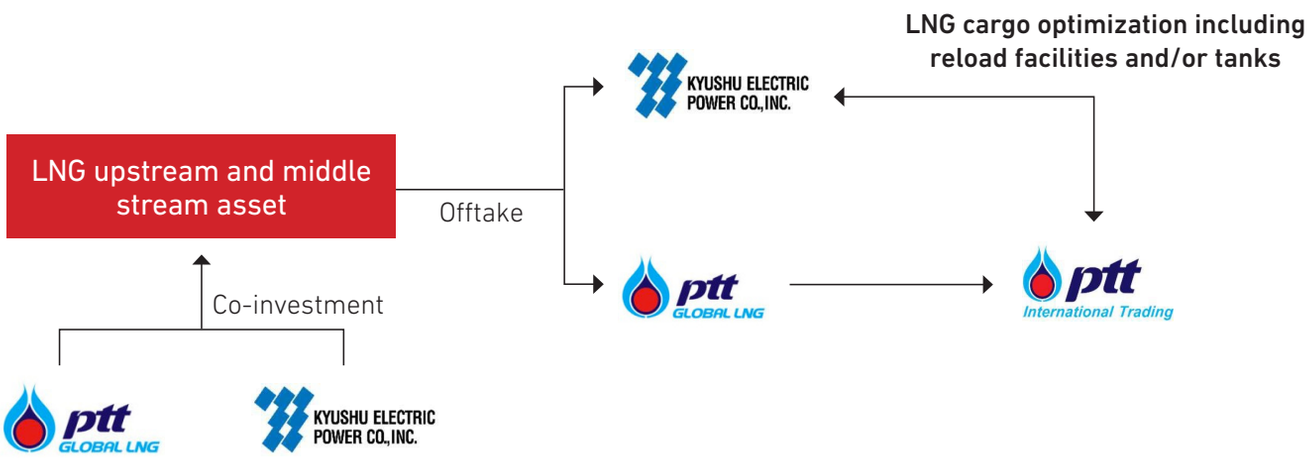
- **Overview:** Collaboration/cooperation between Kyushu Electric Power, PTT International Trading, and INPEX in LNG business
- **Goal:** Three companies, which have different LNG demand seasonality and location, will collaborate and cooperate through LNG trading in order to optimize inventory management

Example of collaboration

MOU between Kyushu Electric Power, PTT Global LNG Company and PTT International Trading for cooperation in LNG business

- **Overview:** Collaboration/cooperation between Kyushu Electric Power, PTT Global LNG Company and PTT International Trading in LNG business
- **Goal:** Kyushu and PTT Group, which have similar ambitious to have more LNG upstream and middle stream asset + utilize reload facilities and/or tanks, will collaborate and cooperate through short to long term area.

