

FY2023
City-to-City Collaboration Programme for
Zero-Carbon Society

Support for Designing Decarbonization Society with BCG
Economy in EEC, Thailand

Report

March 2024

Nippon Koei Co., Ltd.
Osaka City

FY2023

City-to-City Collaboration Programme for Zero-Carbon Society

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in EEC, Thailand

Report

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ABBREVIATIONS

AI	Artificial Intelligence
ASEAN	Association of Southeast Asian Nations
AR	Assessment Report
BCG	Bio, Circular, Green
BECCS	Carbon Capture and Storage
BOI	The Board of Investment, Thailand
C2P2	Clean City Partnership Program
CCS	Carbon dioxide Capture and Storage
CO ₂	Carbon dioxide
COP	Conference of Parties
DX	Digital Transformation
EEC	Eastern Economic Corridor
EECi	Eastern Economic Corridor of Innovation
EECO	The Eastern Economic Corridor Office of Thailand
EPC	Engineering, Procurement, and Construction
ESCO	Energy Service Company
EV	Electric Vehicle
FIT	Feed-in Tariff
G7	Group of Seven
GDP	Gross National Product
GEC	Global Environment Centre Foundation
GHG	Greenhouse Gas
GX	Green Transformation
IEAT	Industrial Estate Authority of Thailand
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IURC	International Urban and Regional Cooperation
JCM	Joint Crediting Mechanism
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
LTS	Long-Term Strategy
LULUCF	Land use, land-use change, and forestry
MOU	Memorandum of Understanding
NDC	Nationally Determined Contribution
NSTDA	Thailand National Science and Technology Development Agency
OCCI	Osaka Chamber and Commerce and Industry
ODA	Official Development Assistance
COVID-19	Coronavirus Disease of 2019
RDF	Refuse Derived Fuel
SDGs	Sustainable Development Goals
TCNN	Thai Carbon Neutral Network
TDEM	Toyota Daihatsu Engineering and Manufacturing CO., Ltd.
TGO	Thailand Greenhouse gas Organization
TOD	Transit-Oriented Development
T-VER	Thailand Voluntary Emission Reduction Program

CHAPTER 1 INTRODUCTION

1.1 Background

1.1.1 Background of the Programme

The Sixth Assessment Report (AR6) released by the Intergovernmental Panel on Climate Change (IPCC) Working Group III in 2022 stated that cities generate approximately 70% of global greenhouse gas (GHG) emissions. Therefore, it is essential to have cities accelerate climate action to meet the Paris Agreement goal of limiting the temperature increase to 1.5°C above pre-industrial levels. To achieve zero-carbon cities, the Japanese government and Japanese cities are working together to create more than 100 “decarbonization leading areas” under the Regional Decarbonization Roadmap formulated in June 2021 and promote expansion of these regions throughout Japan.

For the world to move toward zero-carbon society, it is necessary to accelerate the movement toward making a sustainable zero-carbon society, especially in Asia, where economic growth is remarkable. Support for cities’ efforts is being strengthened internationally to zero-carbon cities, which are the places of activities that support social and economic development.

As an example, the Ministry of the Environment, Japan (MOEJ) launched the Clean City Partnership Program (C2P2) with JICA in February 2023 to address the challenges facing global cities from multiple perspectives, and this project covers the main activities of C2P2. The C2P2 will provide comprehensive and synergistic support to partner cities to address urban challenges, including climate change, environmental pollution, circular economy, and nature positive issues through further mobilization of technology and funds in collaboration with Japanese local governments, private companies, and financial institutions. It will also promote collaboration with other key stakeholders, including G7 and other countries and international development banks.

In this City-to-City Collaboration Programme, Japanese research institutes, private companies, universities, etc., together with Japanese cities that have experience and know-how in the formation of decarbonized societies, conduct research projects to support overseas partner cities in forming decarbonized societies and introducing facilities that will contribute to forming decarbonized societies.

The City-to-City Collaboration between Osaka City and the Eastern Economic Corridor (EEC)¹ has completed Phase 1 (2019-2021) and this year is the second year of Phase 2. This project provides institutional development support for the expansion of the decarbonization dominoes in the EEC and activities that contribute to the promotion of carbon neutrality in the areas of energy savings and renewable energy, waste, transportation infrastructure, and digital and smart cities, which are in high demand in the EEC.

¹ The EEC is a national strategy for the implementation of Thailand 4.0 in the Kingdom of Thailand, which has been established as a governmental organization and targets three (3) provinces in eastern Bangkok. For this reason, EEC assume a city to create City-to-City collaboration with Osaka City.

