VOICE FROM THAILAND

Insights for
a Sustainable Future
with Thailand

Preface

Thailand is currently advancing initiatives toward carbon neutrality and Green Transformation (GX) across both policy and industry. Addressing climate change and achieving sustainable growth have become not only environmental imperatives, but also important management priorities that influence corporate competitiveness and international credibility.

Through its business catalog, *Sustainable Business For Carbon Neutrality*, Japan External Trade Organization(JETRO) Bangkok Office has introduced Japanese technologies and solutions while supporting collaboration between Thailand and Japan.

This publication, *VOICE FROM THAILAND*, offers a different perspective by focusing on initiatives from the Thai side. Through interviews with Thai government officials, executives and practitioners from Thai companies, as well as companies engaged in Thailand–Japan collaboration, it presents insights into policy directions, corporate strategies, and perspectives and expectations regarding partnership with Japanese companies. These voices from multidimensional perspectives help amplify a broadened and realistic picture of the challenges Thailand faces and the direction of their efforts.

It is our hope that this publication will deepen mutual understanding between Thailand and Japan and contribute to concrete initiatives toward the realization of a sustainable future.

Finally, we extend our sincere appreciation to all stakeholders who generously contributed to the preparation of this publication.

March 2026
JETRO Bangkok Office
Sustainable Business Desk

Note: The Japanese version is the original text. The English version is a provisional translation prepared for reference purposes.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Thailand's Carbon Neutrality Policy

Policy Positioning and Target Setting

In recent years, Thailand has increasingly positioned carbon neutrality and net zero greenhouse gas (GHG) emissions not as policies confined to the environmental domain, but as a national strategy that integrate the energy transition, industrial competitiveness, and the improvement of the investment environment. This trend reflects both the physical impacts of climate change—such as floods and droughts—and the growing requirement for decarbonization across global supply chains. As a major export-oriented economy, Thailand recognizes that such trends, particularly influenced by carbon-related regulations in Europe, directly affect its long term competitiveness.

Against this backdrop, the Thai government has progressively established long- and mid-term GHG reduction targets under the international framework of the Paris Agreement, while advancing the development of institutions and plans to support those targets. Specifically, Thailand has adopted an approach of setting its long-term targets—carbon neutrality by 2050 and net zero by 2065—and then establishing mid-term emission reduction targets consistent with these goals. Subsequently, on November 4, 2025, the Thai Cabinet approved NDC 3.0 and submitted it to the United Nations Framework Convention on Climate Change (UNFCCC) on the same date. Under NDC 3.0, the net zero target is brought forward to 2050 (15 years earlier)—indicating the government's commitment to further accelerate efforts toward a low-carbon society.

Progress in Institutional Development

Thailand's decarbonization policy has historically been advanced mainly through voluntary initiatives, various incentives and its commitment as a member of the international community. In recent years, however, initiatives and action plans have been accelerated into formal institutions to drive a low-carbon society. The Climate Change Act symbolized the shift.

On December 2, 2025, the Thai Cabinet approved in principle the draft Climate Change Act. According to the government announcement, the draft bill is expected to establish a framework that mainly prescribes: the National Climate Change Policy Committee, National Greenhouse Gas Database, Emission Trading System (ETS) and Carbon Border Adjustment Mechanism (CBAM), Carbon tax collection for certain types of goods, and the "Climate Fund" as a state legal entity and related mechanisms.

This significant step is a milestone to drive decarbonization efforts from previous voluntary scheme in transition toward an institutional and rule-based framework over the mid to long term.

National Energy Plan as the Core of Energy Policy

In Thailand, Ministry of Energy is developing the National Energy Plan (NEP) as the central pillar of energy policy. The NEP is positioned as a comprehensive framework to advance the energy transition and is structured to integrate five existing plans (see below).

Plan	Focus
Power Development Plan (PDP)	Design of the power generation mix, grid, and electricity supply–demand balance
Alternative Energy Development Plan (AEDP)	Renewable energy deployment and expansion of alternative energy
Energy Efficiency Plan (EEP)	Efficiency improvements in industry, buildings, and transport
Gas Plan	Use of low-carbon gases including LNG and hydrogen
Oil Plan	Managing the transition to EVs, biofuels, and related areas

Key Government Bodies Responsible for Carbon Neutrality Policy in Thailand

Ministry/Agency	Primary Role (Carbon Neutrality-related affairs)
Ministry of Finance (MOF)	Involved in tax measures such as carbon tax and in green finance. Under the Climate Change Act, coordinates between carbon pricing mechanisms and fiscal systems.
Ministry of Transport (MOT)	Responsible for emissions reduction policies in the transport sector, including EVs, public transport, and logistics such as aviation and maritime transport. For EVs, designs institutional frameworks for infrastructure development and operations in coordination with other ministries and agencies.
Ministry of Natural Resources and Environment (MNRE)	Leading ministry overseeing Thailand's overall climate change policy. Engages in international negotiations, formulates of national targets, and coordinates inter-ministeries.
↳ **Department of Climate Change and Environment (DCCE)**	Implementation body under MNRE, specializing in climate change initiatives and actions, responsible for developing the GHG inventory, managing NDC progress, institutional design, and collaborating with the private sector.
↳ **Thailand Greenhouse Gas Management Organization (TGO)**	Conducts GHG emission calculation and certification of Carbon Footprint Organization/ Carbon Footprint Product (CFO/CFP), manages carbon credits (T-VER), and develops methodologies for GHG emissions reduction calculation and verification.
Ministry of Energy (MOE)	Core ministry responsible for reducing GHG emissions from the energy sector, the largest emitting sector. Leads implementation through renewable energy deployment, energy efficiency, electrification, and EV policy.
↳ **Department of Alternative Energy Development and Efficiency (DEDE)**	Designs and promotes renewable energy and energy efficiency deployment, as well as bio-based alternative fuels such as SAF.
↳ **Energy Policy and Planning Office (EPPO)**	Responsible for energy policy formulation and coordination, including ensuring coherence among plans such as the NEP.
Digital Economy Promotion Agency(depa)	Under the Ministry of Digital Economy and Society (MDES), promotes decarbonization and green transformation (GX) through the development of digital schemes and platforms such as energy management and GHG emission visualization ones.
Ministry of Industry (MOI)	Oversees decarbonization in industrial sector including manufacturing industry, aiming to foster/nurture industrial competitiveness with emissions reduction.
Thailand Board of Investment (BOI)	As a core agency responsible for investment promotion policy towards green investments/green economy supports investment in technologies and businesses that contribute to decarbonization and carbon neutrality through incentive schemes.
Eastern Economic Corridor Office of Thailand (EECO)	A focal point center to oversee and promote the Eastern Economic Corridor (EEC: Eastern Economic Corridor), positioned as a modelled low-carbon advanced industrial cluster and as a testbed for demonstration and implementation that balances decarbonization with industrial competitiveness.

VOICE

BOI's investment map for Carbon Neutrality

Thailand Board of Investment (BOI)

Deputy Secretary General

Sudhasinee Smitra

The Thailand Board of Investment (BOI) is an investment promotion agency under the Prime Minister's Office, responsible for formulating investment policy, reviewing and approving investment projects, and granting privileges such as tax incentives. It places priority on fostering high value-added industries that contribute to the upgrading of the Thai economy, and positions advanced manufacturing, digital industries, bio and circular industries, energy-saving technologies, and the adoption of alternative energy as key focus areas. We spoke with Deputy Secretary General Ms. Sudhasinee Smitra, who studied in Japan from high school through graduate school and previously served as Director of the BOI Tokyo Office, about the direction of Thailand's investment strategy and the role expected of Japanese companies.

Carbon neutrality as a catalyst for transforming Thailand's economy and industrial structure

What is the significance of Thailand's efforts toward carbon neutrality?

Climate change is a challenge that the entire world must address. Advancing this response also demonstrates that Thailand, as a member of the international community, shares the same goals. At COP26 in 2021, the Thai government agreed to the Glasgow Climate Pact. At that time, Thailand announced its Nationally Determined Contribution (NDC) and its Long-Term Low Greenhouse Gas Emission Development Strategy (LT-LEDS), committing to the world the targets of "achieving carbon neutrality by 2050" and "achieving net zero by 2065." To achieve these goals, a wide range of updates will be required across all sectors. New industries will form, and the carbon-neutral market will expand significantly. Thailand will be expected to contribute to global environmental solutions while also meeting real market demand. Without various forms of government support - such as regulatory easing and investment incentives - there is a risk that achieving these targets will become difficult.

What role does BOI play in efforts toward achieving carbon neutrality?

BOI's role is to provide incentives for corporate investment in relevant fields and to improve the investment environment in order to achieve the national targets of "achieving carbon neutrality by 2050" and "achieving net zero by 2065." In Thailand's carbon-neutrality policy, key roles are played by the Energy Policy and Planning Office (EPPO), which formulates the National Energy Plan (NEP); the Department of Climate Change and Environment (DCCE), which serves as the international focal point as Thailand's Green Climate Fund National Designated Authority (GCF-NDA); the Thailand Greenhouse Gas Management Organization (TGO), which implements carbon credits in Thailand; and the Department of Alternative Energy Development and Efficiency (DEDE), which promotes the development and deployment of renewable and alternative energy. BOI works with these agencies, the tax authorities, and private-sector companies to strengthen the investment environment in the environmental field. Through preferential measures such as corporate income tax exemptions for targeted industries, exemptions of import duties on machinery, and relaxation of foreign ownership restrictions, we help address two challenges simultaneously: strengthening industrial

competitiveness and responding to environmental and energy constraints.

A green investment incentive strategy Spanning industry, energy, transport, and communities

What investment incentives are offered for the industries BOI prioritizes?

To shift the Thai economy toward a greener and more sustainable direction, the Thai government has established investment incentives across four sectors. BOI provides incentives - directly and indirectly - for the industrial sector, energy sector, transport sector, and community sector. In the industrial sector, when existing businesses undertake smart transformation, energy-saving measures, or reductions in environmental impacts, they can receive a three-year corporate income tax exemption covering 50% or 100% of the investment amount. Eligible activities include the adoption of automation and robotics; digital technologies and Industry 4.0 readiness; energy efficiency and renewable energy adoption; reductions in environmental impacts; and alignment with international sustainability standards such as GAP, FSC, PEFC, and ISO 22000. In the energy sector, by promoting clean energy production and establishing clean electricity procurement mechanisms - such as the Utility Green Tariff (UGT)[1] and direct PPA[2] - we make it easier for companies to procure renewable electricity. In the transport sector, we position the expansion of production and use of electric vehicles (xEVs) and next-generation vehicles as a national priority. Investments in producing various EV types, including BEVs, PHEVs, HEVs, and FCEVs, are eligible for incentives such as corporate income tax exemptions, exemptions of import duties on machinery and raw materials, and duty exemptions on raw materials used for R&D. Measures are also included to reduce import duties and excise taxes on imported completely built-up vehicles (CBUs), and to reduce vehicle taxes on the demand side. In addition, to support the transition of the automotive industry as a whole, additional privileges are available, including an additional two-year corporate income tax exemption[3] for parts manufacturing through joint ventures with Thai partners, a three-year corporate income tax exemption[4] for introducing automation and robots into existing factories, and exemptions of import duties on machinery. Furthermore, when EV and PHEV manufacturers use local parts accounting for at least 40% (BEV) or 45% (PHEV) of raw material value, an additional two-year 50% reduction in corporate income tax is granted. In the community sector, when a company implements projects worth at least 500,000 baht per project and more than 5 million baht in total for cooperatives, community enterprises, local authorities, medical institutions, educational institutions, and similar organizations, it can receive a three-year corporate income tax exemption, plus additional exemptions depending on the field - such as agriculture, environment, tourism, public health, and education. The objective is to support regional and social development, including sustainable agriculture and PM2.5 reduction.

Among these four sectors, which areas does BOI pay particular attention to?

BOI's mission is to promote investment in Thailand. Within that mission, we define clear target industries, and the automotive industry is one of our most representative priority areas. Thanks to investments from many investors, including Japanese companies, it has grown significantly. To keep pace with global trends, the automotive industry must now shift toward electrification. Thailand's EV policy is led by the National Electric Vehicle Policy Committee (EV Board), chaired by the Prime Minister. BOI serves as the secretariat of the committee, and we place particular emphasis on the EV field. Even under the new government, the policy direction remains consistent, and the government's supportive stance and intensity will not weaken. We are examining this with the greatest emphasis on balancing the need for existing industries to meet current demand while also being able to respond to future demand.

1 A tariff menu that allows customers to select and purchase renewable electricity through the grid.
2 A scheme where large customers sign long-term PPAs directly with power producers to procure renewable electricity.
3 Joint-venture conditions (e.g., Thai ownership of 30% or more).
4 50% or 100% of the investment amount.

What about alternative energy such as hydrogen, and CCS?

BOI is always open to new technologies. Rather than limiting ourselves to specific technologies, we take an approach of working backward from the objective of zero emissions. In the automotive space as well, we are not excluding options such as hydrogen. That said, our understanding is that hydrogen has not yet reached the implementation stage in terms of technology, market maturity, and infrastructure development. Hydrogen also includes green, blue, and brown varieties, but if we are to pursue it seriously, we believe green hydrogen should be central. We are aware that Japanese companies are advancing technology development in this field, but ultimately we expect cost will determine the pace of adoption. The automotive industry is currently in a transition phase. If policy shifts are made too abruptly, neither industry nor infrastructure will be able to keep up, and there is a risk that operations on the ground will not function smoothly; therefore, we are highly mindful of maintaining balance. With respect to CCUS (carbon capture, utilization, and storage), we also see many aspects as still at the consideration stage from a technological standpoint. We believe carbon capture technologies are likely to develop first. In Thailand, we are also at the stage of examining how existing oil and gas concessions or depleted gas fields might be utilized. However, the technology maturity is not yet sufficient. For these emerging fields, we continue to monitor technology trends and consider what incentive design and operation would be appropriate. A national committee to address this theme has also been established, and BOI participates as a member.

Building a next-generation green industrial ecosystem through Japanese technology and data collaboration

If there are areas where you have particular expectations for Japanese companies, what domains would they be?

Japanese companies are already conducting advanced R&D across many fields, and we understand that they possess many high-potential technologies, including those not publicly disclosed. Through frameworks such as the United Nations Industrial Development Organization (UNIDO) and the New Energy and Industrial Technology Development Organization (NEDO), several projects in collaboration with Thailand are also underway. Thailand has strengths in the food sector, but there remains substantial room for research and industrialization in areas such as adding value to waste. For example, technologies that upcycle agricultural residues and cellulose into new chemicals or materials are areas where Japanese companies are particularly strong, and we believe Thailand has high expectations as well. There are several domains where we would find Japanese support especially reassuring. One is

the creation of data platforms for chemicals and products. Recently, we received an inquiry about a platform for registering and sharing chemical substance information across the entire supply chain, with compliance with the EU REACH regulation[5] in mind. In many cases, components and chemical products manufactured in Japan are used by Thai subsidiaries and ultimately exported to European markets. If the flow of information could be digitized end-to-end in a manner similar to a "product passport," administrative burdens could be significantly reduced, while improving overall efficiency and the reliability of data. The volume of information is enormous, and there are aspects that would be difficult for Thailand to handle alone. For that reason, we would be very grateful if Japanese counterparts could work with us to consider a cooperation scheme under which companies in both Japan and Thailand participate in a common platform.

5 An EU regulation requiring registration and risk assessment for chemicals made or imported into the EU, and controlling hazardous substances through authorization/restrictions.

Thailand Board of Investment
https://www.boi.go.th/

VOICE

A new Climate Change Act toward net zero GHG emissions

Department of Climate Change and Environment (DCCE)

Director of Strategy and International Cooperation Division

Kittisak Prukkanone

DCCE is a government agency under Thailand's Ministry of Natural Resources and Environment that oversees climate change policy and serves as the command center for driving the country toward carbon neutrality and net-zero greenhouse gas (GHG) emissions. It leads the formulation and implementation of Thailand's NDC and LT-LEDS under the Paris Agreement, while advancing the drafting of a climate change bill, cross-ministerial policy coordination, and collaboration with the private sector. It is also responsible for designing mechanisms such as the measurement, reporting and verification (MRV) system for GHG emissions and carbon pricing. What role is DCCE expected to play in enabling Thailand to achieve both sustainable economic growth and decarbonization? We asked about the direction of Thailand's climate change policy and the key challenges ahead in realizing carbon neutrality and net zero GHG emissions.

International responsibility and stronger competitiveness, why Thailand aims for carbon neutrality and net zero GHG emissions

Why does Thailand need carbon neutrality and net zero GHG emissions, and how do you see the benefits for domestic and international stakeholders?

As a Party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, Thailand must fulfill its commitment as a member of the international community. Cutting GHG emissions is an unavoidable challenge—both to curb global warming and to adapt to the impacts of climate change. At the same time, this is directly linked to the competitiveness of Thailand's economy and business sector. Major export markets and investors have begun to place greater importance on low-carbon products and services and transition strategies, and efforts toward carbon neutrality (CN) and net zero GHG emissions are increasingly becoming a prerequisite for Thai companies to remain in global supply chains. Looking at stakeholders individually: for companies, shifting to environmentally conscious management and low-carbon business models creates opportunities for new investment and technology adoption. For citizens, it can improve quality of life through better air quality, reduced health risks, the creation of green jobs, and opportunities to participate through carbon credits. By demonstrating a responsible stance as a country, Thailand can also attract funding, technology, and knowledge from international organizations and advanced economies.

What role does DCCE play in achieving carbon neutrality and net zero GHG emissions?

DCCE's mission is to integrate policies and plans related to climate change and to lead their implementation. While Thailand is in the process of advancing its comprehensive climate change law, policy is currently the primary tool. Therefore, enhancing policy consistency and effectiveness is the most important practical task for now. Specifically, DCCE leads the formulation of NDC 3.0 and revision of national strategies the LT-LEDS (Long-Term Low Emission Development Strategy), and consolidates sectoral mitigation plans across energy, transport, industry, agriculture, waste, sinks, and other areas. It is also responsible for data collection, progress management, and risk assessment, and for updating plans in line with

economic and social conditions. At the same time, as Thailand's UNFCCC National Focal Point, DCCE serves as the window for international negotiations as well as bilateral and multilateral cooperation.

The core of the Climate Change Act ETS, carbon tax, and four key tools

We understand that DCCE is central to compiling the draft Climate Change Act currently under preparation. Could you explain the overall structure of the bill and the mechanisms that will most strongly promote carbon neutrality and net zero GHG emissions ?

Under this bill, the Ministry of Natural Resources and Environment (MNRE) will be the lead ministry, and the Ministry of Finance (MOF) will be involved as a joint implementing agency handling fiscal tools. The bill is built around four major tools. The first is a framework for national climate and environmental policy. It will be designed so that all actors—government, the private sector, and citizens—can work together, and so that the framework can be reviewed and updated every five years. It will also be aligned with international commitments such as the NDC. The second is a set of tools for reducing GHG emissions. This includes mechanisms related to carbon pricing, such as an emissions trading scheme (ETS), a carbon tax, responses to CBAM (Carbon Border Adjustment Mechanism), carbon adjustment for imports, and carbon credits. We believe the two main drivers to promote CN and NZ are the ETS and the carbon tax. Given Thailand's industrial structure, rather than running many complex schemes in parallel, it is more realistic to design a system in which the ETS covers the production stage and the carbon tax covers the consumption stage—controlling emissions from both sides. If the transition to low-carbon production processes progresses, the burden under the ETS can be reduced. Meanwhile, at the consumption stage, the design must avoid imposing excessive tax burdens on low-carbon goods and must not undermine international competitiveness. The third is an adaptation tool. It will provide long-term climate risk information, authority, and budgets to agencies whose relationship to climate change has previously been seen as limited—such as those involved in meteorology, agriculture, health, water management, and social development. Assuming disaster risks such as heavy rainfall, floods, and heatwaves, systems and infrastructure will need to be designed on 30-, 50-, and 100-year horizons. The fourth is a climate finance mechanism. A "fund-of-funds" type climate fund will be established and, in collaboration with commercial banks and others, will support investment in GHG reduction and adaptation projects. The Ministry of Finance will also be deeply involved in this area, and while adhering to the polluter pays principle, Thailand will build a fiscal foundation to support the transition.

Not for profit, but for reducing GHG emissions, a climate fund with a clear purpose

Could you explain the "fund-of-funds" in more detail?

This fund will be set up under the Ministry of Natural Resources and Environment, but it is expected to be operated as an independent legal entity rather than as an administrative body. DCCE will propose and manage the operating policy and investment areas. The annual revenue target is at least 5 billion baht, with carbon pricing revenue as the primary source of funds. In principle, the structure allows a choice: "a company invests on its own to reduce emissions; or, if that is difficult, it contributes funds to the state, and the state invests on its behalf." As the name "fund-of-funds" suggests, the fund can combine with other funds to conduct blended finance. It will coordinate with other MOF funds, commercial banks, international climate funds, and others, and will structure the optimal package for each project. The key point is that the purpose of this fund is not profit maximization, but the reduction of GHG emissions. Funds will be invested mainly in mitigation projects, with a portion allocated to adaptation and R&D. For investors, returns include not only ordinary interest but also the acquisition of new customers and projects, and the enhancement of environmental value through the projects in which they participate. The long-term vision is to aim for a state where environmental quality improves to the point that such a fund is no longer needed.

Industrial impact: regulation and support as a package

What impact will the climate change law have on industry, and what support measures will encourage companies to prepare?

Under the new law, there may be additional burdens associated with compliance with new requirements—namely, costs for calculation and verification, as well as investment burdens for process improvements and equipment upgrades. In particular, in the early stages, we expect significant impacts on high-emitting industries such as power generation, chemicals and petrochemicals, cement, and steel. However, this law is not merely regulation; it is designed as a "package of regulation and support." Preparations for subordinate legislation are also underway. While the ETS will be limited to operators with large emissions, small and medium-sized enterprises will primarily be required to report emissions. Based on those data, DCCE will act as an intermediary linking them to financial support, technical support, and access to international finance schemes. Regarding reporting obligations, the approach envisaged is to add GHG-related items to reporting already conducted under existing laws such as the Factory Act and the Energy Conservation Promotion Act. The thresholds for reporting obligations and ETS coverage, as well as the length of any transition period, are currently under consideration. As for how burdens should be distributed, we are working with the World Bank to analyze—using economic models—how best to combine the two tools of the ETS and the carbon tax so that market mechanisms function while avoiding an excessive concentration of burdens on specific actors or, ultimately, consumers. If charges are imposed twice—both upstream and downstream—the burden on the public will grow. Therefore, it is important to design a system in which society as a whole shares the burden in a balanced way.

A chance to transform the economic structure, expected benefits and challenges to overcome

How do you view the positive effects this bill will bring, and the challenges that may arise?

There are two major benefits. First, Thailand can contribute to reducing GHG emissions as a member of the global community and fulfill its international responsibilities. Second, the law can serve as leverage for shifting away from a traditional growth model that is becoming stagnant and toward a new economic structure that is low-carbon and sustainable. With this law as a catalyst, Thailand will need to rethink manufacturing processes, products, and even the industrial structure itself, and transform them into a more competitive form. While this can create new investment, employment, and skills, it will also entail burdens during the transition. For older industries with aging equipment and high-emission business models, adaptation will require time and costs. Another challenge is how to secure the investment funds required. Thailand's emissions are not extraordinarily high

in the context of global emissions, but changing business models will require substantial investment. In addition to domestic climate funds and the national budget, it will be important to proactively utilize international frameworks—such as the EU's CBAM, Japan's JCM (Joint Crediting Mechanism), bilateral cooperation with Switzerland and Singapore, carbon markets within ASEAN, and voluntary markets in which the World Bank is involved—and to advance the transition in a way that does not rely solely on the domestic market. Precisely because Thailand alone has a limited market size, we want to use this law to connect with international networks and expand access to finance, technology, and markets. For DCCE, the CN and net-zero targets should be positioned not as mere environmental regulation, but as a "national project to build a new economy and society," and we aim to move forward together with diverse stakeholders.