Example of collaboration



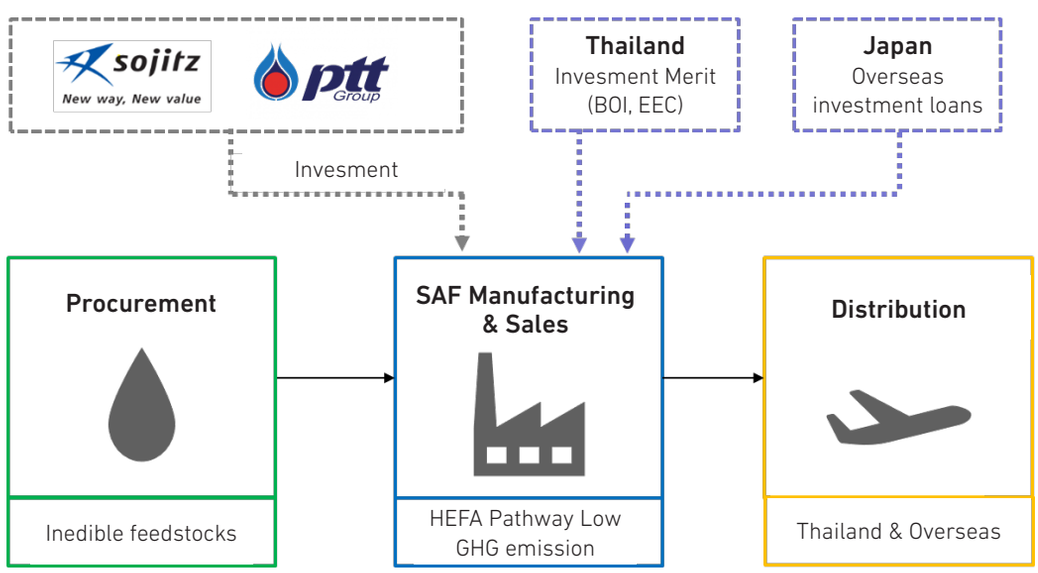
Projects related to MOUs in March 2023

Joint Investment Study for Producing Bio Jet Fuel from Inedible feedstocks

- **Outline:** PTT Group (Thailand), and Sojitz Corporation (Japan) agree to discuss the potential collaboration to jointly develop the business opportunity in Sustainable Aviation Fuel ("**SAF**") project utilizing a hydroprocessed esters and fatty acids ("**HEFA**") process in Thailand to contribute carbon neutrality in the aviation industry.
- **Aim:** (1) Realization of competitive SAF manufacturing utilizing the strengths of each company. (2) Substantial reduction in greenhouse gas emissions through SAF production using inedible feedstocks. (3) Realization of stable supply of SAF in Asia.

Updated Progress: Following the MOU signed in March 2023 at AZEC, PTT Group and Sojitz corporation signed a Term Sheet on September 1, 2023, for joint development of SAF project utilizing HEFA process in Thailand. Both companies jointly proceeded to the engineering phase.

Business scheme



Projects related to MOUs in March 2023

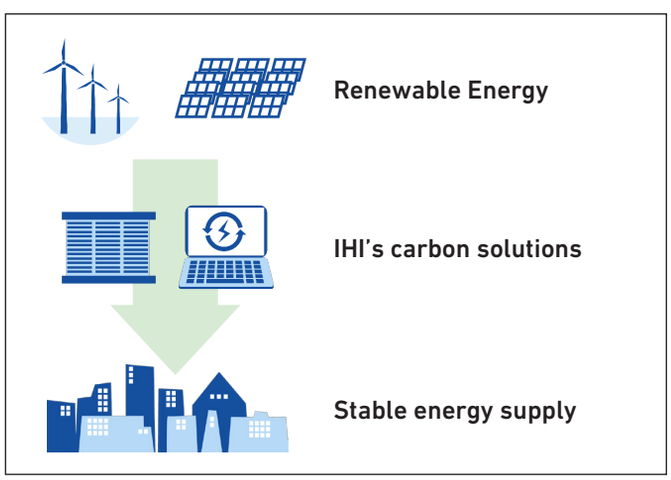
MoU for Cooperation on Decarbonization Projects with EGAT

IHI
Realize your dreams

- **Outline:** Thailand is promoting decarbonization efforts to achieve GHG emission reduction targets of 40% by 2030, and Net ZERO by 2065. EGAT plays an important role in this process, and this MOU establishes a framework for discussion and business matching platform to promote the study and realization of measures to achieve these goals.
- **Purpose/Aims:** To kickstart discussions and information exchange regarding several applicable decarbonization and energy storage solutions. Ultimately, the aim is to reach a common understanding on a comprehensive decarbonization and energy transition roadmap for Thailand and EGAT.

Sirindhorn Dam Hydro & Floating PV by EGAT

https://www.egat.co.th/home/en/20211103-pre/

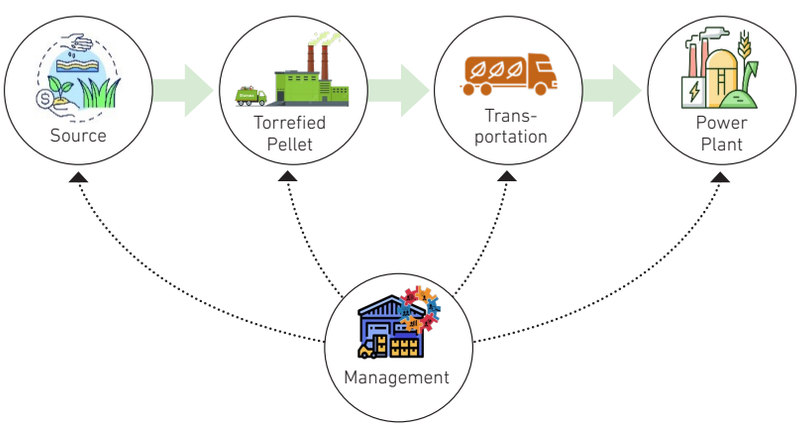


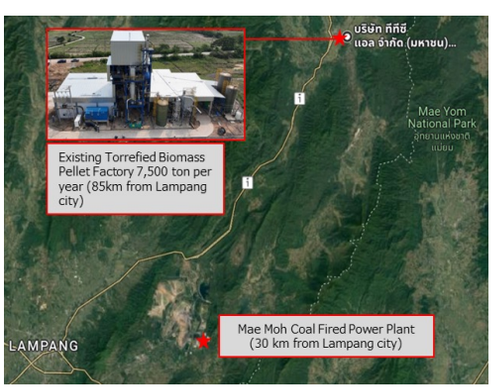
Projects related to MOUs in March 2023

Development of Biofuel Technology and Value Chain Management for Power Generation