1.1.2 City-to-City Collaboration with EEC

The Kingdom of Thailand had a sense of crisis as a developing country that had become a middle-income country through the utilization of natural resources and the attraction of foreign companies would find it difficult to transition to high-income country with growth rates slowed down if they neglected efforts to transform their industrial structure. Because of this sense of crisis, aiming for the country's future socio-economic prosperity, the government has set a national strategy of “Thailand 4.0” since 2015, promoting economic growth over 20 years, and entering status as a high-income country by 2036.

To lead to Thailand 4.0, three provinces (Chonburi, Chachoengsao, and Rayong) were selected as the focal area of EEC. EEC has been developed since the 1980s, and many Japanese factories located in EEC have become important production bases in Southeast Asia. The coastal area of the EEC is remarkably developed as an industrial zone, with regional GDP approximately 15% of Thailand's GDP. Also, there are many companies included in the Japanese automobile industry, and many Joint Crediting Mechanism (JCM) model projects have been formulated and implemented in this region. It is expected that a number of JCM model projects will be developed in the future. In fact, it is confirmed that many Japanese companies are eager to join a JCM scheme and the need for the introduction of decarbonization technologies in the region is extremely high.

1.1.3 Strategy of Osaka City Government on City-to-City Collaboration

Osaka City Government (Osaka City) has implemented City-to-City Collaboration Project with Ho Chi Minh city, Vietnam and Quezon city, Philippines, and has achieved steady results. Also, Osaka City has involved private entities, and supported realization of decarbonization society in Asian cities and aims to contribute to the revitalization of the Osaka/Kansai economy and Japan's international role by utilizing the “Team OSAKA Network²” established and operated by Osaka City, a public-private partnership platform for formulation and creation of decarbonization and low carbonization projects.

Osaka City has paid attention to the possibility of forming a JCM model projects in the EEC area, where industrial parks have accumulated. Since the Osaka City has been consulted from Osaka Gas Co., Ltd. (Osaka Gas) etc. registered in Team OSAKA Network to support business development in this region, the formulation of JCM model projects has been considered.

1.2 Objective

City-to-City Collaboration Programme for Zero-Carbon Society “Support for Designing Decarbonization Society with BCG Economy” (hereinafter called "the Project") in EEC is a study on the realization of a zero-carbon society in the collaboration between EEC and Osaka City, with the following objectives:

- (1) Strengthening the cooperation between Osaka City and EEC
- (2) Formulating JCM model projects that contributes to zero carbon society in Thailand

² Team Osaka Network is a public-private partnership platform centered on companies in Osaka City.

1.3 Implementation Schedule

The Project was adopted in the first call for proposals of City-to-City Collaboration projects and activities for FY 2023 began in June 2023.

The City-to-City Collaboration Project between Osaka City and EEC started in 2019, and as the fifth year of the project, various activities were conducted to lead the development of a decarbonized society through the sharing of know-how on environmental measures in Osaka City. The detailed schedule of the Project is shown in Figure 1.1

#	Activities	2023						2024				
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Formulation of JCM Model Projects												
1	Meetings with stakeholders	▼	▼	▼	▼	▼	▼	▼	▼	▼		
2	Field Studies			1st Field Survey		2nd Field Survey						
3	Examination and selection of candidate sites											
4	Detailed confirmation of existing equipments and installing techniques											
5	Measures of GHG emission reductions and evaluation of business feasibility											
6	Formulation of international consortium for JCM model projects											
7	Discussion and preparation of documents for application											
8	Identification of potential JCM model projects for upcoming year											
City-to-City Collaboration Activities												
A	Policy Dialogue based on the MOU									▼		
B	Sharing know-how related to environmental policies and digital fields											
C	Expanding of the decarbonizes dominos in Thailand											
D	Business matchings between Japan-Thai companies and organization	▼		▼					▼			
E	Support for obtaining carbon credits toward CN											
Fiels Survey, Meetings, Reports and others												
I	Meetings between Osaka City and EECO	▼		▼		▼		▼		▼		
II	Presentations at seminars organized by MOEJ									C3P seminar	▼	
III	Reportings to MOEJ at a kick-off, interim and final meetings		▼				▼			▼		
IV	Collaborations with other organizations			▼								
V	Submission of final report										▼	

Source: Prepared by Nippon Koei

Figure 1.1 Schedule of the City-to-City Collaboration Activities for this fiscal year

CHAPTER 2 OVERVIEW OF THE PARTICIPATING CITIES

2.1 Outline of Osaka City

Osaka City is an ordinance-designated city in Japan, and the central area of administration, economy, and culture in western Japan. Osaka City is the second biggest city in Japan following Tokyo and is a famous commercial city based on manufacturing industry and heavy industry with the largest Gross Domestic Product (GDP) among ordinance-designated cities in Japan. In addition, Osaka City has a wide range of networks with foreign cities and has been implementing and promoting various activities with sister cities, friendship cities and business partner cities including HCMC in Viet Nam.