Department of Climate Change and Environment
https://www.dcce.go.th

VOICE

Supporting the energy transition through both regulation and incentives

Department of Alternative Energy Development and Efficiency (DEDE)

Director of Energy Research Division

Pongsak Prommakorn

DEDE is a core institution that drives Thailand's energy transition from two angles: expanding renewable energy adoption and improving energy efficiency. Under the overarching framework of the National Energy Plan (NEP), DEDE plays a crucial role by specifically overseeing the Alternative Energy Development Plan (AEDP) and the Energy Efficiency Plan (EEP), while supporting the broader national power mix objectives. It also combines measures such as energy management requirements for buildings and factories, the Building Energy Code (BEC), and the No. 5 Label for high-efficiency electrical appliances, thereby accelerating the transition through both regulation and incentives. In addition, DEDE builds up practical, high-impact policies toward carbon neutrality through public awareness-raising on energy conservation and technical cooperation with Japan.

Institutional development under the National Energy Plan and on-the-ground deployment of energy efficiency and renewables

To achieve the Thai government's carbon-neutrality target, what role does DEDE play?

DEDE's role has two main pillars. The first is to design and promote the development and deployment of renewable and alternative energy, expanding the adoption of solar, wind, biomass, hydropower, and waste-to-energy so as to raise the share of renewables in the energy supply. The second is energy conservation - in other words, improving energy efficiency. Across sectors such as industry, commercial buildings, households, and transport, we reduce energy intensity through measures including the development of energy-efficiency standards and labeling schemes. In addition, we underpin the energy transition from both sides - regulation and support - by combining requirements for energy management for factories and buildings above a certain size with support measures such as subsidies for energy-efficiency investments. These measures align with the overarching framework of the National Energy Plan (NEP). Under this framework, DEDE is directly responsible for driving the Alternative Energy Development Plan (AEDP) and the Energy Efficiency Plan (EEP), while operating in coordination with the Power Development Plan (PDP). Discussions on these plans are ongoing.

In the AEDP, how do you aim to achieve both renewable energy expansion and power-system stability?

Energy demand is large, and it can be considered in three categories: electricity, heat, and transport fuels. In the transport sector, the spread of EVs reduces gasoline consumption but increases electricity demand, so deeper decarbonization is required on the generation side. In power generation, a target has been indicated to raise the renewable share to roughly around half, with the main variable renewables being solar and wind. While the upfront investment is significant, once built they have no fuel costs and are cost-competitive over the long term. Meanwhile, biomass and biogas that use agricultural residues are also important renewables. They have an advantage in supply stability, but generation costs tend to be somewhat higher because fuel collection and transport costs are required. When designing the power system,

Thailand must satisfy three factors at the same time: decarbonization, reasonable tariffs, and supply security. Over-reliance on low-cost renewables such as solar and wind increases variability, so we are pursuing a balanced energy mix by combining options such as batteries, hydrogen storage, and biomass/biogas. Nuclear power and hydrogen are also being discussed as future options, but nuclear requires time to build social acceptance, and hydrogen is currently recognized as costly.

Could you also explain the policy direction for fuel switching in the manufacturing and transport sectors?

In manufacturing, it is necessary to shift from high-carbon fuels that are widely used today - such as coal and heavy fuel oil - toward lower-emission options such as natural gas and electricity. Going forward, we aim to introduce electric boilers and heat pumps and supply heat using renewable electricity. Renewable-derived fuels such as biomass, biogas, and waste-to-energy are also important options. In transport, the policy is to use blended fuels such as biodiesel (from palm oil) and ethanol (from sugarcane or cassava) while gradually advancing electrification such as EVs. Such fuel switching also affects the agricultural sector. Because rising biofuel demand can have spillover effects on planting and prices for crops such as palm and sugarcane, we believe it is important not only to use these resources as fuels but also to create higher value-added bioproducts such as bio-oil and transformer oil. The direction is to add value to agricultural residues and vegetable oils in multiple ways while also utilizing them as energy sources.

Stronger building energy-efficiency regulation and market activation through integrating the No. 5 Label

DEDE is also responsible for energy-efficiency regulation for buildings and factories. What does this involve, and what is the direction going forward?

Our role in this area is based on the Energy Conservation Promotion Act, B.E. 2535. For buildings and factories above a certain size, the law requires reporting on energy use, submission of energy-conservation plans, and appointment of energy managers. In the building sector, we have also developed and made mandatory the Building Energy Code (BEC), which specifies the energy performance of buildings. It sets standards for the building envelope - such as walls and windows - and for the efficiency of HVAC, lighting, and hot-water systems, and compliance is required for new construction and major renovations. For factories, we are currently in the process of developing Factory Energy Conservation standards (FEC). We plan to extend the BEC concept into the industrial sector and create efficiency standards and guidelines for factory equipment and processes. At present, factories are required to submit energy management reports, but industry-specific benchmarks - such as how much energy should be used per unit of product - are not yet sufficiently developed. Going forward, we intend to establish reference energy-intensity indicators by industry and connect them to more effective energy management.

Could you also explain the labeling scheme for industrial equipment and the subsidy program?

DEDE uses labeling as an important tool to promote the uptake of high-efficiency equipment. In the past, EGAT operated labels for household appliances, while DEDE separately operated labels for industrial equipment and pumps. Because this was not easy to understand, the two schemes were integrated and unified under the common No. 5 Label. As a result, energy-efficient products - whether for household or industrial use - can now be identified by the No. 5 Label. For companies pursuing energy conservation, the subsidy program from the Energy Conservation Fund should also be a major support. When eligible high-efficiency equipment is installed or upgraded, 20-30% of the investment amount is subsidized, and it is mainly used for replacement projects for existing

equipment. For projects where upfront investment is large and payback takes time, the ESCO[1] model is also used. In this model, an ESCO undertakes the capital investment, and the benefits obtained from subsequent electricity-cost reductions are shared with the project owner. ESCO businesses themselves may also be eligible for investment incentives from the BOI.

When formulating energy-related plans, how do you reference other countries' policies and data?

DEDE continuously studies information from abroad. We learn from many countries' examples, including technology trends, policy instruments for promoting energy efficiency and renewables, and combinations of incentives and regulation, and we adapt them to Thailand's circumstances. In cooperation with Japan, we are advancing joint consideration of new technologies including CCS (CO_2 capture and storage) through JICA projects and the Japan-Thailand Energy Policy Dialogue (JTEPD). We also share successful cases and conduct joint studies through cooperative frameworks within ASEAN and through AZEC (Asia Zero Emission Community), and we discuss the energy transition for the region as a whole.

Applying Japanese energy-efficiency technologies and experience to Thailand's context

In Thailand's energy-efficiency field, which business areas are Japanese companies likely to succeed in?

We have high expectations for Japanese companies in both technology and track record. Japan has extensive experience and technologies in energy-efficient buildings and high-efficiency equipment, and we hope these can be applied in ways that fit Thailand's context. For example, in the building sector, we look to Japan's experience in operating energy-efficiency standards, and to proven deployments of high-efficiency HVAC, lighting, and building energy management systems. In the industrial sector, many Japanese companies are already involved in improving the efficiency of equipment used in buildings and factories, but we see major opportunities ahead in switching processes from coal, heavy fuel oil, and LPG to electrification and lower-carbon fuels. For processes that require high temperatures, there may also be opportunities for technologies held by Japanese gas companies, such as switching to renewable fuels like biomass and biogas, or

using lower-carbon fuels derived from LNG. In addition, given the distance between biogas supply sources - such as livestock and food factories - and demand sites such as public facilities and industrial estates, solutions that transport and supply biomethane in forms such as compressed biomethane gas (CBG) and liquefied biomethane (LBM) also look promising. In transport, initiatives related to EVs and hydrogen are progressing, mainly among automakers, but there is still room for new players to enter. In the building sector as well, we see business opportunities in high-efficiency equipment and systems and in new materials that are not yet widely adopted, and we welcome active participation by Japanese companies.

Department of Alternative Energy Development and Efficiency
https://www.dede.go.th

1 Energy Service Company (ESCO). A business model that provides the equipment investment required for energy-saving retrofits, along with integrated design, installation, and operational improvements, and recovers costs from reduced energy costs (e.g., electricity bills).

VOICE

Where Thailand's Green DX support stands today

Digital Economy Promotion Agency (depa)

Executive Vice President

Preesan Rakwatin

The Digital Economy Promotion Agency (depa) is Thailand's core organization for digital economy policy, established in 2017. It supports the development of the digital industry through initiatives such as startup support, talent development, and smart city promotion. In recent years, while aligning with Thailand 4.0 (the next-generation industrial strategy) and the 20-Year National Strategy, depa has promoted projects in areas such as smart energy and smart environment that contribute to energy efficiency and greenhouse-gas reduction, thereby strengthening its role in achieving carbon neutrality and net zero. We spoke with Executive Vice President Mr. Preesan Rakwatin of the Digital Transformation Promotion Unit about concrete initiatives that combine green and digital, and about the potential for collaboration with Japanese companies.

Driving nationwide transformation and competitiveness through digital policy

Please tell us about depa's position and role.

depa formulates policies to promote digital industries and digital services, and advances improvements and revisions to regulations and rules in consultation with relevant ministries and agencies. At the same time, we also support the development of digital talent, the promotion of new investment, and projects in areas such as smart cities and smart environment.

From a green-tech perspective, which fields does depa emphasize?

In the Digital Transformation Promotion Unit that I oversee, we aim to support Thailand's carbon neutrality from the perspective of digital business. Our approach is to firmly cultivate the startup ecosystem and, within it, help green-tech-related companies grow. depa's startup portfolio includes more than 200 companies. Currently, we have several entrepreneurs specifically focusing on "Green Tech," particularly in the area of greenhouse gas (GHG) management. These startups have developed platforms for measuring the Carbon Footprint of organizations. These digital tools are crucial because they allow entrepreneurs to gain a deeper understanding of their own GHG emission profiles. This insight leads to more effective and sustainable planning for emission reductions. In addition to GHG visualization, our green-tech startups contribute to sustainability through energy use monitoring and paperless solutions. For these startups, depa provides more than just financial support; we place high importance on matching them with potential customers and connecting them to actual use cases on the ground to ensure practical and scalable impact.

Ensuring reliability seems to be a major theme in connecting startups to public and private users. What mechanisms have you put in place?

For government agencies and SMEs to adopt solutions from emerging companies, safety and reliability are crucial. That is why depa has developed "D-SURE," a standard certification for software and digital services. Under "D-SURE," solutions—software and, in some cases, hardware—are assessed from three perspectives: (1) safety, (2) functionality, and (3) cybersecurity. We verify whether the solution can be used safely, whether the functions

claimed in advertisements and specifications are actually provided, and whether it is designed to prevent information leakage or improper data management. As needed, we also ensure consistency with international standards such as ISO 29110[1], thereby guaranteeing a level that users can adopt with confidence.

Building a foundation for a trusted digital public market through certification and procurement incentives

What benefits do companies receive from obtaining D-SURE certification?

Once a company obtains D-SURE certification, it is first listed in the "Thailand Digital Catalog." This is a platform that compiles only digital products and services that meet certain standards, and it is characterized by being directly linked to public procurement and tax incentives. Government agencies can procure products and services listed in this catalog without going through the usual tender process. There are also tax incentives for SMEs. If an SME with annual sales of 30 million baht or less adopts catalog-listed software, it can receive a 200% corporate tax deduction, up to a cap of 300,000 baht. In addition, for large companies or companies above a certain scale, it is also possible to combine this with the BOI incentive scheme so that large-scale digital investments—such as ERP implementation—can qualify for corporate income tax exemption. Many companies, including Japanese firms, already utilize this framework.

What are the requirements for registering in the Thailand Digital Catalog?

The system is open to participation as long as the requirements are met. Therefore, if a company is legally registered in Thailand, it can be registered even with Japanese capital. In addition, the product or service must actually be sold in Thailand, and the public price must be clearly indicated—such as in the form of a price list. It may be helpful to think of it like an online shopping site: when government agencies procure, they basically judge based on the registered price, so it is important that the price is clearly defined. Additional functions and add-ons may be discussed case by case, but if the baseline price is clear, Japanese companies' solutions can certainly be eligible for registration.

1 A software life-cycle process standard specialized for small software development organizations.

Accelerating companies' digital and green transition through talent development and DX investment support

Please tell us about the "Digital Skill Roadmap" for talent development.

If digital talent is lacking, no matter how excellent the software or platform introduced may be, its value cannot be fully realized. That is why depa provides the "Digital Skill Roadmap." Software companies such as SAP and Oracle register their training courses within this framework, and depa reviews the content and certifies them. User companies can send employees to these certified courses and have them obtain completion certificates, enabling the training costs to be deducted from corporate tax at a high rate. The deduction rate is generally set very generously at around 200–250%, creating a mechanism whereby training costs do not simply become expenses, but rather "investment in human capital also leads to tax benefits."

Please tell us about the funding schemes for DX support.

depa's DX support includes two funding schemes that companies can use when investing in digital technologies. One is a matching fund, and the other is a reinvestment-type subsidy. Under the matching fund, if a company invests in software or SaaS such as chatbots, CRM, ERP, or HRM, depa covers 50% of the cost. The reinvestment type is a system in which subsidies are granted after the fact for digital investments that meet certain performance indicators. This is suited to larger DX projects and projects—such as smart factory initiatives—where outcomes must be measured, and the detailed design is worked out on a case-by-case basis.

About the "Digital Grow Green Project"—we understand it is a pilot targeting around 400 SMEs. What are its aims and contents?

The "Digital Grow Green Project" is a strategic 40-million-baht initiative originally established to raise sustainability awareness among 400 SMEs across Chiang Mai, Khon Kaen, Chonburi, and Ayutthaya. The project's mission has gained immense urgency following Thailand's landmark announcement at COP30 to accelerate its net zero target by 15 years; this "wake-up call" drastically shortens the preparation window for the private sector, making digital readiness a survival requirement as global supply chains shift toward mandatory reporting. Built on the principle that "you cannot manage what you do not measure," depa provides a specialized carbon-footprint management platform free of charge, enabling entrepreneurs to accurately visualize their Scope 1, 2, and 3 emissions[2] by simply inputting routine operational data—such as utility bills—without requiring prior sustainability expertise. Beyond identifying emission bottlenecks for precision cost reduction, the platform generates government-standard reports to ensure seamless regulatory readiness. Complemented by an intensive one-day training and a depa Certificate, this project offers a unique opportunity for Japanese companies and local SMEs to test advanced digital tools, reduce operational costs, and ensure they remain preferred partners in the global green supply chain. We warmly invite our Japanese partners and local entrepreneurs in these four pilot provinces to join us in leading this sustainable transition.

Supporting Japanese companies as a partner that stays alongside them

What kinds of cooperation and collaboration can depa offer Japanese companies facing challenges in decarbonization and DX?

We often hear from Japanese companies that "we want to work on digital transformation and carbon neutrality, but we don't know where to start." I want depa to be a partner that stays alongside such companies. Specifically, I believe there are three entry points. The first is talent development through the "Digital Skill Roadmap." If a Japanese company is registered in Thailand, it can strengthen its talent base by leveraging tax deductions for hiring digital-related roles and for training existing employees. The second is leveraging the "Thailand Digital Catalog." If a company provides its software or digital services as a Thai entity, obtains "D-SURE" certification, and registers in the catalog, it can access public procurement and expand business in combination with SME tax incentives. The third is combining DX support schemes with BOI incentives. If

the business entity is designed with a structure that meets requirements such as a joint venture arrangement or Thai shareholder ratios, the company can utilize depa's matching fund and reinvestment-type subsidies, as well as BOI tax incentives, to advance digitalization and decarbonization of factories and supply chains simultaneously. Collaboration with Japanese companies is also an extremely important theme for depa. Looking not only at the Thai market but also ASEAN as a whole, we hope to continue working together on the development of green tech and digital solutions.

Digital Economy Promotion Agency
https://www.depa.or.th

2 Scopes 1–3 are categories of GHG emission sources: 1 refers to direct emissions from the company itself; 2 refers to indirect emissions associated with purchased electricity, etc.; and 3 refers to other indirect emissions from the supply chain.

VOICE

Sustainability strategy for the Eastern Economic Corridor

Eastern Economic Corridor Office (EECO)

Executive Director

Angsutorn Wasusun

The Eastern Economic Corridor (EEC), promoted by the Thai government, is a national project that advances—on an integrated basis—faster licensing and permitting procedures, tax incentives, and the development of land, sea, and air infrastructure across three provinces east of Bangkok. At the core of the growth strategy is the BCG (Bio-Circular-Green) economic model, and through expanding the adoption of renewable energy and promoting decarbonization investment, the EEC is strengthening its preparedness for international environmental regulations. We spoke with Angsutorn Wasusun of the Eastern Economic Corridor Office (EECO) about the aims of institutional design, the practicalities of investment promotion, collaboration with Japanese companies, and responses to changes in the institutional environment.

Accelerating the development of the three wastern provinces under the national plan "Thailand 4.0"

What role does the EEC play in promoting economic development in the eastern region?

The EEC was launched in 2017 as part of the national vision "Thailand 4.0"[1]. It is responsible for developing the three eastern provinces of Rayong, Chonburi, and Chachoengsao, and is operated based on the Eastern Special Development Zone Act (enacted in 2018) as its enabling legislation. Within the EEC, the permits and licenses related to establishing factories can be centralized, simplifying and speeding up procedures. For licenses that fall under 14 laws—including construction, factory equipment registration, and foreign worker permits—the Secretary-General of the EEC or the EEC Committee has discretion over approvals. As a result, companies face a reduced burden of having to visit multiple agencies individually, and they can make investment decisions more readily after improving the certainty of their plans. Furthermore, under an investment incentive framework based on a 2024 Cabinet resolution, there is a mechanism through which investment projects approved in the EEC can be granted incentives such as corporate income tax exemptions (up to 15 years), investment allowances (up to 70%), import duty exemptions, and foreign worker permits (up to 10 years). To obtain these incentives, a company must locate its base in a special zone within the EEC (such as industrial estates, free zones, logistics/port or airport-related areas, innovation hubs, and so forth). As of December 2025, there are 46 special zones, and the plan is to expand this to 50 zones by the second quarter of 2026. The expansion of special zones is intended to increase the applicability of incentives and expand the capacity to accommodate investment projects.

1 National policy to shift the Thai economy from a labor-intensive model to a high value-added model driven by technology and innovation.

Supporting Investment Projects through Infrastructure Development

How does infrastructure development help encourage investment?

The EEC is strategically located with well-developed transportation networks by land, sea, and air. EECO proposes and promotes infrastructure development that aligns with investor needs through public-private

collaboration. In general, infrastructure development requires around one and a half years just for permitting, but the EEC can shorten this period. For investors, a major advantage is that it becomes easier to establish a clear outlook for starting operations. As a representative example, the development of a high-speed rail line with a total length of approximately 220 km connecting the major airports (Don Mueang, Suvarnabhumi, and U-Tapao) is underway, with the aim of commencing operations in 2030. In 2025, land handover from local landowners was completed, and progress such as contract execution toward construction is expected going forward. At ports, there are plans to expand Laem Chabang Port's container handling capacity to 18 million TEU (twenty-foot equivalent units) per year by 2027, and to increase Map Ta Phut Industrial Port's throughput capacity to 31 million tons per year by 2028. Improving logistics efficiency contributes not only to manufacturing competitiveness but also to emissions reductions across the entire supply chain.

Placing Sustainability at the Center of the Growth Strategy

How is sustainability positioned in the economic development of the eastern region?

One of the industrial clusters emphasized by EECO is BCG[2], which includes biofuels and chemicals as well as advanced agriculture and food. Next-generation vehicles (EVs, batteries, and smart mobility) are also closely related to sustainability. In recent years, BCG has accounted for a certain share of investment in the eastern region, and we position it as a pillar that reconciles growth with environmental responsiveness. EECO has set out the "Green & Circular Execution Plan in EEC (2021–2025)" and has established a target of reducing greenhouse gas (GHG) emissions by 10% compared with 2021. On the power side, we aim to achieve ahead of schedule in the EEC the national target of a 50% renewable energy share by 2050. First, we will secure more than 500 MW of solar power generation capacity and plan to meet 30% of electricity demand with renewable energy by 2030. In factories within the region, the adoption of rooftop solar power generation is progressing, and we believe the adoption rate has effectively reached 75%. Precisely because this foundation exists, the next step is to proceed with area-wide optimization by combining the greening of procured electricity with energy conservation on the demand side.

2 A strategy to use innovation to utilize resources efficiently and achieve resilient and sustainable growth in the bio-industry, circular industry, and green economy.

Optimizing Investment Incentives on a Project-by-Project Basis

How do EECO's investment incentives differ from other incentive schemes?

EECO's strength in promoting BCG-related investment is that we do not determine investment incentives in a uniform manner. Instead, each project is discussed by the EEC Committee and individually designed according to its content. In doing so, we make decisions while considering factors such as future GHG reduction effects and the degree of contribution to carbon neutrality. In other words, this is a framework that makes it easier to evaluate a project's spillover effects—including environmental value—rather than judging only by the size of capital investment. Many decarbonization-related businesses do not fit neatly into conventional industry classifications. For example, improving the efficiency of building air-conditioning requires not only the manufacture of equipment but also services (software) such as design and control. Because it is difficult to clearly separate manufacturing from services, such projects may not fit well within the incentive categories of the BOI. However, within EECO there is room to provide sufficient incentives through deliberation. This flexibility helps accelerate the implementation of new decarbonization solutions.

Advancing collaboration with Japanese companies into the implementation phase

How is collaboration with Japanese companies progressing?

Over the seven years from 2018 to 2024, Japan invested approximately 215.3 billion baht (approximately 1.055 trillion yen; 1 baht ≈ 4.9 yen) in the EEC (on an approved investment basis). Areas include next-generation

vehicles and BCG. The "Japan–Thailand Strategic Economic Partnership Five-Year Plan," concluded between the governments of Japan and Thailand in 2022, also includes agreements to promote investment in low-carbon technologies in the EEC region and to support BCG demonstration projects by Japanese companies. As a concrete example, at the BLCP Power coal-fired power plant in Rayong Province, Mitsubishi Heavy Industries, Mitsubishi Corporation, and JERA conducted a feasibility study toward commercialization for introducing ammonia co-firing. EECO is also considering the provision of investment incentives at the commercialization stage. We have heard that the aim is eventually to reach a 20% co-firing ratio. In the hydrogen field, Toyota installed Thailand's first hydrogen station for fuel-cell vehicles (FCVs) and conducted a demonstration of a limousine shuttle service between U-Tapao Airport and Pattaya using the Mirai. As the next stage, we are considering the installation of hydrogen stations in areas such as smart cities where development is progressing in the EEC.

Aiming to build markets through JCM and carbon credits

What are the prospects for institutional collaboration and market development?