- **Overview:** Development of project focusing on biofuel technology and value chain management for power generation in Thailand and/or any other area in order to trade it to domestic and/or international industries for the utilization throughout the value chain as a fuel for power generation.
- **Purpose:** Toward the realization of decarbonization target in Thailand, TTCL Public Company Limited (TTCL) and Electricity Generating Authority of Thailand (EGAT) wish to strengthen their relationship and cooperate with each other in order to study and exchange the information and ideas relating the potential business opportunity, joint investment, market targeting, procurement, and the supply chain of biofuel cycle within the area including source of biofuel, biofuel processing/production, management, storage, transportation, and client.
- **Contribution to SDGs:** Other than reducing GHG, this project can contribute the solving air pollution problem by preventing open burning, the reducing poverty by additional income to farmers and the introducing torrefaction and/or other innovated technology.

Updated Progress: : EGAT proposed 7 kinds of biomass as feedstock candidate, and currently preliminary study for this project in terms of technology and commercial aspects. We can start the detail study after confirmation of Mae Moh Decarbonization policy by Thai Government.



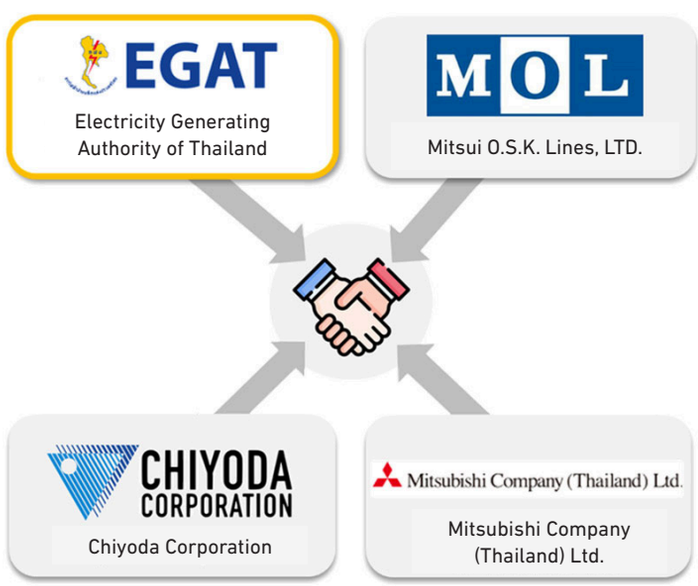


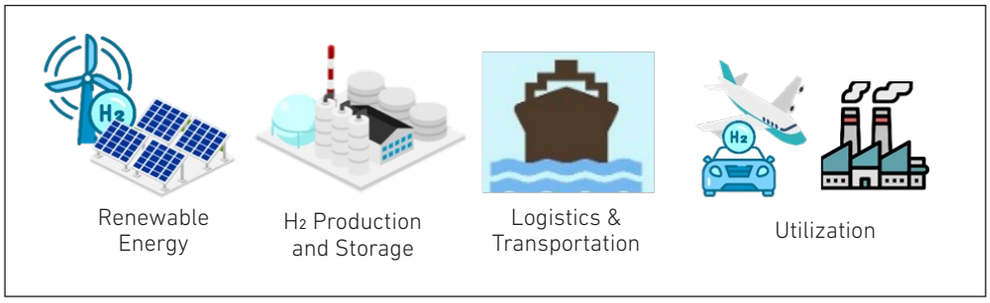
Projects related to MOUs in March 2023

The Development of Clean Hydrogen/Ammonia Value Chain

- **Project Overview:** Development of project focusing on producing clean hydrogen/ clean ammonia from renewable energy in southern provinces of Thailand in order to trade it to domestic and/or international industries for the utilization throughout the value chain.
- **Purpose:** Toward the realization of decarbonization target in Thailand, Chiyoda Corporation, Mitsui O.S.K. Lines, and Mitsubishi Company (Thailand) Limited aims to study and provide expertise to Electricity Generating Authority of Thailand (EGAT), the Thailand's leading state-owned enterprise, to cooperate and exchange the ideas relating the supply chain of clean hydrogen/ clean ammonia in southern provinces of Thailand, including the production, storage, transportation and utilization.