Outline of Osaka City is as follows.

Table 2.1 Outline of Osaka City

#	Item	Overview
1	Area	225.33 km ² (as of April 1, 2023)
2	Population	2,768,139 (as of August 1, 2023)
3	Population density	12,285 people/km ² (as of August 1, 2023)
4	Number of households	1,527,741 (as of August 1, 2023)
5	Number of industrial enterprises	4,879 (As of June 2020: Industrial census in 2020) * Number of enterprises with more than 4 workers
6	Value of shipments of manufactured goods	JPY 3,747 billion (As of June 2020: Industrial census in 2020)
7	Main industries	Metal materials manufacturing: 997 enterprises (20.4% of total) Printing: 620 enterprises (12.7% of total) Production-use machinery and Business-use machinery: 485 (9.9%) (As of June 2020: Industrial census in 2020)

Source: Prepared by Nippon Koei based on Osaka City's website

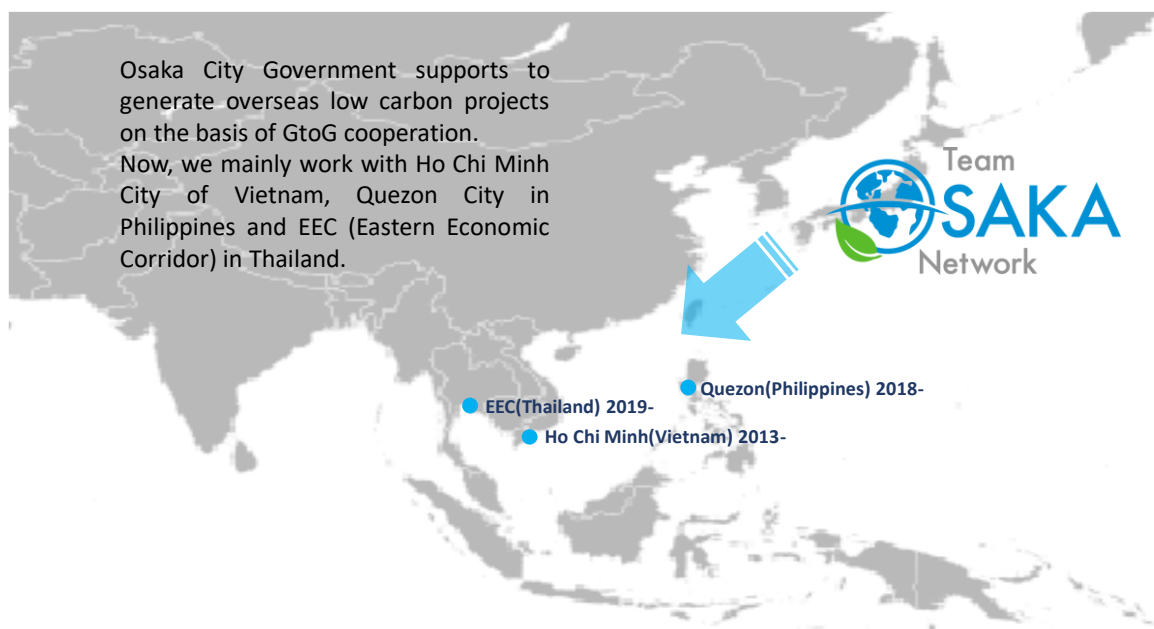
2.1.1 International Environmental Cooperation by Osaka City

In the environmental field, Osaka City conducts City-to-City Collaboration projects with Ho Chi Minh City, Viet Nam and Quezon City, Philippines as shown in Figure 2.1.

The Environment Bureau of Osaka City, the main department for the Project, aims to contribute to solving environmental problems in developing countries by sharing know-how on various experiences and measures in Osaka City and promoting decarbonization technologies in cooperation with member companies of the "Team OSAKA Network", a public-private partnership platform, to formulate environmental projects including JCM model projects. In addition, a Memorandum of Understanding (MOU) for cooperation on the environment was signed with the State of Maharashtra, India, in 2020, and the MOU was renewed in 2022 with the addition of cooperation for the realization of decarbonization. Furthermore, in 2021, the city started collaboration with Greater Manchester, UK, within the framework of the European Union International Urban Regional Cooperation Program (IURC), and in 2023, the city signed a MOU on building friendly relations to promote exchanges in the environmental field and other areas and cooperation among universities, thereby strengthening international collaboration toward the realization of a decarbonized society.