EECO is working with Osaka City to develop projects under the Joint Crediting Mechanism (JCM). Since Thailand and Japan signed a memorandum of understanding in 2015, 48 projects (equivalent to approximately 245,000 tons of CO_2 reductions) had been formed on the Thai side as of the end of 2024. Until now, solar power generation has been the main focus, but in recent years the scope has expanded to include energy-saving technology deployment across areas such as consumption activities, manufacturing, and urban development. Regarding carbon credits, we are strengthening collaboration with the Federation of Thai Industries (FTI) and the Thailand Greenhouse Gas Management Organization (TGO), with a view to creating a future trading market. On the other hand, the current market is centered on the Thailand Voluntary Emission Reduction Program (T-VER) managed by TGO, and our first priority is to use theframework correctly and broaden the base for project formation.

Regulatory environment from 2026 and EECO's approach

How do you view changes in the sustainability-related environment, and how will you proceed going forward?

Internationally, the EU's Carbon Border Adjustment Mechanism (CBAM) is scheduled for full-scale implementation in 2026. As Thailand advances FTA negotiations with the EU, there is also the possibility that sustainability-related disciplines will be introduced. Domestically as well, the promotion of a low-carbon society is expected, including the enactment of a climate change law. For export industries, it is expected that

tracking emissions and accountability will come to the forefront as management issues. Taking these changes into account, we will first proceed with energy conservation under the currentframework. Because the establishment and operation of laws andframework take time, for the time being we will steadily build up improvements in energy-use efficiency. After newframework are introduced, it is also possible that measures such as the adoption of biofuels will accelerate toward wider renewable energy uptake. Japanese companies have an advantage in energy-saving technologies, and we view the effectiveness of machinery, equipment, and systems as high. We also expect contributions from solution providers—such as Zeroboard, a startup working on visualizing GHG emissions. Furthermore, beyond the industrial sector, in smart city-related fields we would like to build broad partnerships, including collaboration with Japanese local governments that are working toward a low-carbon society.

Eastern Economic Corridor Office of Thailand
https://www.eeco.or.th

VOICE

Triple S strategy and the power transition

Electricity Generating Authority of Thailand (EGAT)

Assistant Governor - Corporate Strategy

Thawatchai Pattanapipitpaisal

As the core utility responsible for supplying electricity across Thailand, EGAT has set the achievement of carbon neutrality by 2050 as an organizational goal. To deliver on this commitment, EGAT is developing a roadmap centered on the "Triple S" framework, combining power source transformation, sink measures, and demand-side actions such as energy efficiency, demand response (DR), and EV infrastructure development. How can decarbonization be reconciled with electricity tariffs and reliability of supply? We spoke with Mr. Thawatchai Pattanapipitpaisal, Assistant Governor - Corporate Strategy, about the generation mix envisaged under the Power Development Plan (PDP), challenges to scaling renewables, and the technologies and partnerships EGAT expects from Japanese companies. (Interview conducted on September 23, 2025)

A Power Transition Toward 2050, Shaped by the Triple S Strategy

Please tell us about EGAT's organizational goal of "2050 Carbon Neutrality".

The backdrop is Thailand's clear commitment to climate action in line with the Paris Agreement. At the UN Climate Change Conference of the Parties (COP26) held in Glasgow, the United Kingdom, in 2021, the Thai government announced to the international community its aim to achieve carbon neutrality by 2050 and net zero greenhouse gas emissions by 2065, reaffirming strong national intent on climate action. As a state-owned enterprise that supports this national pledge from the energy sector, the Electricity Generating Authority of Thailand (EGAT) is likewise committed to achieving carbon neutrality by 2050. To ensure this goal does not remain a slogan but is translated into an executable strategy, EGAT has formulated the "Triple S Strategy" as its core framework. Through its three pillars - "Sources Transformation", "Sink Co-creation", and "Support Measures Mechanism" - EGAT aims to chart a transition pathway that is aligned with national targets while maintaining system reliability.

Could you elaborate on the "Triple S Strategy"?

The first pillar, "Sources Transformation", is to progressively increase the share of clean power sources and renewable energy. While maximizing the potential of existing hydropower, solar, and wind resources, a key initiative is the Floating Solar-Hydro Hybrid Power Plant Project. Accordingly, energy storage systems have been introduced, including Pumped Storage Hydro Plants and Battery Energy Storage Systems (BESS) to improve grid flexibility, stability, and reliability. In parallel, EGAT is advancing surveys and R&D on next-generation technologies - such as small modular reactors (SMRs), hydrogen, and fuel cells - as future options. The second pillar, "Sink Co-creation", promotes work on carbon capture, utilization, and storage (CCUS) in collaboration with research institutions, industry, and local communities. This is not limited to capturing and storing CO_2; it also encompasses utilization, the design of the entire low-carbon supply chain, and initiatives that consider the broader energy transition. The third pillar, "Support Measures Mechanism", establishes policies and mechanisms to advance energy efficiency and demand-side management (DSM), informed by the Bio-Circular-Green (BCG) economy concept. Examples include the energy-efficiency

label (Label No. 5) to promote efficient appliances, and various demand response programs managed by the Demand Response Control Center (DRCC). A further feature of the "Triple S Strategy" is that it integrates ESG thinking into EGAT's corporate strategy, not only to reduce carbon emissions. Alongside environmental actions, EGAT is also advancing social initiatives related to human rights, occupational safety and health, and local communities, as well as governance measures such as enhancing transparency, ethics, and risk management through the Sustainability Committee.

Targeting 50% renewables: building an optimal generation portfolio

What kind of generation portfolio is envisaged under the Power Development Plan (PDP)?

The Power Development Plan (PDP) is currently under formulation, but EGAT anticipates configuring its own generation portfolio as follows: floating solar projects to be developed across suitable reservoirs at EGAT-owned dams; onshore solar farms coupled with BESS; small modular reactors (SMRs); expansion of pumped-storage hydropower. By combining these appropriately, EGAT aims to reconcile a higher renewables share with reliable electricity supply. At the same time, EGAT believes that a certain level of conventional thermal power capacity must be retained from the standpoint of grid reliability. Accordingly, EGAT is also examining options such as co-firing with hydrogen and ammonia as measures to reduce CO_2 emissions from existing thermal generation. While the PDP is positioned as still pending final decision, it is being discussed in a direction that would raise the renewables share to 50% or more.

What challenges do you see in increasing the renewables share to 50% or more?

To significantly increase the renewables share, multiple elements must be combined to secure overall system stability. The first is leveraging pumped-storage hydropower. Surplus electricity from solar generation is used to pump water uphill, and the stored water is released to generate power when solar output is unavailable - smoothing output variability. The second is deploying large-scale BESS. By locating BESS on the grid side, EGAT envisions balancing supply and demand, regulating frequency, and leveling peak loads. While both require careful consideration from a cost perspective, EGAT believes that creating synergy by combining pumped storage and BESS can maintain grid stability even at higher renewables shares, thereby making a major contribution to achieving carbon neutrality.

Please explain EGAT's approach to decarbonizing conventional thermal power generation.

Decarbonizing conventional thermal power generation is a critical challenge for the power sector, as emissions must be reduced while maintaining power system security, reliability, and adequacy. In this context, EGAT views hydrogen as one of the emerging enabling technology under consideration and has identified four main areas. First is direct power generation using fuel-cell technologies with different applications and operating temperatures, such as proton exchange membrane fuel cells (PEM) and solid oxide fuel cells (SOFC). Second is co-firing with natural gas at combined-cycle power plants. In the 2024 PDP draft, a direction is shown to co-fire around 5% hydrogen from 2030 onward. However, because hydrogen remains costly, its impact on the final electricity tariff is a concern. Third,

for existing coal-fired power plants, EGAT is considering substituting part of the fuel with ammonia to reduce CO_2 emissions. Fourth is the potential to utilize hydrogen as a form of long-duration energy storage from the standpoint of grid stabilization - including demand response, peak shaving, load leveling, and frequency regulation. In addition, through pilot projects such as the "Lam Takhong Wind-Hydrogen Hybrid"[1] and the "Hydrogen Energy Storage Microgrid"[2], EGAT is also working on microgrid demonstrations that combine wind and solar power, BESS, electrolyzers, and fuel cells. These projects are positioned as a platform for technology verification toward a future energy mix that includes hydrogen.

Building a hydrogen and ammonia value chain through Japan-Thailand collaboration

We understand that cooperation with Japanese companies is advancing in developing a hydrogen and ammonia value chain.

For building the hydrogen and ammonia value chain, EGAT is promoting projects with key Japanese partners such as Mitsui O.S.K. Lines, Chiyoda Corporation, and Mitsubishi Corporation (Thailand), with support from Japan's Ministry of Economy, Trade and Industry (METI). Specifically, EGAT is examining an integrated value chain that spans production, transport, storage, and power generation use of hydrogen and ammonia, thereby advancing the groundwork for future decarbonized fuels and low-emission energy systems. In addition, EGAT is working with Mitsubishi Heavy Industries on hydrogen co-firing for gas turbines, and with IHI on stationary BESS and biomass co-firing at the Mae Moh Power Plant. Furthermore, in a project with the New Energy and Industrial Technology Development Organization (NEDO) and Marubeni Corporation, EGAT is introducing digital technologies and predictive maintenance at the Mae Moh Power Plant to improve plant performance and reduce carbon intensity. Through these initiatives, EGAT aims to accelerate decarbonization in the power sector by linking Japanese technologies with EGAT's operational sites.

What kind of Thai society do you envision in 2050?

Even looking back just a few years, how concretely could we have imagined that solar power would be deployed at such scale and at such low cost, or that so many EVs would enter the market? Major technological

innovations and structural shifts in markets may continue to occur, and it is not easy to fully describe what they will look like from today's vantage point. Still, personally, I strongly hope for a world where the entire energy supply chain and all stakeholders are supported by "good governance" - well-designed policies, balanced regulation, and high transparency and accountability. When these elements function effectively, everyone can access energy fairly and society as a whole can achieve a sustainable and resilient society. I believe our work toward carbon neutrality in 2050 is the process of laying the foundation for such a future.

Electricity Generating Authority of Thailand
https://www.egat.co.th

1 A demonstration project that converts wind output in Nakhon Ratchasima Province into hydrogen for storage, then re-generates power with fuel cells when needed. The objectives are to absorb renewables variability, stabilize the grid, and verify LCOE and operational requirements.
2 A distributed power demonstration that converts solar and other sources into hydrogen via electrolysis for storage and reuse via fuel cells. Operated with real equipment at an EGAT learning site, it aims to accumulate know-how on design, safety, and MRV and to build human resources.

VOICE

Leading Thailand's energy transition

Energy Policy and Planning Office (EPPO)

Deputy Director General

Watcharin Boonyarit

The Energy Policy and Planning Office (EPPO), an agency under Thailand's Ministry of Energy, oversees the energy sector, which is estimated to account for around 70% of Thailand's greenhouse gas emissions. As a core institution, it is driving the realization of "Net Zero Emissions 2050." Under the National Energy Plan (NEP), currently being formulated, Thailand is laying out a long-term roadmap for the energy transition, including increasing the share of renewable energy, advancing EV policies, and accelerating energy conservation. We spoke with Mr. Watcharin Boonyarit, the Deputy Director General of EPPO about Thailand's decarbonization strategy and the business opportunities it can bring to companies and investors.

The Command Center of the National Energy Plan

What role does EPPO play in the government's energy planning?

EPPO continuously follows key issues related to Thailand's energy transition while operating five major energy plans in an integrated manner under the National Energy Plan (NEP). These are the Power Development Plan (PDP), the Alternative Energy Development Plan (AEDP), the Energy Efficiency Plan (EEP), the Gas Plan, and the Oil Plan. EPPO not only coordinates these five plans from an overarching perspective but also functions as the secretariat of the National Energy Policy Council (NEPC). CO_2 emissions from the energy sector are projected to account for roughly 70% of Thailand's total greenhouse gas emissions, and EPPO designs various measures—including regulations and incentives—to reduce emissions in this sector and incorporates them into the energy plans. The NEP is the central framework, under which the five plans are positioned to organize energy policies from the short to the long term. The PDP defines the direction of the power generation mix; the AEDP promotes expanded adoption of renewable and alternative energy; the EEP covers energy conservation and efficiency; and the Gas Plan and Oil Plan address decarbonization of the fuel supply chain and the mobility sector. By designing and monitoring these plans as an integrated whole, EPPO is in a position to map out the pathway to achieving net zero emissions (NZE).

How is renewable energy being deployed toward NZE? Please also explain approaches by sector, such as industry and households.

For Thailand to achieve NZE, a transition in the energy sector is indispensable, and the core of that transition is expanding the adoption of renewable energy. The scope is not limited to power generation; it spans diverse sectors including industry, services, commercial buildings, households, agriculture, and logistics, with different approaches taken for each. First, through knowledge-sharing and awareness-raising in each sector, we encourage the replacement of existing equipment and systems with more efficient ones. For households, we are implementing the "Solar Rooftop" project to support the installation of rooftop solar. Households that install solar panels can benefit not only from lower electricity bills but also from schemes such as tax deductions. In the power generation sector, under the PDP, we will gradually increase renewable

power sources such as solar, wind, small hydro, and biomass to reduce the carbon footprint of the power sector as a whole. Under the AEDP, in addition to renewable electricity generation, we also emphasize the use of thermal energy—such as that derived from biomass and agricultural residues—in factories and the industrial sector.

Grid Infrastructure, Smart Grids, and Demand Response (DR)

As the renewable energy share rises, how do you view grid stability and infrastructure development?

As renewable deployment expands, variable power sources increase, making infrastructure measures essential for stable grid operation. EPPO positions development of the foundations for flexible supply-demand balancing—such as smart grids and demand response (DR)—as one of the key pillars. By upgrading transmission and distribution networks and introducing control technologies, we aim to enable power supply that responds to demand. In DR programs, we ask customers such as those in the industrial sector to curb usage during peak periods, thereby flattening the demand curve and improving efficient operation of the overall grid. When the marginal supply source ends up being LNG-fired power, generation costs become higher; however, if peak demand can be reduced, dependence on LNG can be lowered and this can also help reduce total system costs. We are currently at the pilot stage, but we are also considering positioning DR as a full-fledged policy in the future. Regarding energy storage, we believe a diverse range of storage options—including batteries and pumped-storage hydropower—is important. We are also advancing efforts to store renewable-derived electricity by utilizing mechanisms such as pumped-storage projects at dams like the Lam Takong Dam, which pump water to higher elevations and generate electricity by releasing it when needed.

Please also tell us about EV policy.

The Oil Plan targets primarily the transport and automotive sector and aims to reduce emissions in transport through measures such as expanding the use of biodiesel and ethanol-blended fuels and promoting the adoption of high-efficiency hybrid electric vehicles (HEVs). Japan is an important production base for HEVs, and we see significant room for cooperation in technology and investment in this area. At the same time, the spread of electric vehicles (EVs) is also a major policy pillar. The Thai government has set the EV adoption target "30@30," aiming for EVs to account for 30% of new vehicle sales by 2030. To achieve this, we are considering support measures across the entire supply chain, such as developing charging infrastructure and fostering the battery industry, and we view the battery industry in particular as a priority field that can lead to job creation and enhanced industrial competitiveness.

Electricity Tariff Cost Allocation and Tariff Structures Must Be Reviewed for the Future

At what stage are electricity liberalization and the expansion of PPAs? How do you view the merits and drawbacks of adoption?

Community power, the Utility Green Tariff (UGT)[1], and direct PPAs are all initiatives linked to electricity liberalization and PPA expansion, but they are still at the discussion and verification stage and have not yet been fully established as a formal scheme. For direct PPAs for large-scale customers, within a sandbox targeting approximately 2,000 megawatts for data centers, we are examining how third-party access (TPA)[2] should work, the tariff structure, and the impact on the grid. As renewable deployment progresses, generation costs and demand patterns are changing, making a review of electricity tariff cost allocation and the tariff framework unavoidable. If liberalization advances, companies and households will be able to generate electricity themselves and participate as "prosumers," selling surplus power to the grid, and diversification of market participants can be expected. While there is a risk of tariff volatility, we do not anticipate a substantial overall increase in electricity tariffs; rather,

1 A tariff menu that allows customers to select and purchase renewable electricity through the grid.
2 A mechanism that allows third parties to use transmission and distribution networks.

we emphasize allocating costs appropriately—including costs that have not been sufficiently reflected to date—and moving toward a tariff structure that is fair to both producers and consumers. The current time-of-use (TOU) tariff is designed as cheaper at night and more expensive during the day, but as solar power expands, the daytime supply structure and peak time periods are shifting. By redesigning tariffs based on these realities, we want to realize stable and efficient power system operation while keeping customer burdens under control.

Next-Generation Energy Initiatives: Energy Storage, DER, SAF, and More

What technologies and fields are you focusing on going forward to support renewable expansion and electricity liberalization?

One of the key words of the energy transition is energy storage. To absorb fluctuations in renewables and ensure grid stability, it is necessary to deploy diverse storage technologies such as batteries and pumped-storage hydropower. Another priority area is sustainable aviation fuel (SAF) in the aviation sector. We want to advance decarbonization of the transport sector by blending bio-based fuels—such as biodiesel and ethanol—into aviation fuel. This is also consistent with the direction of expanding distributed energy resources (DER): by combining diversification of power sources with autonomous energy management on the demand side, we aim to enhance the resilience and sustainability of the overall energy system.

What areas do you expect Japanese companies to contribute to in achieving NZE?

Hydrogen is one of the key pillars in the NEP, and we believe expectations for Japanese companies are high regarding the use of hydrogen in power generation and industrial processes. Japan is ahead in hydrogen-related technologies, and we want to learn from its track record and expertise and connect that to deployment in Thailand. Specifically, we are paying attention to possibilities such as power generation that combines hydrogen and gas. In industry, Japanese energy-saving technologies have already been introduced in Thailand across many areas, including cooling systems, heating systems, and pneumatic equipment. What we increasingly expect going forward is demand management using energy management and digital technologies. By using platforms that leverage technologies such as AI to visualize and optimize electricity use, we can manage energy use in factories and other facilities at a higher level and contribute to grid stabilization from the demand side as well. Demand response (DR) is also an important theme in energy management. We expect companies in the industrial sector to participate in EPPO's program and, by reviewing their equipment and operating methods, cooperate in suppressing peak demand. To date, we have received considerable support from Japan through frameworks such as the Joint Crediting Mechanism (JCM) for human resource development and technical cooperation in energy management. In the future, we would like to expand opportunities for cooperation through forms such as human resource development, joint workshops, and demonstration projects while sharing experience on both sides.

Please tell us about key upcoming points on the regulatory and institutional front, and the potential for cooperation with Japan.

The Thai government is preparing to enact a Climate Change Act, which is expected to include mechanisms such as a carbon tax and carbon credit trading. This could create business opportunities through the creation and trading of carbon credits for companies in Thailand, particularly Japanese companies operating in Thailand. We believe companies will be able not only to work on reducing their own carbon footprints but also to engage in new services and projects that utilize credits.

Energy Policy and Planning Office
https://www.eppo.go.th

VOICE

A practical institution accelerating Thailand's Low-Carbon Transition

Thailand Greenhouse Gas Management Organization (TGO)

Executive Director

Nakorn Tangavirapat

As Thailand's implementing agency for greenhouse gas (GHG) emissions reductions, TGO drives GHG mitigation projects and carbon credit transactions; develops and maintains the GHG Information Center and database; and undertakes the practical operation of policies and mechanisms related to carbon markets—thereby accelerating the transition to a low-carbon economy. Since its establishment in 2007, TGO has encouraged participation by a wide range of stakeholders through its proprietary crediting schemes such as T-VER. Looking ahead, with linkage to the forthcoming Climate Change Act and an emissions trading system in view, TGO aims to advance in an integrated manner the foundations for carbon foot printing and internal carbon pricing, as well as investment and technology cooperation with Japan through the Joint Crediting Mechanism (JCM).

Serving as the Practical "Engine" for GHG Reductions in Thailand

In efforts to achieve carbon neutrality, what role does TGO play?

TGO is a public organization established in 2007 under the supervision of the Ministry of Natural Resources and Environment. It is positioned as Thailand's core practical institution for reducing GHG emissions. We have played a role in accelerating the decarbonization of Thailand's economy by promoting domestic GHG mitigation projects and carbon credit transactions; developing the GHG Information Center and database; and undertaking the practical operation of policies and schemes related to carbon market mechanisms. Building on these roles, TGO is leading Thailand's efforts to reduce GHG emissions toward achieving net zero by 2050. Specifically, we develop and operate mitigation mechanisms such as T-VER, Premium T-VER, and the simpler LESS program, enabling a diverse range of actors—companies, local governments, communities, and citizens—to participate in GHG reductions through concrete projects. TGO does more than design schemes. We ensure the integrity of the crediting system as a whole by developing and approving MRV (measurement, reporting, and verification) methodologies, emission factors, and calculation tools, as well as registering and supervising third-party validation and verification bodies. Through training and technical support provided by the TGO Climate Action Academy and via the Thailand Carbon Neutral Network, TGO functions as a practical "engine" that connects policy and institutional frameworks with on-the-ground implementation.

Please tell us about carbon credit schemes such as T-VER that are led by TGO.

T-VER is a domestic voluntary crediting scheme for projects within Thailand that voluntarily reduce or remove GHG emissions. It targets projects implemented in Thailand that achieve emissions reductions or removals (including forest carbon sequestration). A wide variety of projects are registered across sectors such as energy efficiency and renewable energy, waste management, agriculture and forestry, and biomass utilization. Verified reductions and removals are issued as T-VER credits. By purchasing these carbon credits, companies can offset the carbon footprint of their business activities, products, events, and other items, and use them for sustainability reporting and ESG assessments. Premium T-VER is an upper-tier

scheme for projects that deliver environmental and social co-benefits and meet higher reliability requirements. Under additional guidelines, it is positioned as a higher-value credit. Premium T-VER credits have been approved by the International Civil Aviation Organization (ICAO) for use under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), and credits of designated vintages are recognized as CORSIA-eligible units for the 2024–2026 phase. The LESS program is designed to enable local communities and citizens to participate in emissions reductions in a simpler way. Because it is based on self-declaration and does not require third-party verification, the participation barrier is low. The aim is to expand climate action at the community level through familiar measures such as energy saving and adoption of renewable energy.

● What are the benefits for companies and local communities of adopting T-VER or LESS?

For companies, there are three main benefits. First, companies can build a portfolio aligned with their climate targets and net-zero strategy by combining emissions reductions and offsets. Second, through credit purchases, companies can support domestic low-carbon projects and communicate the outcomes as part of their ESG narrative. Third, by using internationally recognized schemes such as Premium T-VER, companies can more readily respond to requirements from global supply chains and the aviation sector. Meanwhile, preparations are under way for a Climate Change Act as an institutional foundation to support nationwide emissions reductions. Under this draft legislation, a framework is expected to be established that comprehensively defines, among other elements, the allocation of GHG emission allowances and emissions trading, a carbon tax, and the positioning of carbon credits. While Standard T-VER and Premium T-VER currently focus primarily on the voluntary market, they are designed on the premise that they will be operated in a manner consistent with future climate legislation, including a potential emissions trading system (ETS). Accordingly, we believe that making use of these mechanisms in advance carries important strategic meaning for companies, including as preparation for future regulatory compliance and carbon pricing.

Incentives Created by Green Procurement and Certification Logos

● We understand that TGO is developing platforms related to organizational and product-level carbon footprint assessment and internal carbon pricing.