Updated Progress: Selected as METI's Subsidy Project Feasibility Study in October 2023. Kick-off Meeting and Site survey will be conducted at the end of November and aim to complete the Study in February 2024.





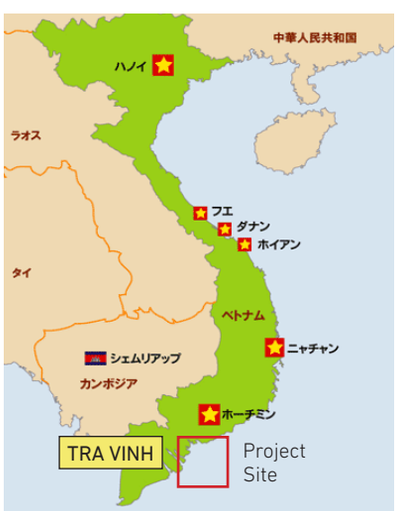
Projects related to MOUs in March 2023

MOU for the development of the Project Truong Thanh Wind Farm with a total expected capacity of 2.0 GW in Tra Vinh province, Viet Nam

高める、つくる、そして、支える。
熊谷組

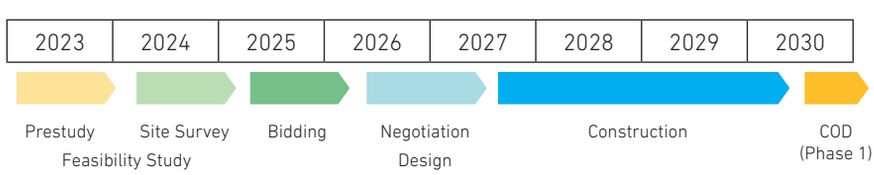
- **Outline:** TTVN and a group of Japanese companies led by Kumagaigumi and participated by INPEX and Kansai Electric Power signed MOU to cooperate in the development of a 2GW offshore wind power generation project in the offshore of Tra Vinh Province in Viet Nam.
- **Purpose and Objectives:** The project is the first large-scale offshore wind power project in Viet Nam, planned to generate 2 GW in total, 800 MW in Phase 1. Through the promotion of this project, Viet Nam's economic development and Japan's energy infrastructure exports are expected to be further promoted.
- **Others:** "Feasibility Study for Overseas Development of High-Quality Energy Infrastructure", "Asia Green Growth Promotion Project" surveys underway supported by METI and ANRE.

Updated Progress: A new MOU is scheduled to be concluded in December with local company REE (REFRIGERATION ELECTRICAL ENGINEERING CORPORATION) joining as a new consortium member in order to be selected as a project to start operations by 2030 in the PDP8 implementation plan. An application for a sea area survey was filed in September, and the five companies continue to study the feasibility of commercializing the project.



Location

Offshore Wind Power Project (Image)



Estimated Project Schedule

Meeting with TRA VINH Provincial People's Committee, Nov. 2022

KUMAGAI GUMI
INPEX
Kansai Electric Power
TTVN

MOU Contracting Party

Projects related to MOUs in March 2023

MOU among erex Co., Ltd., Tuyen Quang Province, and Yen Bai Province for Cooperation in Biomass Fuel Developments

- **Summary:** The MOU confirms mutual cooperation to develop biomass fuels in existing in Tuyen Quang and Yen Bai provinces in Viet Nam and to realize projects to utilize unused resources from agriculture and forestry
- **Significance and Aim of the Cooperation:** erex Co., Ltd. aims to construct biomass power plants in both provinces, and both provinces aim to develop biomass resources from the perspective of regional revitalization and carbon neutrality. Through the MOU, erex and the two provinces will cooperate to develop unused biomass resources, aiming to achieve CO_2 reduction targets and sustainable developments
- **Others:** A task force team will be formed this spring among the two provinces and erex to accelerate the study.