In alignment with international standards, TGO develops and certifies platforms for assessing carbon footprints at both the organizational and product levels. These enable businesses to visualize the amount of GHG emissions generated through their operations and product life cycles, and to identify emissions-reduction potential and priority areas for management. In addition, we are advancing the development of a platform for internal carbon pricing to help companies internally evaluate and manage environmental costs. By assigning an internal price to their emissions, companies can more readily incorporate climate impacts into investment decisions, equipment renewal, and procurement strategies, thereby supporting decision-making for medium- to long-term decarbonization investments. For Japanese companies, leveraging these tools makes it possible to connect business activities in Thailand consistently to globally required disclosure and

reporting—such as understanding supply-chain emissions and responding to Scope 3. Some of the platforms certified by TGO already include solutions originating in Japan. Through such Japan–Thailand collaborative tools, data-driven decarbonization management is expected to be promoted.

What opportunities do TGO's certification schemes provide for companies?

For example, the Pollution Control Department (PCD) has a "Green Public Procurement" mechanism that gives preferential evaluation in government procurement to companies with lower emissions that disclose their carbon footprints. Similar thinking is spreading to the supply chains of large corporations such as CP Group, and an environment is gradually being created in which SMEs that work to reduce emissions are more likely to be selected as suppliers. To support this trend, TGO offers multiple certification schemes, including logos related to carbon-neutral events, carbon footprints, and the circular economy, which can be obtained at either the product level or the company level. Several Japanese companies have already obtained these certifications, and they are helping improve competitiveness in green procurement contexts.

Building a Partnership with Japan Through the Joint Crediting Mechanism

How should Japanese companies engage with TGO's schemes? And what roles and contributions do you expect from Japanese companies in areas such as technology cooperation and investment?

Setting a goal of achieving net zero by 2050 sends a clear message that Thailand takes the environmental crisis seriously and, like other countries, shares the common objective of mitigating global warming. Achieving this goal requires both accelerating the implementation of national policies and actively promoting the introduction of low-carbon technologies, new technologies, and innovation. At present, Thailand and Japan are advancing close cooperation under the Joint Crediting Mechanism (JCM). Under this framework, the Japanese side supports investments in Thailand for the introduction of equipment and technologies that contribute to GHG reductions, and in return, carbon credits generated by the projects are allocated between Thailand and Japan. Since FY2015, a total of 57 projects have been implemented, and annual CO_2 emissions reductions of 449,678 tons are expected. Such cooperation not only helps Thailand reach its net-zero target faster, but also provides Japanese companies with an opportunity to expand investment in Thailand—a market with high potential—and to create outcomes that

are sustainable both economically and environmentally. We expect multi-layered collaboration, including transfer of clean technologies, deployment of highly efficient energy management, and the expansion of innovations that contribute to GHG reductions. Japanese companies have advantages in both technological and management capabilities, and from Thailand's perspective, they can also play an important role as role models. By participating in projects in Thailand and demonstrating tangible results, Japanese companies can provide practical benchmarks for Thai companies and companies from other countries as they move toward carbon-neutral management. In that sense, we hope that Japan's private sector will build deeper partnerships in areas such as investment, technology cooperation, joint development, and human resource development.

Thailand Greenhouse Gas Management Organization (Public Organization)
https://www.tgo.or.th

VOICE

Contributing to the well-being of people, society, and the planet

Ajinomoto Thailand

Associate Director, New Business Creation Division

Masaaki Fujitsuka

Ajinomoto Thailand develops seasonings, beverages, instant noodles, and other products. With approximately 4,800 employees, it operates a business with sales of around 32.6 billion baht. Positioned among the leading food manufacturers in Thailand, it places the provision of healthy food at the core of its growth strategy. In recent years, under the banner of "Eat Well, Live Well," it has embedded sustainability into business operations around three pillars: consumers, society and the environment, and employees. Toward 2030, under Ajinomoto Group Creating Shared Value (ASV), it is stepping further into visualization and implementation of its next focus, Scope 3, aiming to reduce environmental impact by 50% and extend healthy life expectancy. How can it move forward on pragmatic solutions for packaging, upstream traceability, and health proposals aligned with Thai food culture? We spoke with Mr. Masaaki Fujitsuka, Ajinomoto Thailand.

Aiming for three forms of well-being for consumers, society, and employees

Based on the global sustainability policy, what themes does Ajinomoto Thailand prioritize in the Thai market?

We in the Ajinomoto Group share the purpose of "Contributing to the well-being of people, society, and the planet through AminoScience," and, under the ASV[1] philosophy, we work on the premise of creating social value and economic value simultaneously as we pursue that purpose. At Ajinomoto Thailand, we place the axis of our initiatives on three forms of well-being (happiness and health). First is consumer well-being. Centered on nutrition and health, we will expand products and services that are compatible with "deliciousness." Second is social well-being: we treat environmental issues—such as greenhouse gases (GHG), plastics, food loss, water resources, and sustainable procurement—as management issues for the entire supply chain. Third is employee well-being: we will put in place mechanisms that draw out the power of the workplace and support both growth and happiness of employees. By clarifying these three pillars, individual initiatives do not remain partial optimization; they become easier to translate into business priorities and investment decisions, as well as workplace improvement activities. Because Thailand also plays a major role as a manufacturing base, we believe it is important to advance an integrated supply chain design that covers not only improvements in factory operations, but also raw-material procurement and logistics.

Please tell us more about social well-being.

Initiatives to reduce environmental impact are positioned at the core of social well-being. We manage environmental themes across five domains: GHG, plastic waste, food loss, water resources, and sustainable procurement. Our aim is not to optimize just one area, but to move forward on interrelated issues in parallel and embed them into business operations. In implementation, we assess not only whether something works technically, but also whether it can run in day-to-day operations and meet customer requirements, and then translate it into an executable form. In addition, we see health and nutrition as just as important as the environment. Thailand is aging, and it is becoming more important to address challenges rooted

1 Ajinomoto Group Creating Shared Value (co-creation of social and economic value through business)

in lifestyle habits. That is why we will design our initiatives not as a discussion limited to individual products, but from the perspective of how we can realistically improve consumers' diets.

Packaging improvements cannot be driven by manufacturers alone

Please describe the status of initiatives to reduce environmental impact, such as packaging recycling and material transitions.

With packaging, the direction is clear, and we are advancing three things simultaneously: reducing total usage, shifting to designs and materials that are easier to recycle, and utilizing recycled content. In particular, for small-sachet products, the packaging ratio tends to be relatively high, making it a domain where opportunities for reduction—such as down-gauging and size optimization—are easier to identify. That said, packaging is not as simple as "replace it and you're done." First, barrier properties are necessary for quality preservation, and the current structure has a rational basis. For example, even if we replace aluminum with a different approach, we need to substitute its function through methods such as vapor deposition. That entails re-examining everything from color tone and physical properties to adaptability on production lines and the design of quality assurance. Second are constraints arising from distribution and retail requirements. Items linked to customer requirements—such as secondary packaging used to protect, transport, and display products in aggregate—cannot be changed simply because the manufacturer deems them unnecessary. Therefore, it is realistic to collaborate with customers and transition step by step while presenting alternatives. Improving packaging is not limited to R&D; it is a company-wide issue that spans sales, logistics, and quality assurance. We are advancing internal alignment and discussions with trading partners as a set.

Two wheels: renewable energy and production efficiency

In Thailand, how do you envision a long-term strategy toward achieving carbon neutrality?

For us, we place two wheels at the center: expanding the use of renewable energy and improving production efficiency. Production efficiency means generating more output with the same energy input, thereby lowering the energy intensity per product. This cannot be completed solely through investments such as new technology and equipment renewals; it is achieved by optimizing process conditions, reducing losses, and accumulating day-to-day improvement activities. In addition, the Ajinomoto Group has set a direction of reducing GHG by 50% toward 2030, and in Thailand we are building plans in line with that level of ambition from both factory operations and supply-chain perspectives.

The next focus is implementing Scope 3

Please tell us about the status of GHG reductions for Scope 1 and 2, and your future initiatives for Scope 3.

We have a strong sense that reductions in Scope 1 and 2 have reached almost 100% achievement at this point. The combination of accumulated energy-saving and process improvements within factories, together with the introduction of renewable energy, has been effective. Specifically, while advancing optimization of energy use, we have layered initiatives such as the use of biomass and the installation of solar power generation at major factories. On the other hand, the next focus is Scope 3. External factors such as procurement, primary industries, and logistics are significant, and the difficulty rises another level from visualization to implementation. The core challenges are how to assemble data that can identify where emissions occur and in what quantities, and—even if coefficients can be set using international databases or averages—how to translate those into assumptions robust enough for implementation when there are gaps between

local realities, such as climate and cultivation methods, and the assumptions underlying such coefficients. For that reason, we will prioritize supply chains with larger impacts and advance traceability and data development step by step. At the same time, we will collaborate with the government, universities, and others to develop the definitions of data, collection methods, and rule-making, while designing operations that do not impose excessive burdens on the field. Furthermore, we will build initiatives together with benefits for farmers (such as higher productivity) and implement reduction measures in a form that is sustainable for all stakeholders.

A biocycle that returns by-products to local circulation connects procurement and decarbonization

Please explain how you position resource circulation in Thailand and your specific initiatives.

Resource circulation is an important theme within our sustainability efforts. For by-products generated in processes such as amino-acid fermentation, we are advancing initiatives to provide them not simply as materials to be treated, but in forms that can be used as agricultural inputs, thereby contributing to improved productivity for surrounding farmers. When circulation works locally, it contributes not only to reducing waste but also to benefits for farmers and sustainable procurement. The key to continuity is to design the operation—from supply format and quality to usage methods and verification of effects—so that stakeholders can run it without strain. Through the circulation mechanism, we will advance environmental-impact reduction and the sustainability of procurement as an integrated effort.

Define exploration areas and connect them to PoCs

Please tell us what you value in tech events, your expectations for Japanese companies, and the criteria for selecting startups.

The aim of the event is not the act of holding an event itself, but to define priority areas and then move end-to-end—from forming connections through to proof of concept (PoC). We have set priority areas as alternative proteins, fermentation technologies, and nutrition management (including personalization). While continuing dialogue with presenting companies and partners, we translate implementability into concrete themes. In selecting startups, in addition to fit with the priority areas, we place importance on the stage of the business and its scale, and whether there are vision we can jointly share. Because large companies require a certain amount of time for investment decisions and for designing facilities and quality assurance, the more a theme has large future

potential but also high uncertainty, the more important it becomes to incorporate external technologies and speed and to use PoCs to determine the conditions for viability. For Japanese companies, we expect contributions in shaping technological strengths to match "implementation conditions in Thailand." Packaging design, resource circulation, and digital technologies for visualization all need to satisfy prerequisites such as quality, cost, operations, and commercial distribution. Rather than presenting technology in isolation, it is important to build it as a PoC aligned with supply-chain realities and refine it with implementation in mind. We believe that doing so will create significant room for collaboration.

Ajinomoto Co., (Thailand) Ltd.
https://www.ajinomoto.co.th

VOICE

Walking the Green Journey with customers

Banpu NEXT

Senior Vice President, Net-Zero Solutions

Kanokwan Jitchobtham

Banpu NEXT, a subsidiary of Banpu PCL., is a leading smart energy and net zero solutions provider. With a target of reducing greenhouse gas emissions across all scopes by 50% by 2035, it supports companies in advancing electrification and the shift to renewable energy through an integrated portfolio that brings together rooftop and floating solar with energy storage, energy management, net zero journey consultation, and green transportation. It is also accelerating on-the-ground implementation, including one of Thailand's large floating PV projects in the 16 MW class, smart energy solutions for data centers, an integrated service for commercial EV fleets, and carbon solutions leveraging I-REC and CFO certification. We spoke with Ms. Kanokwan Jitchobtham, who oversees the net zero solutions business, about the company's strategy and specific initiatives.

Net Zero Solutions Provider

Please tell us about Banpu NEXT's mission.

Banpu NEXT is positioned within the Banpu Group as one of flagship businesses for achieving net zero, and it plays the role of a "net zero solutions provider." Working closely with ecosystem partners that bring specialized expertise, we place great importance on delivering the optimal solutions for each customer. Our mission can be organized into three main goals. First, we aim to be a partner that walks the customer's "green journey" together. Rather than simply installing equipment, we design green solutions that fit the customer's business while also realizing energy cost reductions. Second is operational excellence. No matter how well a solution is designed, its value cannot be fully realized unless safety and stability are ensured in post-implementation operations. In energy solutions, we believe the single most important value is operational capability that maintains safe, uninterrupted supply. Third, we want to be a long-term companion on the "net zero journey." We do not want the relationship to end with the introduction of a single solution; instead, as the customer's business grows and technology evolves, we want to remain a partner that continues to capture emerging needs for green energy. By proactively incorporating new technologies such as AI, we aim to keep updating ourselves together with our customers.

Four Values Delivered to Customers

What value does Banpu NEXT want to deliver to customers and society?

From the perspective of "what we are able to provide" to society and customers, we define four concrete values. First is our role as a consultant. When adopting green technologies, the newest or most advanced technology is not necessarily optimal for every customer. It is important to identify the "just right" technology in light of the customer's business characteristics and investment capacity, and that is where our expertise lies. Second is solution design and implementation. By working as one with ecosystem partners, we can assemble comprehensive solutions. Third is operational excellence. We must ensure a stable, uninterrupted supply of energy and services. This is a source of reassurance for customers and is what we value most. Fourth is measurement of results. We do not stop at implementation; we quantitatively measure how much closer the customer has come to achieving its net zero

targets. For customers that have declared a target year for achieving net zero, we continuously track their progress. What matters is that these four values form a cycle, and that cycle itself is our "green journey." Within each solution, we aim to simultaneously elevate three outcomes: business performance, corporate image, and green targets.

The Core Business Is "Net Zero Consulting"

Among the diverse menu you provide—energy efficiency, solar system, EMS, green transportation, environmental attributes, and more—what is the core area you prioritize most?

Banpu NEXT's initial process is net zero consultant—in other words, overall net zero design. If we can work with a customer from the earliest stage, we can jointly draw a "perfect journey" from the outset. By first sharing items such as emissions reduction targets, carbon footprint standards, and the timing of a carbon-neutral declaration, and then designing the roadmap accordingly, implementation that follows becomes more effective and efficient. In reality, however, many customers come to us after they have already started solar power generation or specific energy-saving measures. In such cases as well, we first respond to the needs that have already surfaced—for example, requests such as "we want to introduce solar first" or "we want to adopt EV fleet first"—while at the same time redesigning the overall net zero journey. Customers differ in what they prioritize first: cost savings, reducing their carbon footprint, or achieving carbon neutrality that they have already declared. By carefully identifying those differences through thorough interviews and designing a solution mix tailored to each company, we fulfill our role as a net zero consulting partner.

Integrated Services for Commercial EV Fleets: "Prime Mobility"

Please tell us about your green transportation business.

In collaboration with Marubeni and Fuyo Lease, we have established "Prime Mobility," an integrated service for commercial EV fleets that includes charging, operations, and billing. For the domestic charging network, we are expanding it as a public charging station for commercial fleet network along expressways and in urban areas and commercial facilities through equity investment in, and business partnerships with the EV charging operator. There are three major types of services customers expect in green transportation. The first is "Vehicle as a Service," a model in which vehicles are used as a service. It has

two forms—long-term leasing and short-term rental with E-fleet management solutions—and this is the central business of Prime Mobility. The second is "Energy as a Service." For customers that already own vehicles, the next challenge is charging infrastructure. Here we provide both the chargers as hardware and the software platform that manages them. The third is "Platform as a Service." Fleets constantly transmit data from both vehicles and batteries. The platform centrally manages vehicles, delivery and charging timing, driving routes, payloads, and more, and also performs AI-based optimization. In addition, by combining complementary services such as insurance, warranties, maintenance, and battery recycling, we build a comprehensive green transportation. Many people think, "I want to switch to EVs for the sake of going green and optimisation," but to be truly green and optimisation, it is necessary to design not only the vehicle itself but also fleet operations, services, and recycling.

For each solution—solar, energy efficiency, e-mobility, and others—please tell us which industrial sectors and customer segments you particularly prioritize.

Our focused segment is the commercial and industrial sector (C&I); however, we prioritize different business types depending on each solution. First, for solar power generation, we highlight the commercial and manufacturing businesses. Next, for energy efficiency solutions, we pay particular attention to industries, hotels, and mixed-use buildings with high cooling demand and heavy electricity consumption, such as refrigeration and cold storage equipment. For example, we support efficient energy use by partnering with companies that operate district cooling systems that collectively cool groups of buildings. In green transportation, the following three customer segments are the main targets. First, fleet operators whose core business is long-distance transportation and trailer operations. Second, comprehensive logistics companies that handle 3PL (Third-Party Logistics), e-commerce fulfillment, cold chains, and the like. Third, retailers and manufacturers that operate their own trucks for deliveries between stores and factories while committing to RE100 or net zero targets.

Partners Aiming for Green Together

In what areas would you like to work together with Japanese companies going forward? Please also tell us what your ideal partner looks like.

What we seek in partners is not company size. The essence is whether they fit as pieces of the solution jigsaw puzzle. To date, we have collaborated not only with major trading houses such as Marubeni but also with Japanese startups. When we view a company as a solution partner, we place emphasis on whether its technologies or services properly match our core business. On the other hand, for co-investment partners, we emphasize whether we share a vision for net zero and whether the partner has networks and business development capabilities. In a single phrase,

that vision is "aiming for green together." It is important whether we can share the four values mentioned at the outset. Even now, we are actively seeking new partners in areas such as energy efficiency, net zero consulting, solar system, green transportation, and energy platforms. For us, what matters most is delivering end-to-end net zero solutions to customers. We would like to continue broadly exploring possibilities for collaboration with partners that share this mindset and that can combine the strengths of Thailand and Japan to contribute to achieving net zero.

Banpu NEXT Co., Ltd.
https://www.banpunext.co.th

VOICE

On-the-ground corporate transformation co-created by a Decarbonization Partner

Left: Kitiya Tavorn
Center: Chayoot Chatunawarat
Right: In-touch Ruckpanich

Innopower

Head of Decarbonization Partnership
Kitiya Tavorn
Principal
Chayoot Chatunawarat
Investment Associate
In-touch Ruckpanich

Innopower is an innovation company established through joint investment by the Electricity Generating Authority of Thailand (EGAT) together with its affiliated power generation companies, RATCH and EGCO. By combining clean energy and digital technologies, it supports corporate decarbonization. With an eye on the entire energy value chain, it provides solutions such as renewable energy deployment, energy management, and the use of carbon credits and renewable energy certificates. At the same time, it is also working to nurture next-generation technologies through investments in the climate-tech field. We spoke with three key members about the aims behind these initiatives and the outlook ahead, as well as the role Innopower hopes to play within Thailand's 2050 carbon-neutrality target.

"Decarbonization Partner" Across the Energy Value Chain

Thailand's government has set a goal of achieving carbon neutrality by 2050. In that context, what role and objectives did Innopower have when it was established?

Innopower is an energy-innovation company born to create new businesses that go beyond the traditional framework of the power sector, through collaboration between the national power utility and power generation companies. Since its establishment, the keyword we have consistently upheld is "decarbonization partner." It is difficult for a company to achieve carbon neutrality through only a single technology or service; multiple solutions must be combined across the entire energy value chain, from power generation through to the demand side. Innopower plays the role of proposing the optimal combination for each customer while looking at the overall picture, and accompanying them through implementation.

Could you share an overview of the areas in which you develop solutions?

The areas of energy innovation that Innopower targets can be broadly organized into four categories. The first is the power generation domain: we plan and develop renewable-energy projects such as solar power, and support deployment for companies and industrial estates. The second is the transmission and distribution domain: solutions that enhance monitoring and maintenance of infrastructure such as transmission and distribution lines. By combining drones, sensing technologies, and software, we work to reduce transmission/distribution losses and improve maintenance efficiency. The third is the energy-management domain: we provide energy management systems that collect and analyze operating data from power plants, commercial buildings, and factories, and optimize the operation of air conditioning, lighting, and industrial processes. The fourth is demand-side innovation: through solutions for electric vehicles (EVs) and fleets, we promote the shift from fossil fuels to electricity, aiming to supply that electricity with the cleanest possible power sources.

In addition, through certificates such as RECs that prove electricity is derived from renewable sources, we support companies in achieving their sustainability targets.

How are you approaching the carbon credit and REC businesses?

For Carbon credit generation, in some cases we prepare the Project Design Document (PDD) in-house, while in other cases we design it jointly with partners. Final validation and verification are carried out by an independent validation and verification body (VVB)[1]. By clearly separating what we do internally and what we entrust to external parties, we are accumulating know-how. For RECs, Innopower also plays the role of an aggregator. At present, large-scale power plants are the main focus, but in the future we would like to bundle rooftop solar at the household and SME levels as well, monetize it as RECs, and thereby broaden the base of renewable-energy adoption. We are also involved in building schemes in collaboration with financial institutions—such as green finance and support for the registration and sale of RECs for small-scale solar—aiming to form an ecosystem in which economic incentives circulate to environmental projects.

A Companion Model as a Decarbonization Partner

As companies pursue decarbonization and the achievement of sustainability targets, what steps do you take in accompanying them?

In recent years, many companies have begun setting sustainability targets and net-zero targets. Innopower positions itself as a "decarbonization partner," accompanying clients through the entire process from baseline calculation to implementation. The first step is to visualize greenhouse gas (GHG) emissions. By using platforms such as those provided by Japan's carbon accounting company Zeroboard, we "make visible" emissions across Scopes 1–3 so that companies can understand their current situation. Based on that, we set reduction targets in line with the customer's required standards. As the next step, we propose a combination of measures such as renewable-energy deployment, energy efficiency, and EV fleet introduction. Even if solar panels are installed across an entire rooftop, Scope 2 emissions remain as long as grid electricity is used in parallel. To fill that gap, it is increasingly common to combine the use of carbon credits and RECs. For companies exporting to Europe in particular, responding to the Carbon Border Adjustment Mechanism (CBAM) is a key issue. Innopower understands both domestic standards such as T-VER and international standards such as VERRA, and supports companies so they can maintain competitiveness while meeting regulatory requirements through coordination with those standards.

What is the biggest hurdle in advancing decarbonization consulting?

For many companies, the biggest hurdle is building mechanisms for data collection and reporting. Many are only just beginning their efforts and have not established systems for how to record and store emissions data and

1 An independent organization that, as a third party, conducts validation and verification to confirm whether a carbon offset project meets the requirements of international standards and program rules.

evidence, and how to retain them in a form that can be verified. In addition, in some cases in-house personnel do not sufficiently understand GHGs and reporting standards, and the efforts are perceived as an unnecessary cost. At Innopower, we will focus on two priorities: organizing data and building automated systems, and closing gaps in understanding and recognition among personnel. Meanwhile, SMEs have limited information and human resources, creating concern that they may find it difficult to respond if regulations tighten in the future. As part of a quasi-state-owned enterprise group, Innopower is also strengthening support for SME capacity building—for example, by holding seminars and workshops in collaboration with government agencies such as the Office of SMEs Promotion (OSMEP).

Localization and Product–Market Fit Are the Priorities

Please tell us about your framework for collaborating with Japanese companies.

One concrete example of collaboration is the partnership with Zeroboard mentioned earlier. Zeroboard is an emissions calculation and reporting platform adopted by many Japanese companies, and there has been an increase in cases where Thai sites use the same platform as an extension of that adoption. As an important partner for Zeroboard in Thailand, Innopower uses the platform as an entry point and then connects clients to our own solutions such as renewable-energy deployment and energy management.

What potential do you see for collaboration with Japanese companies, and what points do you look for in partners?