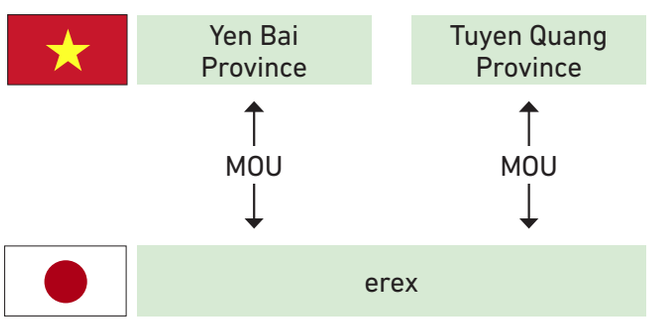
https://www.jbic.go.jp/ja/information/press/press-2023/press_00104.html

Updated Progress: erex has signed loan agreements with JBIC and SMBC for production and sale of biomass fuel through EREX TQ and EREX YB. (US$4.6 mil. for each).

The following surveys and researches will be conducted by each province and erex

(1) Surveys to attract investments in the biomass sector
(2) Research on sustainable supply of biomass resources in each province
(3) Survey on wood pellet plant investment feasibility in each province

MOU Relationship Diagram



*Surveys and researches listed on the left will be conducted with each province.

Projects related to MOUs in March 2023

JOGMEC concluded MOU with PetroVietnam to seek further collaboration study on CCS

- **Outline:** Japan Organization for Metals and Energy Security ("JOGMEC") has signed a Memorandum of Understanding (MOU) with PetroVietnam ("PVN") to discuss the continuation of joint study to realize a CCS project in Viet Nam.
- **Purpose:** The Parties have studied the feasibility of CCS in Viet Nam since February 2022. By conducting succeeding studies, we aim to contribute to the launch of a CCS project in the 2030s, and ultimately to the carbon neutrality of both countries.

Updated Progress: Discussions are underway for succeeding studies to actualize CCS project in Viet Nam.

Signing for MOU to discuss further collaboration on CCS study

From Left to right : Mr. HOSONO Tetsuhiro, former Chairman & CEO, JOGMEC, NISHIMURA Yasutoshi, Minister of Economy, Trade and Industry in Japan, ASAWA Satoshi, Executive Vice President, Energy Business Unit, JOGMEC, Mr. Le Ngoc Son, Vice President, PVN, Dr. Trinh Xuan Cuong, General Manager, Exploration division, PVN

Rough location of the study area
(within Vietnamese territorial waters)

Appendix

- **Participants of AZEC Ministerial Meeting**
  (4 March 2023)
- **AZEC Joint Statement**
  (4 March 2023)
- **Chair's summary of AZEC Ministerial Meeting**
  (4 March 2023)

06

Participants of AZEC Ministerial Meeting

AZEC partner countries

Indonesia

H.E. Mr. Arifin Tasrif

Minister of Energy and Mineral Resources

Malaysia

Y.B. Tuan Mohd Rafizi bin Ramli

Minister of Economy

Philippines

H.E. Mr. Raphael Perpetuo M. Lotilla

Secretary, Department of Energy

Singapore

H.E. Mr. Gan Kim Yong

Minister for Trade and Industry

Thailand

H.E. Mr. Supattanapong Punmeechaow

Deputy Prime Minister and Minister of Energy

Viet Nam

H.E. Dr. Tran Hong Ha

Deputy Prime Minister and Minister of Natural Resources and Environment

Participants of AZEC Ministerial Meeting

Australia

Hon Jenny McAllister

Assistant Minister for Climate Change and Energy

Brunei

Mr. Haji Shahbudin Haji Musa

Ambassador Extraordinary and Plenipotentiary

Cambodia

H.E. Dr. Ty Norin

Secretary of State, Ministry of Mines and Energy

Laos

H.E. Mr. Sinava Souphanouvong

Vice Minister of Energy and Mines

International organizations

ERIA

Professor Hidetoshi Nishimura

The President of ERIA

IEA

Ms. Mary WARLICK

The Deputy Executive Director

Asia Zero Emission Community Joint Statement

Tokyo, 4 March 2023

We, the Ministers of Australia, Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam held the Asia Zero Emission Community (AZEC) Ministerial Meeting in Tokyo on March 4th, 2023, where we, as the AZEC partners, shared our ideas and the views on the challenges and opportunities of decarbonization and jointly committed to accelerating a clean, sustainable, just, affordable, and inclusive energy transition towards carbon neutrality/net-zero emissions in the Asian region building on the mutual trust cultivated over the years.

We recognize that accelerating the energy transition in the Asian region is key to achieve the goals of the Paris Agreement, including holding the increase in the global average temperature to well below 2°C above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5°C above preindustrial levels, and recalling the Paris Agreement will be implemented to reflect the principle of common but differentiated responsibilities and respective capabilities in the light of different national circumstances. We further recognize that the energy transition should allow for various and practical pathways tailored to meet the circumstances of each country, including in the Asian region which is experiencing rapid increases in the energy demand due to economic growth.