When we look at Japanese startups, passion for the work is a basic premise, but we place particular emphasis on two points. One is product–market fit. A product that succeeds in one country or region will not necessarily work in another market as is. We carefully assess whether it fits the conditions in the Thai market and neighboring countries. The other is "people" and the presence of local partners. Whether there is a partner who deeply understands local conditions and has networks and experience can strongly influence the success or failure of commercialization and scaling. Rather than bringing a model that succeeded in Japan directly into the market, we believe it is important to work with local partners and take a stance of advancing localization. Going forward as well, we would like to expand "mutually complementary" partnerships that combine Japanese technologies and platforms with Innopower's market access and implementation capabilities.

Looking five or ten years ahead, what kind of future vision does Innopower have?

It may not yet be the stage where we can fully express our vision through numerical targets alone, but at minimum we want to spread throughout society the recognition that "energy innovation is not a theme for power utilities alone." Expanding clean energy requires involvement by diverse players—not only power utilities, but also companies, local governments, financial institutions, and consumers. With that as the foundation, our major goal is to become the "first choice" that comes to mind when someone wants to engage in clean energy or decarbonization. While not limited to the energy sector, we want to grow into an innovation platform that supports Asia's decarbonization transition, expanding both investment and business into decarbonization solutions for other industries such as agriculture, manufacturing, and mobility.

INNOPOWER Co., Ltd.
https://www.innopower.co.th

VOICE

Toward a sustainable society through energy

PTT

Senior Executive Vice President, Corporate Sustainability

Rathakorn Kampanathsanyakorn

PTT Group serves as the cornerstone of Thailand's energy security, with a core portfolio rooted in oil and gas. Having successfully exited the coal sector, the Group has set a Net Zero target by 2050, aligning its ambitions with Thailand's national climate objectives. As a significant stakeholder accounting for over 10% of the nation's domestic emissions, the Group is committed to fostering a sustainable Thai society through its C3 Strategy. This framework integrates the decarbonization of its investment portfolio, the optimization of existing assets, and strategic ventures into frontier technologies such as Carbon Capture and Storage (CCS), nature-based solutions, and hydrogen. We spoke with Mr. Rathakorn Kampanathsanyakorn, who oversees corporate sustainability, about the overall picture of these initiatives and the challenges ahead.

A roadmap for the energy transition: the C3 strategy

What role does the PTT Group play in achieving carbon neutrality in Thailand?

PTT Group is mandated to safeguard Thailand's energy security, a mission that has evolved into a broader vision of growing sustainably alongside Thai society. We believe that true progress transcends mere economic growth; it requires enhancing quality of life while maintaining environmental balance. Thailand, like many other countries, has set clear decarbonization pathways and long-term climate ambitions. In this context, PTT Group supports national efforts by ensuring energy security and affordability through a diversified energy mix—spanning both hydrocarbons and renewables—while progressively advancing sustainability solutions such as carbon capture and storage (CCS) and hydrogen. As the nation's energy leader, we are committed to aligning our long-term transition with the Thai government's international climate pledge and its interim emissions reduction goals, in a manner that is practical, secure, and economically sustainable.

What kind of roadmap is the PTT Group drawing for the energy transition and decarbonization?

To achieve our 2035 and 2050 targets, we require a rigorous strategic framework, which we have formalized as the C3 Strategy. The first pillar, Climate-Resilient Business, involves systematically rebalancing our investment portfolio toward low-carbon businesses. However, because an immediate shift to renewables poses risks to cost structures and grid stability, we are adopting a phased approach that monitors technological cost curves and electricity tariffs to balance affordability, energy security, and environmental stewardship. The second pillar, Carbon Conscious Asset, focuses on decarbonizing our operational footprint through clean energy integration and advanced technology. With our current emissions at 46 million tonnes per year, we have identified energy efficiency—driven by AI and digital transformation—as a "quick win," with sharing these best practices across the Group enhancing both profitability and our decarbonization trajectory. Finally, the third pillar - The Coalition, Co-creation, and Collective Efforts for All - emphasizes strategic partnerships and nature-based solutions. These efforts encompass large-scale industrial abatement, such as

Carbon Capture and Storage (CCS), and carbon removals via afforestation. By collaborating with a diverse ecosystem of domestic and international partners, we aim to aggregate technology, capital, and expertise to execute a large-scale energy transition.

Turning strategy into action for a practical net zero pathway

Specifically, what initiatives are you working on?

In the short term, we are prioritizing the displacement of coal with lower-carbon alternatives to maintain energy security, specifically positioning LNG as a critical transition fuel. We plan to scale LNG imports from the current 5 million tonnes per annum to 10 million by 2030, and 15 million by 2035. Simultaneously, our power subsidiary, Global Power Synergy PCL (GPSC), is accelerating renewable energy deployment, with plans to expand capacity from 10 million kW to 15 million kW by 2035. Regarding CCS, PTT is spearheading a national initiative under the "Eastern Thailand CCS Hub" concept of which a project at the Arthit oil field has been initiated to address industrial emissions in the eastern corridor, beginning with a 1-million-tonne-per-year pilot slated for commercialization by 2028. We anticipate scaling this to 5–10 million tonnes by the mid-2030s. We estimate that CCS could support approximately 60 million tonnes of annual emissions reductions by 2050. We are currently collaborating with the government to survey subsea geological structures in the Gulf of Thailand to assess the viability of large-scale storage. Furthermore, while hydrogen is a key component of our clean energy future, current production costs suggest that utility-scale deployment will likely materialize after 2040.

How do you position nature-based solutions?

Nature-based solutions constitute the vital third pillar of the C3 Strategy, intended to account for 10% to 15% of our total GHG reductions. To date, PTT Group has reforested approximately 140,000 hectares, and we intend to expand this footprint throughout our Net Zero journey. Our philosophy extends beyond carbon sequestration; we aim to create shared value by generating economic opportunities and employment for local communities. This includes revenue from sustainable timber and agricultural products, as well as from monetizing certified carbon credits. We are also exploring a cross-border business model involving afforestation concessions in Southeast Asia and co-investing in Japanese-operated funds to generate high-quality carbon offsets.

Judging investment timing carefully

What are the challenges in embedding sustainability into a diverse business portfolio?

The primary challenge is economic viability. Sustainability initiatives must be self-sustaining; we cannot maintain long-term investments without financial pragmatism. Projects must deliver both environmental impact and economic justifications. Additionally, the regulatory landscape is crucial. To accelerate decarbonization, we need robust frameworks for carbon pricing and clear requirements for ESG disclosures. However, we must remain sensitive to the impact on the

national economy and the cost of living. It is essential to balance "carrots" (incentives) with "sticks" (mandates). PTT Group remains vigilant, monitoring technology costs and policy shifts to ensure we time our investments for maximum impact and flexibility.

Watching technology trends and seeking partners with a long-term view

What roles do you expect from overseas partners, including Japanese companies, and what technology areas are you looking for?

In the Carbon Capture and Storage (CCS) landscape, capture costs typically represent 60% to 70% of the total expenditure. Consequently, forging strategic alliances with partners possessing breakthrough technologies to curtail these costs is a critical priority. We maintain a rigorous global scouting program across the United States, the United Kingdom, Japan, and other innovation hubs to identify emerging lab-scale and pilot-scale capture solutions. Upon identifying high-potential technologies, our objective is to aggressively pursue investment and co-development opportunities to localize these advancements within Thailand. In recognizing that carbon capture encompasses four to five distinct technical pathways, selecting the optimal methodology requires a nuanced understanding of specific emission source characteristics. Accordingly, our evaluation framework extends beyond mere performance metrics; with emphasis on process compatibility, scalability feasibility, and the R&D prowess of potential partners. Regarding hydrogen, the primary driver for adoption remains the aggressive reduction of production costs for both green and blue hydrogen. We are closely monitoring international technology trajectories—with a particular focus on Japan—to cultivate long-term strategic partnerships. Beyond isolated production costs, we aim to optimize the entire value chain, including integrated low-carbon hydrogen schemes underpinned by CCS infrastructure. Currently, several high-profile collaborative initiatives are already gaining momentum, such as the Gulf of Thailand CCS Survey - a joint venture between the Japan Organization for Metals and Energy Security (JOGMEC) and PTTEP, and the Hydrogen Pilot Station - a demonstration project for fuel-cell vehicles spearheaded by Toyota and PTTOR. Moving forward, we are committed to accelerating Thailand's energy transition through deepened synergies with international stakeholders and Japanese industry leaders.

Contributing to both better living standards and environmental conservation through energy

Finally, what does the "sustainable Thai society" envisioned by the PTT Group look like?

PTT Group's objective is to be an enterprise that prospers in unison with the nation. From an energy perspective, this means ensuring reliability and energy equity. By delivering clean, reliable energy at affordable prices, we aim to elevate the quality of life and realize a sustainable future for all Thais. This is the essence of the PTT Group vision. We do not seek standalone success; we strive to advance alongside our stakeholders, harmonizing improved living standards with rigorous environmental conservation through responsible energy development.

PTT Public Co., Ltd.
https://www.pttplc.com

VOICE

Decarbonization Innovation Strategy powered by Circular Materials

PTT Global Chemical (GC)

Executive Vice President, Science and Innovation

Kamel Ramdani

As the core chemicals business of Thailand's largest energy group, PTT Group, GC is advancing business transformation under the banners of carbon neutrality by 2050 and the circular economy. The company is accelerating initiatives across the entire value chain—covering decarbonization including Scope 3 emissions; resource circulation through mono-material packaging and recycling plants; and collaboration with startups via its corporate venture capital (CVC) arm. With potential collaboration with Japanese companies in mind, GC aims to create sustainable solutions originating in Thailand and extending across ASEAN, Europe, and the United States. We spoke with Executive Vice President Kamel Ramdani, who also serves concurrently as Managing Director of group subsidiary GC Ventures Co., Ltd., about GC's strategy for advancing a circular economy.

Value Chain with a Circular Economy Perspective

What role does GC play in achieving carbon neutrality, and what themes are you focusing on in particular?

PTT Group has set a goal of achieving net zero by 2050, and GC shares this goal. As a chemical company positioned downstream in the value chain, we place importance not only on reducing our own emissions, but also on supporting customers' decarbonization through sustainable products and solutions. In addition to reducing Scope 1 and Scope 2 emissions, a core focus for us is optimizing the entire value chain, including Scope 3. From this perspective, we are focusing on two major themes. The first is operational decarbonization—low carbon initiatives including Carbon Capture and Storage (CCS) and Carbon Capture and Utilization (CCU). By combining improvements in process efficiency, fuel switching, and operational optimization through digital technologies, we aim to steadily reduce the carbon footprint of our production sites. The second focus is the development of products and solutions that reduce Scope 3 emission. In application areas such as packaging, we are promoting a shift toward materials with lower carbon intensity and improved recyclability, while also advancing mono-material design and the use of recycled resins from a circular economy perspective. We see it as our role to work closely with stakeholders, including suppliers, brand owners, and retailers, to achieve both emissions reductions and resource circulation across the entire value chain.

Within that role, how do you envision the future of the chemical industry?

At GC, we have defined four growth platforms: Advanced Materials, Green Solutions, Energy and Energy Efficiency, and Bio-based Chemicals. These include composite materials and high-performance resins that contribute to lightweighting and energy saving, bioplastics and bio-polymers, and materials for EVs and energy storage. All of these are closely linked to structural changes in energy systems, mobility, and consumer goods. Over the next decade, chemical companies will increasingly be expected to optimize processes and supply chains using digital technologies, while contributing to cross-industry decarbonization through advanced materials.

Digital Innovation and Mono-Material Solutions

Among the major projects currently underway, could you share specific examples that contribute to sustainability?

One example is operational improvement though digital technologies. GC has a dedicated digital team deploying advanced tools—such as process-optimization algorithms—across its production sites. In one project, we succeeded in significantly reducing both the carbon footprint and hydrogen consumption in the production process, while also improving yield. Another example is mono-material packaging. Conventional multi-layer packaging materials are difficult to recycle and have become a bottleneck for resource circulation. By working with customers and startups across the value chain, we have developed and commercialized packaging solutions composed of a single material that is easier to recycle. In addition, we are advancing applied development in partnership with a UK startup on technologies that use CO_2 as a feedstock to produce surfactants and other chemical products.

How is the open-innovation approach cultivated through GC Ventures being incorporated into GC's core business?

As GC's corporate venture capital function, GC Ventures operates teams in Bangkok, Europe, and the United States, sourcing startups globally. Each year, we screen more than 100 companies and continuously evaluate around 30 strategically promising candidates. Initial assessment focuses on factors such as management capability, technical visibility, differentiation from existing solutions, and cost structure. Only those that meet our criteria proceed to detailed due diligence. Final investment decisions are made by an investment committee spanning innovation, strategy, and finance. Beyond financial returns, we place the greatest emphasis on strategic synergy with GC's businesses and technologies. We also emphasize technical alliances and joint development without requiring large capital investment. For startups, we provide access to the Southeast Asian market and engineering support for scaling up, while integrating promising technologies—creating a win-win relationship. Through this framework, the knowledge accumulated by GC Ventures is directly reflected in GC's innovation strategy.

Market-Driven Innovation

In commercializing plastic recycling and biomaterials, what challenges do you see?

Sustainable solutions face several common challenges. The first is cost competitiveness. No matter how environmentally friendly a solution may be, market adoption will be limited unless it can be offered at a price customers are willing to accept. The second challenge is scale-up. Even with strong lab-level performance, moving to mass production requires substantial capital investment and technical validation. Ensuring consistent quality and performance on a scale is a critical hurdle. The third challenge is competition and speed. With many players pursuing innovative technologies simultaneously, the speed of decision-making and execution often determines success. At the same time, companies are often reluctant to be first

movers, preferring to follow once others have proven the business model. For circular and bio-based products, government regulation and policy are also important factors. GC works closely with the Thai government and industry while monitoring policy developments overseas—particularly in Europe and the United States. However, even well-designed policies will not drive adoption if the cost gap in conventional products remains too large. Balancing policy design with the market's cost tolerance is therefore critical.

A Leader in Circular Solutions

What strategies does GC emphasize in response to these challenges?

We emphasize a shift toward a market-driven innovation process. Rather than advancing technology development first and searching for markets later, we engage customers early and validate needs throughout development. Instead of aiming for a perfect product, we bring solutions to market at the minimum viable product (MVP) stage and rapidly improve them based on feedback. We also focus on building ecosystems that share risk— combining joint development with startups, CVC investment through GC Ventures, and government support schemes to help overcome the scale-up phase. Personally, I believe it would be desirable to have mechanisms in which the government takes on a certain level of risk to support projects and, if successful, returns a portion of the outcomes to fund the next projects. Not every innovation succeeds but creating an environment where large companies and startups can take on challenges contributes to the competitiveness of the entire ecosystem.

International Collaboration and GC's Role

What roles or contributions do you expect from collaboration with overseas companies, and are there fields you would like to focus on going forward?

For overseas companies—particularly Japanese companies—we have high expectations for their advanced technological capabilities and expertise. In areas such as materials technology, process technology, and quality management, we see strong potential synergies, especially in biomaterials, advanced materials, and energy-related materials. Collaborating with Japanese companies provides GC with opportunities to co-create new business models that start in Thailand and extend to ASEAN, and even Europe and the United States. Thailand offers diverse green feedstocks including biomass, as well as easy access to the broader ASEAN market. By combining Japanese technological strengths with Thailand's feedstocks, location, and market access, we believe we can create new value propositions for sustainable solutions.

In the circular society that Thailand aims to build, what role will GC play?

Within Thailand's energy and chemical industries, PTT Group bears the responsibility of balancing energy security with decarbonization. As GC, we aim to contribute to reducing the carbon footprint of products and the entire value chain while maintaining a stable supply of energy and materials. True sustainability cannot be achieved without addressing the entire lifecycle—from suppliers and customers to product use and end-of-life management. By operating plastic recycling plants in Thailand and developing mono-material packaging, we are advancing the implementation of the circular economy. Look ahead, we aspire to serve as a leader in circular solutions, capable of scaling successful models from Thailand to ASEAN, Europe, and the United States.

PTT Global Chemical Public Company Limited (GC)
https://www.pttgcgroup.com

VOICE

Coexistence-based sustainability nurtured with local communities

Saha Pathana Inter-Holding (SPI)

Executive Chairman & CEO

Vichai Kulsomphob

SPI is the holding company of SAHA GROUP, responsible for various areas of business developments and investments including the SAHA GROUP's industrial park. Building on its track record that began in Sriracha, it now operates four industrial parks—Sriracha, Kabinburi, Lamphun, and Mae Sot. Not only commercializing land and buildings, SPI supports tenant operations by providing utilities such as electricity, water, and wastewater treatment. Also, since the business operation of the industrial park is very connected or related to environmental impacts, the company then aims to accelerate implementation toward carbon neutrality. We spoke with Mr. Vichai Kulsomphob, Executive Chairman & CEO, about priority initiatives and the direction for co-creation with Japanese companies.

Implementing net zero aligned with national policy

Within the SAHA GROUP's sustainability policy, what themes are you currently placing the greatest emphasis on?

As the SAHA GROUP, we have operated diversified businesses in Thailand for many years, and through strategic investment and business development, have contributed to building the foundations of Thai industrial sector. As a corporate group in such a position, we believe we should take responsibility not only for business growth, but also for the sustainability of economy, society and the environment. The Thai government has set targets of achieving net-zero greenhouse gas (GHG) emissions by 2050. While aligning with this national policy direction, we aim to deliver results at a faster pace than the government targets in areas where there is a clear line of sight to implementation—through technology, strategic investment, and strong partnerships. With net-zero GHG emissions as the anchor, we will expand the use of renewable energy—such as deploying solar power—and improve energy efficiency in common areas, promote water reuse and recycling, and improve the supply chain side including packaging materials. We intend to extend these initiatives beyond the limited confines of SAHA GROUP industrial park to surrounding business partners and to points of consumption as well.

Beyond providing land, creating value that goes beyond an SAHA GROUP industrial park

Please tell us about your specific initiatives.

The operation of SAHA GROUP industrial park is where our business is most directly connected to environmental challenges. In industrial estates, day-to-day operations are inseparable from managing environmental burdens—such as appropriately treating wastewater generated by factory operations, managing impacts on the atmosphere, and addressing greenhouse gas emissions associated with the use of electricity and fuels. Accordingly, we recognize that we bear greater environmental responsibility than ordinary consumers. For example, in SAHA GROUP industrial park Sriracha, we have developed infrastructure such as a central wastewater treatment facility. At the same time, we do not stop at merely providing industrial land. Under the concept of

"Building More than Just an Industrial Park," we place importance on operations that enhance environmental, social, and economic dimensions simultaneously.

Minimizing impacts on water resources and coexisting with local communities

From the perspective of industrial park operations, what measures do you prioritize for water treatment?

For SAHA GROUP industrial park, "water" itself is competitiveness. We therefore pursue both stable supply and reduced environmental impact at the same time. Across SAHA GROUP industrial park, we are expanding the reuse of treated water. In 2024, the volume of water treated and reused within the industrial estates reached 2.26 million m^3, accounting for 34.86% of total water used in the target area. At the same time, we were also able to reduce the procurement volume of water purchased from outside (tap water and industrial water) by 13.36%. Relationships with communities surrounding the SAHA GROUP industrial park are also important. We place emphasis on both appropriately managing water demand within the industrial park and minimizing impacts on shared water resources in surrounding areas (water intake and allocation of volumes). In fact, in the same year, no concerns or complaints from local residents or community stakeholders regarding SAHA GROUP industrial park water use were identified. Going forward, we will further expand efforts to properly treat wastewater and reuse it, thereby reducing dependence on external water intake and water procurement. As a result, we aim to continue operating in a way that can coexist with local communities while reducing the burden on water resources.

Measure, reduce, and offset—accumulating progress through "visualization"

As a group, how are you advancing renewable energy and energy efficiency?

Energy is used not only in the operation of SAHA GROUP industrial park, but across every site of our diverse business activities—manufacturing bases, logistics, offices, commercial operations, and services. That is why we believe it is important, first, to consolidate data on actual usage by site and clarify baselines under common standards; then, starting with the highest-priority areas, to improve efficiency and introduce renewable energy, steadily accumulating improvements. In 2024, we organized fuel and electricity use data across sites and focused on understanding the current situation and establishing baselines. Building on that, from 2024 we have set a target to reduce electricity consumption by 1% or more compared with 2023, and we are moving to execute concrete reduction measures. For example, we will build results through individual projects such as converting common areas to LED lighting and installing rooftop solar PV, and then roll these out sequentially to other sites. Net-zero GHG emissions is not merely an ideal; the key is to translate it into practical work through measurement and operations. Under our policy of "measure, reduce, and offset," we first understand emissions, reduce them where possible, and offset what remains in an appropriate manner. In 2024, we expanded data collection to eight sites—including offices, SAHA GROUP industrial park, golf courses, and rental properties—and developed baselines. Total emissions across Scopes 1–3 amounted to approximately 203,000 tCO_2eq, and we view responses to electricity-related emissions (Scope 2) as particularly important.

Going as far as consumer behavior—promoting "buy only what you need" from the retail frontline

Please tell us about the sustainability measures you pursue across the group and the initiatives you optimize individually depending on business characteristics.

What is common across SAHA GROUP is that we do not adopt the idea of "lowering costs by cutting

environmental measures." Of course, there are situations where costs increase as a result of environmental considerations. However, to reconcile the environment and business, we place importance—when selecting partners—on proximity to our values. At the same time, each business has its own characteristics. SAHA GROUP also operates premium grade A office developments for rent and retail businesses such as convenience stores, where consumer behavior directly links to environmental issues. Overconsumption creates a structure that leads to overproduction and waste. To change this vicious cycle, we communicate the message "buy only what you need" from the frontline. We also move, as far as possible, toward recycling and reuse and toward materials with lower environmental impact for products and packaging.

Consumer education—accumulating "examples," not running nationwide campaigns

Changing consumer awareness is difficult. Specifically, what kind of initiatives are you taking?

We are neither a government agency nor an educational institution, so we cannot run campaigns on a national scale. What we can do is to set examples and become a model for the society we aim for. Around industrial estates are the lives of people who work there, and there are local communities such as temples, hospitals, and schools. We emphasize having day-to-day points of contact with these communities, and we continue to implement activities together with them—such as sports events and charitable activities—dozens of times per year. Each time, we set a small theme and try to communicate messages in an easy-to-understand way. A concept we consistently uphold is "just right" (moderate; sufficient and necessary). Rather than ending with a one-off event, we believe that accumulating initiatives at a realistic scale that can be sustained over the long term leads to behavioral change among consumers. We do not believe that securing profit and shifting away from mass production and mass consumption are contradictory. What we value is not profit maximization, but profit in a form that harmonizes with society—namely, harmonizing profit. Especially when profits rise in the short term, we review whether we have gone too far, and we return part of those gains to society through education, providing opportunities, and sharing knowledge. As a result, we believe trust with the community is strengthened, which in turn contributes to the sustainability of our business.

Expectations for Japanese companies—making Thailand a base for "proof of concept and scaling"

Looking ahead, in what areas do you have expectations for Japanese companies?

We would like Japanese companies to continue providing good opportunities in Thailand. In addition to the Thai market, it is also important to view Thailand as a base for expanding into ASEAN. Thailand can become a logistics and transportation hub, and we hope Japan will continue to position Thailand as a long-term partner and keep valuing it as a market for demonstrating technologies and ideas. As was the case with the automotive industry in the past, rather than simply manufacturing and taking

profits home, it is desirable to leave knowledge and industrial foundations in Thailand and build a relationship in which future generations can feel that they "grew together with Japan." As a more specific example, with next-generation mobility company SkyDrive, we are not only examining business feasibility but also participating in public-private dialogue forums while advancing the enabling environment toward implementation in Thailand. Looking ahead, we also hope this can lead to commercialization as Made in Thailand.

Saha Pathana Inter-Holding Plc.
https://www.spi.co.th/

VOICE

Building a Green Supply Chain

Sahaviriya Steel Industries (SSI)

Vice President, Group Energy and Environment Technology Office

Somsak Pikkanesuan

Head of Operation, Manufacturing Division

Veerapong Intasakha

Sahaviriya Steel Industries (SSI), a leading steel producer in Thailand, supplies up to 4 million tons of hot-rolled coils annually, centered on its hot-rolled sheet plant in Prachuap Khiri Khan Province, and supports the automotive, construction, and energy industries as one of ASEAN's largest flat steel product manufacturers. In 2024, revenue reached approximately THB 26.3 billion (about JPY 128.9 billion; THB 1 ≈ JPY 4.9), and the company employed around 1,200 people. As an energy-intensive industry player, SSI has set a 2050 net-zero target and is taking on the challenge of decarbonizing the entire value chain and building a green supply chain through initiatives such as energy saving, renewable energy adoption, and logistics optimization. We spoke with Mr. Somsak Pikkanesuan, who oversees energy and environmental technologies, and Mr. Veerapong Intasakha, who is responsible for plant operations, about SSI's efforts toward achieving net zero.

Net-Zero response and green steel strategy for Thailand's steel industry

How is Thailand's steel industry as a whole approaching the net-zero target?

The Thai government has brought forward its net-zero greenhouse gas (GHG) emissions target from 2065 to 2050. As the steel industry, we also need to step up our CO_2 reduction efforts in line with this new national target. We work together within the Steel Industry Club of the Federation of Thai Industries (FTI) to reduce emissions across the industry. In particular, responding to regulations in various countries—such as the EU's Carbon Border Adjustment Mechanism (CBAM)—and ensuring that Thai steel products can remain competitive in overseas markets under the new rules is a critical issue. We are also working with specialized institutions such as the Iron and Steel Institute of Thailand (ISIT) to develop a strategy to enhance Thailand's steel industry into "green steel," namely a low-carbon, environmentally conscious industry. We are currently preparing a white paper and are moving forward with preparations to propose it to the Ministry of Industry. As a member of these networks, we are promoting CO_2 reductions across the steel industry and the transition to green steel.

Please tell us about SSI's long-term strategy toward net zero.

We have adopted the green supply chain as our key concept, aiming to green our operations consistently—from suppliers, to our production processes, and all the way to our customers. Our mission has two main pillars: first, safe and stable production; second, environmental consideration. In addition, for energy saving and efficiency improvements, we have established numerical targets in three stages: short-, mid-, and long-term. We see these

as achievable levels through technology deployment and operational improvements. To realize this vision, our long-term plan is built on a two-pronged approach: first, energy saving and efficiency improvements in operations; and second, a shift from fossil fuels to clean energy. SSI Group also has an energy business group, and by receiving supplies of clean electricity and fuels from it, we aim to progressively replace fossil-fuel-derived electricity and fuels and achieve net zero by 2050.

A steel industry where fuel switching is difficult

Please tell us about specific measures to reduce GHG emissions.

Over nearly 30 years since we began operations, we have made various investments. Many of our GHG reduction measures to date have focused on improving production efficiency. As efficiency improves, fuel and electricity consumption decreases, which also leads to carbon reduction. Specifically, we have invested in improving insulation materials in reheating furnaces to reduce heat loss. We have also installed waste heat recovery equipment and reuse the recovered heat to preheat combustion air, thereby improving combustion efficiency. In addition, we have introduced variable speed drives (VSDs) for large pumps and fans. Normally, such equipment tends to consume a constant amount of electricity regardless of load, but by controlling motors with VSDs, we can significantly reduce energy use. We have many large motors—such as those for descaling equipment, water treatment facilities, and conveyors—and we are promoting energy saving by applying VSDs broadly to them. For renewable energy, not only SSI but also group companies have investment plans. The plan is to introduce rooftop solar, floating solar, solar farms, and other options in phases, and some group companies have already implemented them. For SSI as well, we are considering a concept to utilize several hundred rai[1] of land around Bang Saphan in the south, primarily for self-consumption power, with a target of at least around 20 MW of solar power generation. We are also working on upcycling waste and offcuts and switching to recyclable packaging materials.

What do you find particularly difficult in advancing decarbonization in the steel industry?

The steel industry is a heavy industry that uses large quantities of diverse energy sources, including fuel oil, LPG, and electricity, and it is not easy to switch these entirely to clean energy. In particular, because we are far from the gas pipeline network, we cannot receive natural gas via pipeline, which is a major constraint in advancing fuel switching. In the past, we discussed with the petroleum major PTT the idea of bringing in LNG by truck transport to replace a portion of fuel oil, but based on cost estimates, it is not economically viable at this point and we have not proceeded with the project. Meanwhile, the group's energy business company is considering producing biomass, biogas, RDF (refuse-derived fuel), and other fuels itself and using them as substitute fuels for fuel oil. The idea is to gasify waste and convert it into syngas or fuels, then use them as a substitute for fuel oil. In addition, because the southern region has many operators with potential for biomass and biogas—such as palm oil mills—we are also considering collecting and using biogas from such operators. In this way, fuel switching is a comprehensive challenge that involves not only technology, but also infrastructure, local conditions, and costs, and we recognize it as a theme for which it is difficult for a single company alone to find a solution.

Visualizing fleet operations to improve safety and efficiency

1 A unit of land area in Thailand. 1 rai equals 1,600 square meters.

Regarding your demonstration experiment for truck operations, what are the objectives and what are you doing?

Our plant site is large and many heavy trucks travel back and forth within the premises, but we faced the issue that we could not sufficiently grasp empty runs and idling time. Therefore, we introduced the solution of "eMotion Fleet," an EV fleet management service originating in Japan, to visualize trucks' locations, travel routes, and driving behavior—such as sudden acceleration and hard braking—in real time. Through this, we aim to simultaneously reduce diesel fuel consumption and strengthen safe driving management.

An "invisible wall" between those with challenges and those with solutions

What technologies or roles do you expect from Japanese companies, startups, and advanced research institutions?

We have many challenges, but the biggest issue is that "we cannot see who has what kind of solution." We do not have sufficient information about what Japanese startups are like and what technologies they possess, or which research institutions are working on which themes. I think there is an "invisible wall" between those who have challenges and those who have solutions. In addition to the steel business, we also have an energy business and a technology engineering business, and in the technology engineering division we are also planning to launch a startup business. By leveraging synergies among these businesses, we believe we can build cooperative relationships with Japanese startups in diverse ways. As for specific technologies, first, we are seeking energy-saving technologies—especially technologies that can reduce fuel oil consumption used in reheating furnaces. In the past, we considered a regenerative burner system from a Japanese company, but did not proceed due to constraints such as furnace size. We hope for new technologies that can overcome such constraints while reducing fuel use. Second, we are looking for hydrogen-related technologies. At a group company's cold rolling plant, hydrogen is a major cost factor; currently hydrogen is produced by steam reforming of LPG, but the high cost is an issue. We are seeking technologies that can produce clean hydrogen at low cost, such as green hydrogen using clean energy like solar power, and hydrogen production via electrolysis. Third, because it is difficult to replace fuels 100% with clean energy, we believe alternative technologies such as CCS (CO_2 capture and storage) and CCUS (CO_2 capture, utilization and storage) are indispensable. We are highly interested in CO_2 adsorption technologies using materials such as metal–organic frameworks (MOFs), which are being

developed by startups and tech providers in Japan and other countries. This is because there is potential to retain CO_2 over the long term by adsorbing and immobilizing it within materials rather than injecting it underground. We are also paying attention to carbonate mineralization technologies using calcium-based materials. We are also referring to initiatives in Japan that absorb CO_2 and convert it into carbonates and use the products as building materials such as cement and concrete. We would like to consider how such new technologies could be utilized within our manufacturing processes going forward.

Sahaviriya Steel Industries Public Co., Ltd.
https://www.ssi-steel.com

VOICE

From feedstock to decarbonization innovation

SCG Chemicals

Chief Operations and Innovation Officer

Suracha Udomsak

SCG Chemicals, a leading Thai chemicals company, is pursuing multifaceted and practical innovation—ranging from plastics recycling and converting CO_2 into feedstock, to leveraging bio-based raw materials and using AI to improve production efficiency. As polymer demand expands across Southeast Asia, the company is advancing the development of "green polymers" designed with strong environmental performance and promoting the recycling of post-consumer plastics. At the same time, in areas that are difficult to recycle—such as food packaging—it is also focusing on reducing the carbon footprint of manufacturing processes. By incorporating external collaboration, including participation in a CCU (carbon capture and utilization) demonstration supported by the European Commission and the construction of a demonstration plant with Japanese companies, the company aims to strengthen both decarbonization and competitiveness. We spoke with Dr. Suracha Udomsak, Chief Operations and Innovation Officer, about these initiatives and his expectations for co-creation.

Developing high-environmental-performance "Green Polymers" focusing on a broad range of decarbonization technologies

Please tell us about SCG Chemicals' initiatives toward decarbonization.

We produce polymers across Southeast Asia, primarily in Thailand and Vietnam. Polymers (resins) are essential materials in many aspects of everyday life, and in Southeast Asia, demand for containers and packaging materials is rising as living standards improve. In this market environment, we have been developing "green polymers" designed with high environmental performance. Specifically, we have technologies to recycle used plastics into high-quality PCR[1] HDPE[2] and PCR PP[3]. Through mechanical recycling (recycling via physical processing), sorted and reprocessed plastics can be converted into household goods, packaging materials, and other products. Collecting and recycling waste plastics and circulating them reduces the need for new raw material inputs, directly contributing to a lower carbon footprint. In addition, we have also established technologies to manufacture resins by regenerating a portion of these plastics into naphtha[4]-alternative raw materials and use them in resin production. Through these efforts, we have successfully reduced the amount of raw materials required for product development by 30% to 100%, and have been promoting sustainable product development.

How do you advance decarbonization for applications that are difficult to recycle?

Not all polymers can be recycled back to their original applications using this same method. For example, in food-packaging applications, it can be difficult to recycle

1 Post-Consumer Resin
2 High-density polyethylene
3 Polypropylene

4 A petroleum product. A basic petrochemical product such as ethylene and propylene, and ultimately a feedstock for plastics.

plastics back into polymers for the same use. In such cases, reducing the carbon footprint of the manufacturing process itself becomes important. For this reason, we focus not only on recycling but also on a broad range of decarbonization-related technologies, selecting the optimal approach according to the characteristics of each application.

Demonstrating CCU and bio-based feedstocks through overseas collaboration deepening co-creation with Japanese companies

How do you collaborate with overseas companies and startups?

As the first Thai company to receive support from the European Commission, we participate in a CCU (carbon capture and utilization) project led by SINTEF, Norway's industrial research institute. Through the CO_2 fermentation technology, we are undertaking a demonstration to produce 1,000 tons of acetone per year—used as a solvent in industrial applications—and to apply it to downstream chemical products such as propylene. We believe the significance of this effort lies not only in demonstrating a technology's potential, but also in verifying it in a way that can connect to real business. We have also advanced in polymers production using bio-based feedstocks. In 2024, we established a joint venture with Braskem, a leading Brazilian bioplastics company, and plan to complete Asia's first plant by 2028 to produce 200,000 tons of bio-ethylene per year from ethanol derived from agriculture feedstock. We expect it to serve as a sustainable feedstock alternative to fossil-fuel-derived ethylene, and we position it as an initiative to broaden our options for the future.

With what themes are you advancing collaboration and partnerships with Japanese companies?

In collaboration with Japanese companies, and with support from the New Energy and Industrial Technology Development Organization (NEDO), we are partnering with IHI, a major chemical plant engineering company, to build a CCU technology demonstration plant within the Map Ta Phut Olefins (MOC) site in Rayong Province in eastern Thailand. The plant will convert CO_2 into light olefins as a feedstock. To coincide with the completion of the demonstration facility, we also held a ribbon-cutting ceremony with relevant stakeholders on May 22, 2025. We also place importance on learning, through collaboration with external partners, what is needed to move from demonstration to the next stage.

More than just funding Nurturing startups through VC and on-the-ground support

Please tell us how you identify startups and what form your collaborations typically take.

We have our own venture capital arm, and for the startups we work with, we emphasize on providing value beyond funding. For entrepreneurs to succeed, connections and collaboration with networks and suppliers are essential. We support use-case development and prototype manufacturing, and we have also established facilities to provide technical advice to help them overcome challenges. In addition, we aim to provide necessary support in concrete forms to encourage progress toward implementation. Being able to appropriately provide the required raw materials is also one of our strengths. We also share our know-how on scaling up for commercialization and mass production. In the chemical field, technological progress is rapid, and recently, technologies that activate chemical reactions through new methods—such as plasma and electrification—have become important. Taking these new trends into account, we would like to broaden the scope of collaboration while examining demonstrations

and applicability. We are competing not only within Thailand but also against global companies. Innovation is indispensable in this competition, and we believe that for startups as well, we can become an industrial partner necessary for their growth. It is important to build a relationship in which we can complement each other's strengths.

From recycling to energy saving and AI A partnership strategy to expand implementation

What areas do you hope to partner in going forward?

In areas that contribute to decarbonization—such as the new recycling technologies and bio-related technologies mentioned earlier—we will continue to promote collaboration with other companies, including startups. In addition, we also have high expectations for introducing renewable energy and for energy-saving technologies. In large-scale plant businesses such as petrochemicals, electricity costs have a major impact and there is significant room for efficiency improvement. From this perspective, we are taking a broad view of technologies that can lead to implementation. A concrete example of CO_2 reduction through energy saving is AI-based facility management and predictive maintenance solutions. Through DRS (Digital Reliability Solutions) provided by our subsidiary REPCO NEX, AI can simultaneously improve power plant operational efficiency and reduce CO_2. We provide this solution to other companies as well. We have signed a memorandum of understanding with B.Grimm Power, which operates floating solar power generation projects in Thailand, to improve operational efficiency for a 19.5-megawatt-class power generation project at Amata City Chonburi Industrial Estate. Safe and efficient operations using AI will become increasingly important going forward for the digital transformation of manufacturing, based on production management and forecasting. In addition, we have developed CHILLOX, an energy-efficient solution designed for cold-chain transportation, refrigerated storage, and data centers. It is designed to maintain stable control across a wide temperature range from −40°C to +40°C, and to keep IT equipment at optimal temperatures even during emergencies such as power outages. With an emphasis on practicality tailored to each application, we are rolling it out while envisioning specific use cases.

Connecting Japanese technology with Thai on-the-ground operations turning co-creation into implementation

Do you have any expectations or messages for Japanese companies and startups?

Japan has many small and medium-sized companies with unique technologies, and I feel it also offers an

environment where interesting ideas are likely to emerge, supported by active R&D investment. Thailand has a diverse industrial ecosystem and offers fertile ground for creating use cases in areas such as food, bio, and the chemical industry. If an appropriate theme is identified and connections with industry are made effectively, finding a partner in itself is not particularly difficult. What matters is clarifying the point of focus and linking it to on-the-ground challenges. What matters is noticing where large Thai companies—including us—are facing challenges. Large companies are seeking new ideas from outside in order to break away from traditional corporate structures and cultures. In areas that readily lead to implementation, such as decarbonization and AI, we believe there is significant room for co-creation.

SCG Chemicals Public Co., Ltd.
https://www.scgchemicals.com

VOICE

Actively leveraging innovation from overseas

Siam Cement Group (SCG)

Innovation Management Director

Monticha Khammuang

Siam Cement Group (SCG), a major chemicals company in Thailand, is one of ASEAN's largest conglomerates, engaged in manufacturing and sales of cement and building materials, chemical products, and packaging materials. The Group comprises 200 affiliated companies and employs 50,000 people. In 2024, it recorded sales of approximately 511.2 billion baht (approximately 2.5049 trillion yen; 1 baht = approximately 4.9 yen), with earnings of 6.3 billion baht. SCG has set a goal of achieving net-zero greenhouse gas (GHG) emissions by 2050 and is advancing its sustainability initiatives. We spoke with Ms. Monticha Khammuang, Innovation Management Director (Innovation and Technology), about the company's decarbonization efforts.

Achieving net zero across the group by 2050 through a combination of measures

Could you give an overview of SCG's cement business and your overarching strategy for decarbonization?

The cement business is at the core of SCG's greenhouse gas (GHG) emissions, and decarbonizing it is a cornerstone of the Group's overall sustainability strategy. We place GHG reduction, supply-chain resilience, and environmental protection at the center of our business strategy, and we are proactively developing and expanding the adoption of low-carbon cement. As of 2024, roughly 80% of our cement sales value already comes from low-carbon cement, and we aim to raise that share further. At COP26, the Thai government set out targets of achieving carbon neutrality by 2050 and net zero by 2065. SCG is likewise committed to achieving net zero across the Group by 2050, and within the cement business we are advancing our efforts along three pillars in particular. First is the use of green products. We are expanding the use of supplementary cementitious materials and reducing the clinker[1] content in our products, thereby cutting limestone consumption and CO_2 emissions at the production stage. By doing so, we aim to steadily lower the emissions intensity of cement while maintaining structural performance and quality. Second is the promotion of green processes. To reduce fossil-fuel use, we are increasing the use of alternative fuels and renewable energy, while also combining process optimization with the deployment of state-of-the-art technologies. At our plant in Saraburi Province in central Thailand, we have installed a waste-heat recovery system to make effective use of generated waste heat, such as for electricity. Third is our work on CCUS (carbon capture, utilization and storage). We aim to cut total CO_2 emissions by 50% by 2050, continuing research investments related to CCUS, and we are also considering the use of nature-based climate solutions (NCS)[2] for residual emissions. By combining these multiple approaches, we are building a pathway toward achieving net zero over the long term.

1 An intermediate product obtained by calcining cement raw materials (limestone, etc.) at high temperature; cement is produced by grinding it and adding gypsum.

2 A collective term for climate measures that use natural ecosystems—such as forest conservation and reforestation, and conservation/restoration of soils and wetlands—to increase CO_2 absorption and storage and/or reduce emissions.

Open innovation through collaboration with overseas startups

How do you position collaboration with startups and open innovation in your decarbonization efforts?

At SCG, we actively collaborate with startups and external partners to address challenges that we cannot fully solve on our own. In addition to initiatives to identify promising startups within the Group, we also participate in programs such as Zest Thailand, operated in Thailand by JETRO, and Innovandi, hosted by an industry association in the cement sector, and we pursue technology scouting in collaboration with a wide range of organizations. Within Thailand, while receiving support from the National Science and Technology Development Agency (NSTDA) and the National Innovation Agency (NIA), we also work with institutions such as Chulalongkorn University on R&D for advanced cement manufacturing technologies. Investment through corporate venture capital (CVC) is another important tool. Through a deep-tech fund launched in 2018, we have invested more than USD 100 million in total in 15 startups and six venture capital firms to date. AddVentures, our CVC focused on digital technologies, also plays a role in identifying advanced technologies. Because AddVentures is not tied to any specific business unit and is positioned directly under SCG's CEO, it can make decisions with independent discretion and speed.

This structure also makes it easier to align with startup business practices and to form flexible collaboration schemes. In the cement industry, many technology startups originate in Europe and North America. About 70% of the open innovation that our cement business adopts from outside is sourced overseas, and domestically originated technologies in Thailand remain limited. Especially in deep tech, it is not uncommon for commercialization to take five to six years, and the ecosystem to support that period is not yet sufficient. As a result, it is difficult for local startups to scale up, and it remains challenging to complete technology adoption solely within Thailand.

Could you share a specific example of collaboration that has already entered the practical implementation phase?

One representative case is our collaboration with Rondo Energy, a U.S. startup. The company's technology stores heat in refractory bricks and then extracts it as high-temperature thermal energy of up to around 1,500°C, enabling electrification of energy supply within factories. Cement manufacturing requires high-temperature processes, and decarbonizing them is a common global challenge; through this technology, we aim for heat supply that does not rely on fossil fuels. In this initiative, we are targeting annual energy production of approximately 90 gigawatt-hours by 2025. The expected CO_2 reductions are estimated at roughly 12 million tons per year, comparable to the emissions from more than four million internal combustion engine vehicles such as gasoline and diesel cars.

Longstanding collaboration with Japanese companies and new opportunities

What kinds of collaboration have you pursued with Japanese companies so far?

Collaboration with Japanese companies is extremely important for SCG. For example, in 2009 we established a joint venture with Sekisui Chemical and have been developing model-house construction in Thailand using our cement. I have been involved in this project since then, and I was deeply impressed by Sekisui House's construction technology, which can complete a detached house in just one to two days. In our building materials business, we also run a joint venture with Noritake, which

works with building materials and industrial materials, to manufacture and sell molded plaster made from gypsum. This material is used for interior materials and medical casts, and it is a field with strong affinity with our cement and building materials business. In addition, for the cement industry we have launched a joint venture focused on improving structural durability in collaboration with Sho-Bond Holdings and the Mitsui Group. Enhancing structural durability is an important theme for us, and we highly value the knowledge and technologies of Japanese companies in this area.

Seeking collaboration with Japanese companies on CCUS and new materials; interest in seismic technologies

Which areas do you particularly hope to collaborate on with Japanese partner companies going forward?

Japanese products and technologies are generally highly reliable, and the safety verification process is handled with great care. That can mean it takes time to implement solutions, but once completed, they are highly regarded by the market for their trustworthiness and safety. Compared with other countries, Thai and Japanese work cultures also share many similarities, and we feel Japanese partners are easy to collaborate with in terms of communication and ways of working. For the cement business in particular, we would like to collaborate with Japanese companies in areas such as CCUS-related technologies; new materials that can substitute for clinker and conventional cement; cement- and construction-related technologies; and new businesses that contribute to reducing carbon emissions. In addition, in response to an earthquake that occurred in central Myanmar in March 2025 and also affected Thailand, we have a strong interest in Japanese seismic technologies. Thai government agencies are seeking support on the 'soft' side, such as early warning systems and evacuation know-how, and in the private sector as well, demand is rising for solutions that reduce economic losses from earthquakes through disaster prevention and mitigation technologies. Our cement business views earthquake preparedness not as a one-off issue, but as a mid- to long-term challenge and, at the same time, a field of new business opportunity. We therefore hope to collaborate with Japanese companies on seismic technologies, warning systems, evacuation know-how, and technologies that contribute to disaster prevention and mitigation.

In Europe and the U.S., there are also some skeptical currents toward promoting sustainability. How does SCG think about its long-term direction toward sustainability?

In Thailand, both the government and industry have a clear commitment to long-term net-zero targets, and we do not expect the roadmap to be rolled back significantly. At the same time, net-zero initiatives must be balanced with corporate performance, and coordination with short-term management decisions is always required. We have also continued discussions on sustainability progress with U.S. companies. While there is concern that the pace could temporarily slow due to factors such as changes in administrations, environmental issues relate to the foundations of life for the next generation and cannot be ignored. Our shared understanding across companies is that the overall momentum toward sustainability will not come to a halt. Within SCG's cement business as well, our stance remains unchanged: we position net zero as a mid- to long-term management goal, and we will continue working to achieve both business growth and reduced environmental impact by combining technology investment, business model transformation, and collaboration with external partners. Going forward, we also want to deepen collaboration further with global partners, including Japan, while actively leveraging innovation from overseas.