We share the following common views and will work together as the AZEC partners

- Recognizing the importance of tackling climate change as a common global challenge and advancing cooperation towards carbon neutrality/net-zero emissions while ensuring energy security,
- Recognizing Asia is projected to remain the engine of global economic growth and energy demand expansion and confirming the importance of promoting energy transition in a manner that is compatible with economic growth and resilience especially through innovation,
- Recognizing there are various and practical pathways towards carbon neutrality/net-zero emissions depending on the circumstances of each country including, but not limited to: industrial structures, social contexts, geographies and stages and rates of development, and the importance of utilizing a diverse range of energy sources and technologies to design and implement such pathways.

Asia Zero Emission Community Joint Statement

Aligned to these views as well as our respective national policies and legislations, we will share information, have discussions and take actions through the AZEC platform, in the areas including but not limited to;

- development, demonstration, and deployment of decarbonization strategies, plans, businesses and technologies such as energy efficiency, renewables, hydrogen, ammonia, energy storage, bioenergy, carbon capture, utilization and storage (CCUS);
- financial support for investments in decarbonization infrastructure including the power grid and the development of clean energy supply chains, including for critical minerals and materials;
- development, harmonization, and securing interoperability of standards of decarbonization technologies, and strengthening of human resource capacity in the area.

In principle, AZEC will hold the annual Ministers' Meeting and regular Senior Officials' Meetings. We will also collaborate with international organizations and institutions such as the Economic Research Institute for ASEAN and East Asia (ERIA), the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), and the ASEAN Center for Energy (ACE) and others as required.

We understand that the contents set forth herein are not legally binding and we will cooperate with each other voluntarily.

Chair's summary

Asia Zero Emission Community Ministerial Meeting

Tokyo, 4 March 2023

We, the Ministers of Australia, Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam held the Asia Zero Emission Community (AZEC) Ministerial Meeting in Tokyo on March 4th, 2023 and issued the "Asia Zero Emission Community Joint Statement".

In addition to the Joint Statement, there was a consensus that AZEC partner countries will further cooperation discussions and actions taking the following perspectives into consideration.

<Energy efficiency and demand-side energy conversion>

Energy efficiency is the "first fuel" in the energy transition. Conserving and making efficient use of energy and resources provide multiple benefits across all sectors. Promoting energy efficiency and energy conversion technologies is extremely important for decarbonization, energy security, and economic efficiency.

<Renewable Energy/Energy Management>

Renewables such as solar, wind, hydro, geothermal and bioenergy are all crucial source of decarbonized energy that contribute to energy security as domestically produced energy and economic development. Deployment of renewable energies and energy management technologies needs to be enhanced to accelerate energy transition while taking into consideration their economic efficiency and acceptance by local communities.

<Natural gas and LNG>

Global demand for LNG is growing continuously as a transition energy source. Enhancing upstream development of natural gas and LNG is necessary in order to secure the stable supply to meet future demand. It is also important to make natural gas a zero-emission energy source through CCS and conversion to hydrogen and ammonia.

<CCUS/Carbon Recycling>

CCUS/Carbon Recycling will be a key technology in reducing CO_2 emission into the atmosphere from large emission sources such as energy and industrial sectors. The promotion of international cooperation for CCUS/Carbon Recycling development in Asia is highly desirable.

<Hydrogen and Ammonia>
Hydrogen and ammonia can play a significant role in decarbonizing thermal power generation, the transportation sector and hard-to-abate industrial sectors. It would be essential to secure multiple hydrogen and ammonia production sites and supply chains, utilize a variety of hydrogen carriers, strengthen demand creation efforts, and share knowledge and expertise acquired through demonstration projects.

<Critical Minerals>
Toward a carbon-neutral economy, the demand for critical minerals such as lithium, nickel and rare earths is expected to increase rapidly. The development of a safe and responsible global supply chain to ensure a fully transparent and sustainable supply of critical materials is essential.

AZEC partner countries will further discuss cooperations in the pursuit of their various and practical pathways towards net-zero emissions/carbon neutrality, including but not limited to energy efficiency, energy conversion, electrification, decarbonization of power and transportation sectors, renewable energy, energy management, bioenergy, natural gas, LNG, CCUS/Carbon Recycling, hydrogen, ammonia, critical minerals, and sustainable finance.