The Siam Cement Public Co., Ltd.
https://www.scg.com

VOICE

Turning flue gas into a resource: decarbonization unlocked by microalgae

Left: Masafusa Oe
Right: Yuthana Charoenwong

BLCP Power

Managing Director

Yuthana Charoenwong

×

Algal Bio

COO

Masafusa Oe

In March 2025, Algal Bio, a R&D-driven venture pioneering the algae foundry™ (Head Office: Kashiwa City, Chiba Prefecture), and BLCP Power, an independent power producer (IPP) in Thailand (hereinafter, BLCP), agreed to launch a joint research project aimed at demonstrating a carbon dioxide (CO_2) fixation technology using microalgae and the commercial utilization of algal biomass. We spoke with Mr. Yuthana Charoenwong, Managing Director of BLCP, and Mr. Masafusa Oe, Chief Operating Officer (COO) of Algal Bio, about the background to the collaboration and the potential for future Japan–Thailand corporate partnerships.

An algae biotech venture launches joint research with a coal-fired power plant in Thailand

Please tell us about your respective businesses and how this joint research is positioned.

Oe: Algal Bio is an algae biotech venture founded in 2018 on the basis of more than 20 years of research results at the University of Tokyo. Leveraging a library of roughly 100 algae strains and cultivation technologies, we provide solutions across a wide range of fields—from health and beauty to CO_2 fixation. This joint research was agreed with the aim of demonstrating the business feasibility of a CO_2 fixation technology using microalgae and the commercial utilization of algal biomass.

Yuthana: BLCP is a joint venture between Banpu, a Thai energy group, and EGCO, which invests in power generation and related businesses as an independent power producer. We operate a coal-fired power plant (1,434 MW) in Rayong Province. We are currently working to advance sustainability and reduce CO_2, and in that context we view carbon recycling using algae as an important option.

How did the two companies come to collaborate?

Yuthana: We met Algal Bio through a matching event hosted by JETRO. Even before that, we had continued networking by participating in various events, but we had not encountered a Japanese company that matched what we were seeking. Algal Bio has technology related to CCU (CO_2 capture and utilization), which drew our strong interest. After repeated discussions both in person and online, we agreed to collaborate, and in 2025 we started an on-site demonstration (FS), meaning within our facility, through joint efforts. If the demonstration is successful, we would like to expand the initiative by involving local communities around Rayong Province and, in the future, to scale it across Thailand. As a result, it should also contribute to revitalizing the Thai economy.

Oe: By strategically leveraging JETRO's business matching support, the fact that we were able to connect with BLCP, our ideal partner, represented a major step forward in accelerating our business.

Advancing carbon recycling even amid shifts in the external environment

Are there any challenges in moving the project forward?

Oe: While we closely monitor decarbonization policy trends across various countries, our technology offers multifaceted value—beyond mere decarbonization, it addresses regional and social challenges. We have firm, unwavering confidence in the mid- to long-term needs and are advancing with resolute determination.

Yuthana: Through ongoing dialogue with our shareholders, support for initiatives toward carbon neutrality has been maintained. Even if the pace of our efforts slows temporarily, our commitment to advancing ammonia power generation and carbon recycling using algae remains unchanged. At the same time, because Thailand's decarbonization trajectory is influenced by many factors—including geopolitical changes, movements in neighboring countries, and economic prospects—there are still aspects of how it will evolve that are not yet clear.

Continuity requires creating a market

What is necessary for the two companies to sustain the collaboration?

Yuthana: To keep the collaboration going with strong momentum, we need to create a market. While we are conducting the demonstration with future scale-up in mind, the first step we should take is to enter the healthcare market. In Thailand, entering the healthcare field requires certification from the Food and Drug Administration (FDA). Although markets such as agriculture, healthcare, and wellness are not as mature as in Japan, interest in health has risen since the COVID-19 pandemic, and the supplement market is also drawing attention. Interest is growing in preventive medicine—preventing illness before it occurs rather than treating it after onset—and the market is expanding.

Oe: It is essential that we take the lead in establishing a commercialization model and demonstrating concrete social impact. Through this project, we will accumulate tangible results and build the standard for algae biotech in the Thai market.

What do Japanese startups need in order to find partners in Thailand?

Oe: For startups like ours offering cutting-edge new technologies, partnering companies naturally exercise considerable caution. Corporate credibility is of paramount importance, which is why we believe support from the Japanese government is essential. For instance, when Japanese startups expand overseas, government selection achievements serve as powerful proof that our technologies are officially validated—providing partners with strong reassurance. Armed with this "proof of technology," we have established a solid collaborative relationship with

BLCP.

Wastewater Treatment and Environmental Solutions Expected to See Demand in Agricultural Thailand

What sustainability-related themes or technologies are likely to see further Japan–Thailand collaboration going forward?

Yuthana: In Thailand, we believe the clean energy market will grow even if there are changes in government or policy. One reason is the movement to expand the installation of data centers, which require clean energy. Thailand aims to raise the share of renewable energy in total generation capacity to 50% by 2037. However, as renewable integration increases, there may be blackout risks depending on season and time of day, so measures are also needed to ensure a stable power supply. Clean energy includes the use of hydrogen and ammonia, and together with JERA we are also conducting a demonstration of ammonia co-firing at a coal-fired power plant. In addition, Thailand is considering biomass and, from the late 2030s onward, the use of small modular reactors (SMRs).

Oe: For our business, it is crucial to consider how we can support Thailand's local communities and society. In particular, we see strong potential demand for wastewater treatment solutions in this agricultural powerhouse. Interest is also growing in applications such as odor control, water purification, and chemical removal.

Forms of support that can accelerate collaboration

What kind of support is needed to promote Japan–Thailand corporate collaboration?

Yuthana: To advance new energy businesses, government backing—in other words, subsidies—is necessary. Commercializing hydrogen and ammonia is costly, and it would be beneficial to have a framework in which the Thai and Japanese governments both contribute subsidies, especially in the initial phase of projects. It is also important for multiple public institutions to establish frameworks in parallel. Implementing collaborative projects between Japan and Thailand will, at least for Thailand, provide an opportunity to learn Japanese technologies. In addition, the Thai government is seeking to introduce a regulatory sandbox[1] for energy-related regulations to support the adoption of clean electricity, with the idea of proceeding through trials even in small areas first.

Oe: While many public support programs for startups focus on decarbonization and new energy, broadening eligibility to include other social challenges would enable a more comprehensive approach to societal issues. One possible way of organizing this is to include not only technologies that stop the progression of global warming,

but also technologies that respond to phenomena caused by warming. We believe that frameworks simultaneously targeting decarbonization alongside other local social challenges — such as farmland soil improvement and wastewater utilization, which cannot be fully solved by decarbonization alone—would be highly effective.

1 A system/framework that allows regulatory exemptions on a limited basis in terms of scope and duration for the demonstration of new technologies and services.

BLCP Power Ltd.
https://www.blcp.co.th

Algal Bio Co., Ltd.
https://algalbio.co.jp

VOICE

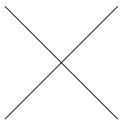
Decarbonization solutions enabled by a Thai conglomerate and Japan-origin technology

Left: John Jiang
Right: Rudder Wu

Charoen Pokphand Group (CP Group)

Group CTO, Inaugural CDO

John Jiang



Thermalytica

CTO

Rudder Wu

CP Group, a Thai conglomerate, has set targets of achieving carbon neutrality by 2030 and net zero by 2050, and the challenge of balancing energy efficiency and profitability at livestock and retail sites is increasingly becoming a factor that determines the Group's overall competitiveness. Meanwhile, Thermalytica, a startup spun out of the National Institute for Materials Science (NIMS), aims to reduce energy consumption by 20% in Southeast Asia's hot climate by leveraging its ultra-high thermal insulation material TIISA®. The two parties have launched a pilot project (PoC) at a poultry farm in Thailand and begun verifying temperature reduction and productivity improvements through insulation coating applied to roofs and walls. How will they realize both sustainability and profits? We spoke with the heads of the technology divisions at both organizations.

How should economic viability and carbon-reduction effects be evaluated?

Please tell us about CP Group's sustainability targets and how this PoC fits within them.

Mr. Jiang (hereafter JJ): CP Group has set targets to achieve carbon neutrality in its own operations by 2030 and net zero emissions—including Scope 1 to 3—by 2050. We have obtained validation by SBTi (Science Based Targets initiative), including for the Forest, Land and Agriculture (FLAG) sector, and we have set detailed targets by business—for example, in energy and industry, reducing Scope 1 and 2 by 42% and Scope 3 by 25% by 2030. To achieve these targets, we established an energy company within the Group and are deploying solar power, biogas, and biomass power generation. At many business sites, we already cover 20–30% of our energy demand with in-house renewable energy. However, the Group's total energy costs continue to rise and are now on the order of USD 1.5 billion per year. The pilot project with Thermalytica is one important initiative supporting our sustainability strategy. While the technical effectiveness is clear, the key question is how to rigorously evaluate both economic viability and carbon-reduction impact. That is why we have started with smaller-scale cases and are at the stage of confirming effects using quantitative data.

In this PoC, CPF's livestock business is the target. Please tell us the background for starting with poultry houses.

JJ: CPF (Charoen Pokphand Foods)'s livestock business is a core business of CP Group, and temperature control directly affects chickens' health and productivity. Current poultry houses are covered with metal roofs, and around 20,000 chickens are raised per house. Chickens are extremely sensitive to temperature, and even a 1°C difference can have a significant impact on feed intake, growth, and mortality rate. Thailand does have cooler periods, but during the hot season there are limits to how much ventilation alone can control temperature, and our challenge was how to suppress peak temperature rises. That led us to focus on Thermalytica's coating, which can reduce heat intrusion through roofs and walls. Metal roofs can absorb sunlight and reach surface temperatures of 50–60°C, which can push indoor temperatures above 35°C. In the PoC, after coating, the roof surface temperature decreased on average from 51°C to around 38°C, and the air temperature inside the poultry house also fell by about 5°C. Lower temperatures create a more comfortable environment for the chickens and may lead to lower mortality rates as well as improved growth and FCR (feed conversion ratio). We expect this to significantly reduce the load on ventilation equipment and contribute both to energy savings and to reducing the carbon footprint.

Collaboration itself with CPF, a company representing Thailand, is a major value for a startup

Why did Thermalytica choose CPF as its PoC partner in Thailand?

Mr. Wu (hereafter Wu): In Japan, we have conducted numerous PoCs and evaluations for our coatings for building materials. For general building-material applications, we have already sufficiently confirmed performance effectiveness. On the other hand, applying the technology to poultry farms was an area we could not enter on our own. Issues such as chickens' survival rate, the problem of a 6% mortality rate due to the impacts of global warming, and the worsening of FCR as chickens lose appetite in the heat require specialized knowledge from livestock professionals. For such a challenging effort, being able to collaborate with CPF, a major global player, is extremely important for us as a startup.

What technical and business challenges did you face in advancing the pilot at poultry farms?

Wu: Poultry farms are extremely large-scale, and using air-conditioning is not realistic. Therefore, we needed to apply thermal insulation coatings to roofs and walls to manage temperatures at low cost. However, the target area is large, and both the roof (metal sheets) and walls (concrete) are materials that readily absorb heat. Coating only the roof is insufficient; because it is necessary to coat the entire roof and walls, the large upfront investment was a challenge. For CPF, this is capital expenditure, so our theme was how to achieve results while keeping costs down. For that reason, in this PoC we are testing different approaches in two poultry houses: one uses an existing high-performance coating that prioritizes performance, and the other uses a newly developed coating for CPF that prioritizes a balance between performance and cost. By comparing the two, we are seeking the optimal cost performance.

Thermalytica's view of the advantages of its own technology and its pricing strategy

In a market where many competing insulation coatings and insulation materials exist, how do you view your company's strengths and advantages?

Wu: For more than a year before entering the PoC, we collaborated with CPF through sample provision and evaluation. During that process, CPF also conducted comparative evaluations that included other companies' insulation coatings and insulation materials. Within that, CPF's evaluation showed that our insulation material, TIISA®, ranked highest in terms of performance. TIISA® is an ultra-high thermal insulation material developed based on my own 19 years of research results; it is characterized by high thermal insulation and fire resistance while also being cost-competitive. When used as a building material, it can significantly reduce heat intrusion from roofs and external walls; when used for factory equipment, it is expected to reduce energy consumption across the manufacturing industry by 20%. At the same time, we recognize that further cost reduction is indispensable in order to roll out at scale in the future. How to balance performance and price is a major theme going forward.

How do you design pricing and payback?

Wu: Our pricing is not arbitrary. We work with customers to design pricing based on detailed payback simulations. In this PoC, we will quantitatively evaluate with CPF how much the chickens' mortality rate and FCR improved, and based on the results, we use as one benchmark ensuring an ROI (return on investment) level that allows the initial investment to be recovered within a reasonable period.

What is CP's benchmark for payback period?

JJ: At CP Group, if the payback period is around 10 months, we decide to adopt without much hesitation—so to speak, it is a "no-brainer" case. If it is around two years, we make an adoption decision while considering priorities. Even for technologies like Thermalytica's, if the ROI is designed to be within two years, we consider it well worth examining.

From livestock to factories and data centers, Horizontal deployment across Southeast Asia as well

If the PoC evaluation is favorable, in which areas would CP like to proceed with commercialization first?

JJ: We believe it is easier to roll out in fields with clear use cases, like CPF. We would first build up successful cases there, and then expand to other applications, such as combining with solar panels. Within the Group, there are many factories such as CP Coop (agricultural products) and CP Packaging (packaging materials and packaging), and there are needs for insulation and heat shielding on

the roofs of their sites. Such companies tend to proactively adopt new technologies for improvement while receiving support from the Group, making them promising next deployment candidates. Beyond that, we also foresee deployment to data centers. The data center business is a field that will expand along with the growth of AI and cloud, and the demonstration results from the poultry houses provide easy-to-understand material for advancing such discussions. One of my roles is to introduce cutting-edge technologies from around the world to the Group and "connect the dots" between business units. We look at various technologies such as nuclear power, quantum technology, and cancer treatment, and I consider nanomaterial technology like Thermalytica's to be one promising option as well.

For Thermalytica, based on the results of this pilot, what kind of expansion do you envision going forward?

Wu: In Japan, multiple projects targeting cloud data centers are already underway. By applying our insulation technology to external walls, roofs, and areas around

heat exchangers, we can reduce the required cooling load and improve overall cooling efficiency. We have similar expectations in Thailand, but our priority is first to properly complete the PoC with CPF. After that, we would like to consider expansion across tropical regions like Thailand as a whole. Because our human resources are limited, we cannot establish a local factory from the outset; however, if we can validate together with customers that the business can be viable, I believe there are various options for building local production and logistics structures, such as joint ventures, equity investment, and debt financing.

Quantifying the profitability of sustainability through carbon accounting

● Please tell us CP Group's thinking on how you balance sustainability and profitability.

JJ: We place very strong emphasis on "profitable sustainability," because sustainability that does not come with profitability will not last. For example, we are switching electricity purchased from the grid to our own solar power generation as much as possible. By utilizing PPAs (power purchase agreements), there are cases where we can reduce electricity unit prices by about half. These are clearly projects that are "worth doing" for both sustainability and profitability. Similarly, power generation using biomass and biogas also enables us to achieve cost reduction and emission reduction at the same time by converting our own waste and by-products into energy. What is important here is carbon accounting. We model various emission-reduction options and quantitatively evaluate which combination is the most economically rational. Carbon credits are also considered as part of that. Even if direct profit margins are not high, adding the value of carbon credits can secure sufficient returns as a business in some cases. When considering new projects, we also evaluate the business case including how much carbon credit purchase costs would increase if we do not invest in the project. Toward net zero in 2050, we do not allow ourselves to rely heavily on carbon credits; the policy is to limit them to at most about 5% of the total. For the remainder, we must reduce emissions ourselves. In that sense, selecting projects that satisfy both sustainability and profit is our basic approach.

The most important growth field is the data center business that supports AI

● Many Japanese companies have expanded

into Thailand. What attitudes or conditions do you think are important for Japanese companies to advance their businesses better in Thailand?

JJ: We are also working on projects such as utilizing hydrogen for executive vehicles in collaboration with Toyota, and we are collaborating with consumer-goods manufacturers on introducing more sustainable detergents and cleaning agents. We have adopted many products from Japanese companies—such as air-conditioning equipment, escalators, and electrical equipment—and they have made major contributions through energy-saving controls and the like. Japanese products are widely recognized for their high quality, and that is a major strength. On the other hand, for startups like Thermalytica to scale, it is effective to "ride along" with the ecosystem of major Japanese companies. For example, proposing as a set with an air-conditioning equipment manufacturer, or collaborating with an automotive manufacturer to incorporate it as a coating solution for vehicle bodies. Chinese companies are very good at riding existing ecosystems and naturally entering somewhere in the value chain. At the center of CP Group's overall growth strategy is AI. As a foundation supporting AI, the data center business is one of the most important growth fields, and we are accelerating the development of data centers that can provide advanced cloud services and GPU resources. Along with this, we plan to expand our digital business and telecom business from conventional communications into businesses that support AI and digital transformation. In this domain, we believe there is ample room for collaboration in Japanese AI-related technologies, cloud, hardware, security, and more. The second growth field is robotics. We have already introduced many Japanese industrial robots, and going forward we are also considering humanoid deployment, exploring robot utilization in areas closer to people—retail, livestock, and households. We have high expectations for Japan's robotics technologies and FA know-how.

Solar roofs and ultra-high thermal insulation coatings A "two birds with one stone" combination

Finally, please give one comment each about the expansion of collaboration based on this PoC.

Wu: This PoC is Thermalytica's first full-fledged collaboration case in Thailand, and we see it as an important step toward expanding our partnership with CP Group. If, through verification with CPF, we can show with data how much the temperature in poultry houses falls and how much improvement there is in mortality rate and FCR (feed conversion ratio), then based on those outcomes we would like to develop joint projects in various fields—other businesses within CP Group and, starting from Thailand, livestock, retail, and data centers across Southeast Asia.

JJ: The business case for rooftop solar panels is very clear, and by using PPAs, customers can cut electricity costs by about half with almost no upfront investment. At that time, it is necessary to clean the roof before installing the panels, so ideally Thermalytica's coating would be applied at the same time. Lowering roof temperature improves the panels' power generation efficiency and also increases the profit margin on the PPA provider side. Making a joint proposal together with solar panels is, in my view, a "two birds with one stone" combination that enhances both energy efficiency and business viability. The sales cycle is certainly not short, but as a technology that achieves both sustainability and profitability, we believe adoption will steadily progress over the long term.

Charoen Pokphand Group
https://www.cpgroupglobal.com

Thermalytica Inc.
https://www.thermalytica.com

VOICE

Thailand as the front line for demonstration and global signaling

Left: Denchai Woradechjumroen
Right: Naohito Ohba

TIE Smart Solutions

Chief Executive Officer

Denchai Woradechjumroen

×

TAISEI (THAILAND)

Managing Director

Naohito Ohba

Taisei (Thailand) is a general contractor with a strong track record in Thailand, providing integrated services ranging from the design and construction of high-rise offices, commercial facilities, and factories to renovation and maintenance management, and has accumulated achievements in environmentally conscious buildings and energy-saving retrofits. Meanwhile, TIE Smart Solutions is a Thailand-based startup that uses an AIoT-enabled energy management platform to visualize and optimize a building's energy consumption, particularly HVAC electricity. The two companies have recently launched a joint project using an existing office building in central Bangkok as the stage, aiming to achieve both improved comfort in common areas and reduced energy consumption. We asked the leaders of both companies about the next stage of building energy efficiency and Japan–Thailand collaboration.

A collaborative project to cut electricity use in existing buildings by 15%

Please outline the joint project and its objectives.

Ohba: This collaboration is a project that targets the common areas of an existing building in Thailand, with the goal of reducing electricity consumption. While I will refrain from naming the specific building, we will install TIE Smart Solutions' (hereafter, TIE Smart) data analytics technology and platform in an already operating mid- to high-rise building, and continuously collect and analyze actual operational data. Because we at Taisei also handle not only architectural work but also equipment work such as HVAC and electrical systems, we will propose practical and rational retrofit options, including from a cost perspective, from both architectural and MEP viewpoints based on the analysis results derived by TIE Smart. Ultimately, the aim of this collaboration is to reduce electricity consumption by about 15% while maintaining comfort in the common areas.

How will the data collected through the project be used going forward?

Ohba: In this project, I believe what matters is not only improving a single building, but also how many

"data points" we can accumulate. Buildings vary widely in attributes and usage; the configurations of chillers and air-conditioning equipment, as well as occupant movement, differ from one building to another. To identify what kinds of operations are most efficient and what people feel comfortable with, we need a certain number of cases and data. As a benchmark, unless we collect data from around 10 to 20 buildings, we will not be able to see what the business will look like. Based on the insights gained, we would like to model approaches to common-area air-conditioning control and insulation retrofits and, as a joint solution of TIE Smart and Taisei (Thailand), eventually develop it as a business. At this stage, parts of the final business model are still uncertain, but I believe the first step is to accumulate a sufficient number of data points.

A "reverse-vector" challenge: returning reductions achieved in Thailand back to Japan

● Please explain the background for choosing this theme and how it relates to Taisei's Vision 2030.

Ohba: At Taisei Corporation headquarters, we have set a corporate goal called "TAISEI VISION 2030," which places three transformations—DX, SX, and GX—at its core. Within that goal, we have defined milestones for quantitatively reducing CO_2 emissions, but achieving the targets solely within Japan is not easy. That is why, while also keeping in mind the framework of bilateral credits being pursued by JETRO and NEDO[1], we are considering returning a portion of the reduction results achieved in Thailand to Japan. Whether the share returned will be 20%, one-third, half, or otherwise depends on the business scheme, but in any case, the prerequisite is "to deliver solid reduction results in Thailand." Then we connect them to bilateral credits. I believe we need a movement where we achieve results in Thailand and then, in a sense, import them back into Japan.

Working with Japanese companies builds trust

● For TIE Smart, what are the benefits and aims of this collaboration?

Denchai: We have been exploring ways to access the Japanese market, but we felt it is extremely difficult for a Thai startup to develop the Japanese market on its own. By collaborating with Taisei (Thailand), we can first work together on the market for Japanese-affiliated companies in ASEAN, particularly in Thailand and Vietnam, and we have also become able to gain trust from Japan-related investors and companies. As we conduct PoCs (proofs of concept) in some projects, we are already able to provide solutions with strong price competitiveness, and we can adequately serve Taisei (Thailand)'s customers as well. Taisei (Thailand) is responsible for ensuring the quality of construction and retrofits and for specification coordination, while TIE Smart specializes in the AI analytics and monitoring platform—this division of roles enables us to maximize the strengths of both sides. In conversations with investors, telling them that "we are working with Taisei for the Japanese market" has also led to more positive reactions. The Japanese market has felt very hard to access until now, but our collaboration with Taisei (Thailand) is opening the door. Looking ahead, with potential investment from Japanese investors also in mind, we have set listing on the Stock Exchange of Thailand (SET) within five years

1 New Energy and Industrial Technology Development Organization (NEDO), a Japanese national research and development agency.

as one of our goals.

Technology development with an eye on international standards and Japan's stringent requirements

When considering expansion into Japan, what technical standards do you assume as prerequisites?

Denchai: We are already advancing discussions with the business development function in Tokyo on the Japanese side. The first baseline is the ASHRAE standards[2], which are international energy-related standards. Japan also basically follows these international standards, but because Japan has additional, unique building-related requirements, the demanded requirements are considerably higher than the international baseline. Through our discussions with the Japanese side, we have strongly felt the need to raise our organization and technical level to a standard where we can collaborate in the Japanese market. In addition, because our work will be compared with net-zero-carbon projects that Taisei (Thailand) is handling in Tokyo, a major challenge is to clarify where our project can differentiate.

Ohba: Even when we say "ASHRAE standards," Japan has four seasons, so we need to consider criteria not only for cooling but also for heating. After accumulating know-how in a country like Thailand, which effectively has only summer, on how to reduce cooling loads, we would bring that back to Japan and discuss "how to lower temperatures in Japan's summer" and "how to improve heating efficiency." I believe that first assembling data from 10 to 20 cases in Thailand and showing results—demonstrating, for example, "we can reduce cooling to this extent"—will be a prerequisite for expanding into Japan.

A design philosophy that reconciles comfort in common areas with energy efficiency

How do you plan to reconcile improved comfort in common areas with energy savings?

Ohba: In this project, the main targets are common areas where people come and go and spend time, such as shopping center corridors, hotel lobbies, and office building entrances. It is extremely important to keep these spaces comfortable during the period from when people enter from outside until they move on to their next activity. To do that, we must not simply overcool; we need to design

2 A collective term for the technical standards and guidelines developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) in the HVAC&R (heating, ventilation, air conditioning, and refrigeration) domain, focusing on energy efficiency, indoor air quality (IAQ), and sustainability; widely used as key indicators for building design, operation, and performance evaluation.

holistically by considering factors such as temperature, humidity, airflow, and PM2.5. If a building interior is kept under negative pressure, outside air infiltrates, which is not good for either energy savings or air quality. It is important to appropriately introduce outside air, keep the building slightly under positive pressure, suppress PM2.5 with filters, and balance air conditioning with ventilation. There is no point in reducing energy alone if it sacrifices human comfort. Our approach is to bring in fresh air while lowering PM2.5, maintain an environment that is neither too cold nor too hot, and then use TIE Smart's analysis to optimize operating patterns and implement on-off control.

Using Thailand as a "hub for demonstration and signaling," with expansion across ASEAN

When pursuing new business overseas, what significance does Thailand's location have?

Ohba: I feel Thailand is a very proactive country in its efforts in the environment and energy fields—comparable to Singapore, or perhaps even more so. It is not only private companies; there is also a sense that the entire country, including government agencies and universities, is moving in the same direction. Universities in particular have strong outward reach, with networks across the world, including Europe, North America, Northern Europe, Africa, ASEAN, Japan, and China. Professors and researchers actively bring in new technologies and information from overseas and think about how to apply them in Thailand. For our part, we have a concept of using Thailand as a base to combine Japanese and Thai technologies to create new solutions related to environmental value and then roll them out across ASEAN. By positioning Thailand as a "hub for demonstration and signaling," we also expect opportunities for Taisei Corporation as a whole in new construction and renovation work to expand.

Please tell us about current startup trends in Thailand and what you expect going forward.

Denchai: Thailand's startups are clearly shifting toward deep tech. More startups are emerging that are based on university research or technologies cultivated overseas, like TIE Smart. Key themes include ESG[3], climate tech, climate-change responses, circular economy, energy saving, decarbonization, and related areas. Funds targeting these fields are also increasing, expanding opportunities to access capital. At the same time, many funds that look across Southeast Asia set "revenue in three or more countries" as an investment condition, so if you focus only on Thailand's market, it can be difficult to become an investment target.

3 An acronym for Environment, Social, and Governance; a concept that indicates consideration for non-financial factors essential to enhancing a company's long-term value.

In that sense, partnering with Japan, Japanese-affiliated companies, and Japanese financial institutions to connect Thailand-born deep tech to broader markets has significant value. As TIE Smart, we want to use the experience gained through this collaboration to give back to the next generation and help show a pathway for researchers and startups to take on global challenges.

Partnering with Japanese companies changes the relationship between startups and investors

As a Thai startup, how do you view the meaning of working with Japanese companies?

Denchai: To be frank, Thailand's large corporations do not necessarily provide sufficient support to Thai startups. We have spoken with more than 10 listed companies' CVCs, and in many cases, terms unfavorable to the startup side tended to be proposed. In that context, PTTOR[4] and Taisei (Thailand) treat TIE Smart as an equal partner. Even in front of customers and investors, they clearly say, "This is TIE Smart's work, and we are supporting it." This level of respect is very different from previous relationships. By working with partners like these, we startups gain negotiating power, and it becomes less likely that we will be forced to accept one-sidedly unfavorable terms. As fundraising progresses, we also want to share these experiences with other researchers and entrepreneurs, and become a role model for startups that "do not know which direction to go."

4 PTT Oil and Retail Business Public Co., Ltd.

Learning from "speed" and "enjoyment"

Finally, please tell us what you learned through this collaboration and what stood out to you.

Ohba: What I feel strongly when working with TIE Smart is the speed of decision-making and action. In Japan, we might hold repeated meetings and consider things carefully, but TIE Smart reaches a conclusion in a single day and immediately starts moving. I think Japanese companies can also learn from this sense of speed. Another memorable aspect is the attitude of "enjoying the project." Even under demanding conditions, there is a sense of leeway to move forward while enjoying the work. As a result, good ideas emerge, and the team's drive increases. Japanese people can demonstrate tremendous power once a goal is set; the question is how to ignite that "spark." In that sense as well, I feel there is significant potential in working with startups like TIE Smart in Thailand, a challenging and open field.

TIE Smart Solutions Co., Ltd.
https://www.tie-smart.co.th

Taisei (Thailand) Co., Ltd.
https://taisei-thailand.co.th

JETRO EVENT REPORT

ZEST THAILAND : THAILAND-JAPAN FAST TRACK PITCH EVENT 2025

Japan–Thailand Challenge-Driven Co-Creation Pitch Event Linking Open Innovation to Projects

The Japan External Trade Organization (JETRO), the Ministry of Economy, Trade and Industry, the Embassy of Japan in Thailand, and Thai government agencies jointly hosted Zest Thailand: Thailand-Japan Fast Track Pitch 2025 on March 5, 2025, at the InterContinental Bangkok. Aiming to embrace open innovation under Japan–Thailand cooperation to shape concrete business opportunities, the event brought together around 280 participants, including 100 who joined online.

At the opening, Mr. MATSUO Takehiko, Vice Minister for International Affairs, Ministry of Economy, Trade and Industry of Japan, Mr. OTAKA Masato, Ambassador of Japan to Thailand, Mr. KURODA Junichiro, President, JETRO Bangkok, Mr. Narit Therdsteerasukdi, Secretary General, Thailand Board of Investment, and and Dr. Sompop Pattanariyankool, Deputy Permanent Secretary of Energy, Ministry of Energy of Thailand delivered remarks, underscoring a shared commitment by the public and private sectors to strengthen the innovation creation foundation.

Ahead of this event, a launch event in November 2024 featured six major companies from Japan and Thailand as challenge owners, each presenting its business challenges. In response, approximately 120 solutions were submitted from around the world. 17 finalist companies carefully selected after the selection process presented their solutions, followed by a steady stream of Q&A grounded in the background and deployment requirements of each challenge.

Toward the end of the event, the Challenge Owner Awards (six winners) and an Audience Award (one winner, selected by participant voting) were announced. Rather than serving as a simple showcase of ideas, the program was designed to complete the cycle—from challenge definition to proposal and evaluation—in one setting, creating a clear pathway to collaboration with startups and other solution providers.

Among the winning proposals, decarbonization and resource circularity emerged as the leading themes. As for the Rojana Industrial Park's challenge, Zeroboard—provider of a cloud service for calculating and visualizing greenhouse gas (GHG) emissions platform—received a Challenge Owner Award. The proposal outlined a service to deliver a platform that makes tenant companies' GHG emissions visible, presenting a concept to support emissions management and improvement activities at the industrial park level.

As for the SCG Chemicals (SCGC)'s challenge, TBM won with a proposal to use LIMEX[1] to develop sustainable products, including by leveraging waste generated from SCGC's factories. The approach—combining material substitution with the effective use of by-products—was highly regarded for transforming on-site manufacturing issues into business opportunities.

The Audience Award went to Thermalytica, a startup spun out of NIMS supported by the Government of Japan. The proposal presented a collaboration concept that applies a newly redesigned aerogel insulation material, TIISA®, along with heat-dissipation analysis using artificial intelligence (AI), to Taisei Corporation's net zero energy building (ZEB) technologies. The concept positions materials innovation and data analytics as complementary drivers to accelerate energy savings and decarbonization implementation in the building sector.

1 A TBM proprietary product containing 50% or more inorganic materials such as calcium carbonate. It reduces the use of petroleum-based plastics and contributes to carbon management.

Photo: Top—award-winning companies. Second row (left)—highlights from the event. Second row (center)—group photo of participants. Second row (right)—the award ceremony. Third row (left)—challenge owners during the Q&A session. Third row (center) and onward—finalists presenting on stage. (All photos by JETRO.)

JETRO EVENT REPORT

ASIA SUSTAINABLE ENERGY WEEK : ASEW

JETRO Pavilion at Asia Sustainable Energy Week

Asia Sustainable Energy Week (ASEW)), a three-day event showcasing sustainable businesses across Asia, was held in Bangkok, Thailand, from July 2 to 4, 2025. ASEW is one of Asia's largest integrated energy exhibitions, delivering technologies and services related to the energy transition through both exhibitions and conferences, while creating opportunities for business matching and collaboration. With support from Thailand's Ministry of Energy, 412 energy- and decarbonization-related companies primarily from across Asia participated (up from 390 in the previous year), presenting the latest solutions in areas such as solar power, hydrogen, energy storage systems, and electric vehicles (EVs). Seminars were also held in parallel on themes including renewable energy deployment, energy efficiency improvements, and the shift toward electrification and new mobility, drawing strong interest from industry stakeholders.

The Japan External Trade Organization (JETRO) hosted a JETRO Pavilion at the venue, where nine Japanese-affiliated companies exhibited. Intending to enter Thai market and to seek collaboration with local partners, each company presented proposals covering not only deployment but also operational support. The exhibitors were Algal Bio, which develops circular-economy and decarbonization solutions leveraging algae; ASUENE(Thailand), which supports corporate CO_2 emissions calculation, visualization, and decarbonization planning; eMotion Fleet, which supports commercial vehicle electrification and fleet operations optimization; Nagase (Thailand), which develops technologies and commercial offerings in the chemical industry, including CO_2 absorbent materials; Sojitz(Thailand), which operates across a wide range of industries while advancing initiatives related to the energy transition; SPACECOOL, which offers temperature-reduction materials utilizing radiative cooling technology; Taisei (Thailand), which supports energy saving and decarbonization based on expertise in the field of building and facilities; Tsubame BHB, which contributes to decarbonization through small-scale, distributed ammonia production technologies; and Zeroboard (Thailad), which supports the practical work of GHG emissions calculation, disclosure, and reduction.

On the talk stage adjacent to the exhibition area, JETRO Pavilion exhibitors presented the key features of their technologies and services in collaboration with JASE-World. Many of the exhibitors are also featured in the Sustainable Business Catalog published by the JETRO Bangkok Office, and the Catalogs were also distributed at the venue attracting notable attention from the audience and passing visitors.

Some of the exhibitors commented that they were able to meet reliable business partners in Thailand through the exhibition and aimed to accelerate their business development in the region, and that companies interested in working with Japanese firms gathered at the JETRO Pavilion, resulting in higher-quality matching opportunities than exhibiting individually. Visitors also shared that they wanted to collaborate with Japanese companies whose products and solutions fit Thailand's business environment and comply with regulatory requirements, and to introduce Japanese technologies in Thailand to help address societal challenges such as energy efficiency improvements.

According to the organizer, total attendance over the three days rose to around 30,000, up from approximately 28,000 in the previous year. The increase suggests growing interest in decarbonization investment and technology adoption in Thailand and neighboring countries, and expectations for Japanese technologies are also strengthening.

Photo: Top—participants attending a presentation (provided by the organizer).
Bottom left—the JETRO Pavilion (provided by the organizer). Bottom right—an exhibitor briefing visitors at a booth (photo by JETRO).

JETRO EVENT REPORT

THAILAND-JAPAN GREEN ENERGY BUSINESS FORUM

JETRO Bangkok and DEDE Co-Hosted Green Energy Business Forum Toward a Low-Carbon Future

The Japan External Trade Organization (JETRO) co-hosted the Thailand-Japan Green Energy Business Forum -Toward a Low-Carbon Future- with the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy on October 6, 2025, in Bangkok. The forum drew more than 100 participants, primarily from Japanese companies operating in Thailand.

At the opening ceremony, Mr. ABE Ichiro, President of the JETRO Bangkok Office, stated that efforts toward carbon neutrality are a key theme for boosting competitiveness both in Japan and Thailand. He also emphasized that the JETRO Bangkok Office is strengthening supports for Japan–Thailand collaboration in the sustainability area through the activities of the Sustainable Business Desk recently established at the JETRO Bangkok Office.

Ms. Apiradee Thammanomai, Director of the Biofuel Development Division, DEDE, then emphasized the importance of advancing initiatives with sustainability in mind and embraced a proactive stance toward fostering new business creation through public-private collaboration.

The forum was organized into two sessions; the first one was focused on the current landscape and outlook for environmental policies and regulations, while the second one was to examine private-sector investments and market opportunities. In the first session, Mr. Watcharin Boonyarit, Deputy Director-General of Energy Policy Planning Office, the Ministry of Energy presented the vision and roadmap of the National Energy Plan (NEP), highlighting that decarbonization is positioned at the core of Thailand's strategy to achieve net-zero GHG emissions by 2050. From an institutional perspective, the session also outlined plans to further develop frameworks that support corporate procurement of renewable energy, including DPPA and UGT, presenting an approach that advances the transition through both regulation and market mechanisms.

In the following session, Mr. Pavich Kesavawong, Deputy Director-General, Department of Climate Change and Environment, the Ministry of Natural Resources and Environment discussed the Climate Change Act and its implications for the private sector. He explained key elements of the draft Act, including the establishment of the Climate Fund and provisions for GHG data submission from the private sector, and indicated that enactment is targeted by the end of 2026. Next, Ms. Sutharee Kiatman from DEDE introduced the Biofuel Development Plan, noting that biofuels are positioned as an important pillar, alongside the implementation status of the Power Development Plan, the Energy Efficiency Plan, and the Alternative Energy Development Plan under the NEP.

In the second session, Mr. Thibodee Harnprasart, committee of the Institute of Industrial Energy, the Federation of Thai Industries stressed that promoting energy efficiency requires economic supports, expert guidance, sharing of success cases, and development of knowledge and technical data. The forum concluded with the presentation by Mr. KIKUCHI Shigeru, Representative of the New Energy and Industrial Technology Development Organization (NEDO) on projects in Thailand that address societal challenges through innovation, including demonstration initiatives such as household systems that use IoT to achieve both comfort and energy savings.

Photo: Top—speakers at the event. Middle row (left)—Abe Ichiro (President, JETRO Bangkok Office). Middle row (center)—inside the venue. Middle row (right)—Apiradee Thammanomai (Director, Biofuel Development Division, DEDE). Bottom row (from left)—Watcharin Boonyarit (Deputy Director-General, EPPO), Pavich Kesavawong (Deputy Director-General, DCCE), Sutharee Kiatman (Senior Professional Level, DEDE), and Thibodee Harnprasert (Committee Member, The Institute of Industrial Energy, FTI). (All photos by JETRO.)

JETRO EVENT REPORT

SUSTAINABILITY JAPAN TOUR

JETRO Invited Leading Thai Conglomerates to Japan to Advance Sustainability Collaboration

JETRO invited six large-sized Thai corporations to Japan on November 26–27, 2025, to explore opportunities for collaboration with Japanese firms in sustainability-related business. The delegation visited Tokyo whose purposes are an information-exchange occasion and company visits for networking. Participating Thai corporations[1] included Charoen Pokphand Group and Siam Cement Group, representing some of leading conglomerates in Thailand.

Since participants are from major players of diverse businesses, it is expected that the collaboration potential could extend beyond a single business unit by expanding into their value chains.

At a workshop hosted at JETRO Headquarters in Tokyo, Japanese and Thai companies shared strategies, investment directions, and challenges to achieve carbon neutrality and the use of Artificial Intelligence (AI). The following networking event was attended by 40 Thai and Japanese participants. During the networking event, presentations by six Japanese companies and six Thai ones. Moreover, participants from both countries actively connected and enjoyed meaningful conversations to explore future collaboration.

Site visits to Japanese companies specialized in sustainability were also arranged. At the Obayashi Corporation Technical Research Institute in Kiyose-shi, Tokyo, the delegation observed the design and operational concepts behind Japan's first solar-powered zero-energy building, as well as the facilities in Techno-Station featuring an advanced seismic control system. The visit also introduced initiatives related to environmentally conscious construction materials and methods, disaster prevention, AI, and robotics, including testing and demonstration efforts. Thai participants showed strong interest in approaches that implement decarbonization and resilience in tandem and listened attentively to the on-site explanations.

The delegation also visited Innoqua in Bunkyo-ku, Tokyo, an environmental startup that introduced its proprietary concept of environmental technology transfer[2]. While observing ecosystems such as coral reefs and mangroves recreated in water tanks, the company shared its business design perspective—from improving local environments to social implementation of its research. Innoqua established an overseas base in Malaysia and is exploring expansion opportunities into Thailand and other Southeast Asian countries from Malaysia as a key hub.

In addition, the delegation visited Asuene in Minato-ku, Tokyo, which provides a platform to visualize CO_2 emissions using AI. Asuene's strength lies in end-to-end supports covering emissions calculation through analysis and reporting, and it has already concluded businesses with many Thai companies. Building on these examples, participants were engaged in lively discussions on key considerations for future business collaboration.

Representatives of the Thai corporations expressed their intention to pursue proactive information exchange and cooperation with Japanese companies on sustainability-related matters, as well as those visited during this tour. The Thai government has addressed a policy to accelerate its net-zero GHG emissions target to 2050, 15 years earlier; therefore, investments in and demands for decarbonized materials and energy management are expected to intensify further. Consequently expectations for expanded collaboration between Japan and Thailand continue to grow.

1 The six companies were Charoen Pokphand Group, CP ALL, Siam Cement Group, SCG Chemicals, Banpu NEXT, and Berli Jucker.

2 A proprietary technology concept that recreates natural aquatic environments, including marine ecosystems, on land using water tanks. By using AI/IoT devices developed by the company, elements that make up nature are structured to reproduce conditions close to real environments.

Photo: Top—highlights from the pitch event. Left—visit to Obayashi Corporation. Middle right—visit to Innoqua. Bottom right—visit to Asuene. (All photos by JETRO.)

Abbreviation	Full Term
AEDP	Alternative Energy Development Plan
BEC	Building Energy Code
BESS	Battery Energy Storage System
BEV	Battery Electric Vehicle
BOI	Board of Investment
CBAM	Carbon Border Adjustment Mechanism
CBG	Compressed Biomethane Gas
CBU	Completely Built-Up
CCS	Carbon Capture and Storage
CCU	Carbon Capture and Utilization
CCUS	Carbon Capture, Utilization and Storage
CN	Carbon Neutral
COP	Conference of the Parties (UNFCCC)
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
CVC	Corporate Venture Capital
DCCE	Department of Climate Change and Environment
DEDE	Department of Alternative Energy Development and Efficiency
depa	Digital Economy Promotion Agency
DER	Distributed Energy Resources
DPPA	Direct Power Purchase Agreement
DR	Demand Response
DRCC	Demand Response Control Center
DSM	Demand Side Management
EEC	Eastern Economic Corridor
EECO	Eastern Economic Corridor Office
EEP	Energy Efficiency Plan
EGAT	Electricity Generating Authority of Thailand
EPPO	Energy Policy and Planning Office
ESG	Environment, Social and Governance

Abbreviation	Full Term
ETS	Emissions Trading System
EV	Electric Vehicle
FCV	Fuel Cell Vehicle
FDA	Food and Drug Administration
FEC	Factory Energy Code
FLAG	Forest, Land and Agriculture
FS	Feasibility Study
FTI	Federation of Thai Industries
GC	PTT Global Chemical
GCF	Green Climate Fund
GHG	Greenhouse Gas
GX	Green Transformation
HDPE	High-Density Polyethylene
HEV	Hybrid Electric Vehicle
IAQ	Indoor Air Quality
ICAO	International Civil Aviation Organization
IPP	Independent Power Producer
ISIT	Iron and Steel Institute of Thailand
JCM	Joint Crediting Mechanism
JETRO	Japan External Trade Organization
JOGMEC	Japan Organization for Metals and Energy Security
JTEPD	Japan–Thailand Energy Policy Dialogue
LBM	Liquefied Biomethane
LESS	Low Emission Support Scheme
LT-LEDS	Long-Term Low Emission Development Strategy
MDES	Ministry of Digital Economy and Society
MNRE	Ministry of Natural Resources and Environment
MOF	Ministry of Finance
MOT	Ministry of Transport

Abbreviation	Full Term
MRV	Measurement, Reporting and Verification
NCS	Nature-based Climate Solutions
NDA	National Designated Authority
NDC	Nationally Determined Contribution
NEDO	New Energy and Industrial Technology Development Organization
NEP	National Energy Plan
NEPC	National Energy Policy Council
NIA	National Innovation Agency
NIMS	National Institute for Materials Science
NSTDA	National Science and Technology Development Agency
OSMEP	Office of Small and Medium Enterprises Promotion
PCD	Pollution Control Department
PCR	Post-Consumer Recycled material
PDD	Project Design Document
PDP	Power Development Plan
PEM	Proton Exchange Membrane (Fuel Cell)
PHEV	Plug-in Hybrid Electric Vehicle
PoC	Proof of Concept
PP	Polypropylene
Premium T-VER	Premium Thailand Voluntary Emission Reduction Program
REC	Renewable Energy Certificate
SAF	Sustainable Aviation Fuel
SBTi	Science Based Targets initiative
SCG	Siam Cement Group
SCGC	SCG Chemicals
SET	Stock Exchange of Thailand
SINTEF	Foundation for Industrial and Technical Research
SME	Small and Medium-sized Enterprise
SMR	Small Modular Reactor

Abbreviation	Full Term
SOFC	Solid Oxide Fuel Cell
SPI	Saha Patana Inter-holding
SSI	Sahaviriya Steel Industries
T-VER	Thailand Voluntary Emission Reduction Program
TGO	Thailand Greenhouse Gas Management Organization
TOU	Time Of Use
TPA	Third Party Access
UGT	Utility Green Tariff
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
VERRA	Verra
VSD	Variable Speed Drive
VVB	Validation and Verification Body
ZEB	Zero Energy Building

VOICE FROM THAILAND
Insights for a Sustainable Future with Thailand

Published: March, 2026

Cover Design: Yukari Araki
Editorial & Production: SYNC Design Co., Ltd.
Publisher: : Japan External Trade Organization (JETRO) Bangkok Office

---

Disclaimers

- Information in this catalog is valid as of the published date, and is subject to changes any time after its publication.
- JETRO and the production contractor will not be held responsible for any losses or damages arising directly and indirectly from the use of this catalog or any information thereof.
- Any form of diversion or appropriation of this catalog to a third party for the purpose of profit is prohibited.

JETRO