Also, Osaka City, which is one of the major cities in Japan, has a history of improving the public health of citizens and overcoming pollution issues. It can provide useful insights and

contributions to the challenges facing the Bangkok Metropolitan Government and EEC. Osaka City supports overseas cities facing environmental problems and create opportunities for private companies to expand their business through cooperation between the cities and through international cooperation.



Source: Prepared by Nippon Koei based on Osaka City's material

Figure 2.1 International Cooperation by Osaka City

2.1.2 Team OSAKA Network

In June 2016, Osaka City launched the "Team OSAKA Network", a platform for more effective cooperation between industry, academia and government, in order to support the realization of a decarbonized society with cities in Asia, etc. As of October 2023, 160 companies, which have energy-saving and renewable energy technologies etc., are registered. The secretariat of this platform is the Environment Bureau, Osaka City.



Team OSAKA Network aims to encourage companies to expand overseas, revitalize the Osaka /Kansai economy, and play a leading role in Japan in the field of international environment, which also meets the purpose of the City-to-City Collaboration.

2.1.3 Actions to Climate Change by Osaka City

The main actions and plans to address climate change by Osaka City are discussed below.

(1) Osaka City Action Plan of Global Warming Countermeasures (Local Program)

Osaka City announced to aim of realizing Zero-Carbon City by 2050 in the Osaka City Council on 27 November 2020, and reported it to the MOEJ on 9 December 2020. Also, the implementation of measures to achieve the goal of FY2030 and approaches and measures to realize “Zero-Carbon Osaka 2050”, that is, zero-carbon society leading to the maturity of Osaka City are clearly stated in “Osaka City Action Plan of Global Warming Countermeasures (Local Program)” which was prepared in March 2021. This action plan was being revised in October 2022, taking into account the acceleration of efforts to achieve carbon neutrality in Japan and the world.

“Osaka City Action Plan of Global Warming Countermeasures (Local Program)” showed the target of the plan and vision for 2050 as follows.

Target of the Revised Action Plan

To reduce 50% of GHG emission reductions by FY2030, compared with FY2013 to achieve net zero emission of GHG in 2050.

Vision for 2050

“Zero-Carbon Osaka 2050 -Realization of zero-carbon society leading to maturity of Osaka-”

(2) “SDGs Future City” and “SDGs Models of Local Governments”

Osaka Prefecture and Osaka City were selected as the “SDGs Future City and SDGs Models of Local Governments” by the Cabinet Office, Japan on July 17, 2020, which is the first case of a joint proposal by prefecture and municipality. In October 2020, the “Osaka Prefecture/Osaka City SDGs Future City Plan” was formulated, and it was revised in July 2021.

The vision of “Osaka Prefecture/Osaka City SDGs Future City Plan” is as follows.

Three visions

- <1> Human Well-being
- <2> Diverse innovation
- <3> Global Co-Creation Hub

(3) Action Plan for “Osaka Blue Ocean Vision”

As one of the activities of "SDGs Future City and SDGs Models of Local Governments, " Osaka Prefecture and Osaka City formulated the Action Plan for "Osaka Blue Ocean Vision" in March 2021. The plan aims to contribute to the realization of "zero pollution of marine plastic waste by 2050" and achieve SDGs targets as an individual plan for the water field of the Osaka City Environmental Basic Plan.

The goals of the Action Plan for "Osaka Blue Ocean Vision" are as follows.

Goals of the Action Plan

- <1> Reduce the amount of plastic waste flowing into Osaka Bay by half in 2030.
- <2> Achieve and maintain 100% of the national environmental standard for water quality in rivers and seas and improve citizen satisfaction with water environment to 40%.

(4) Specific Activities Toward Carbon Neutrality by 2050 in Osaka City

Osaka City is implementing various measures to achieve carbon neutrality by 2050 as set forth in the "Osaka City Action Plan on Global Warming. The following measures were introduced.

1) Introduction of Rooftop Solar Power Generation

Based on the Feed-in Tariff (FIT) program, Osaka City has leased the roofs of city-owned elementary and junior high schools and gymnasiums to private companies since 2017 and installed solar panels on 181 schools over a three-year period until 2020. This has helped to expand renewable energy and make effective use of assets, as well as provide environmental education for children.

2) Waste to Energy

All six waste incineration plants in Osaka City generate electricity, with an annual output of approximately 470 million kWh/year. Three of these plants supply steam to neighbouring facilities.

3) Environment Friendly Building

In order to promote energy-saving at the building stage, Osaka City has established its own environmentally conscious system for buildings and requires buildings above a certain size to comply with the ordinance on "conformity of heat insulation performance, etc. in buildings other than residences" and "conformity with energy-saving standards for residences," which are not covered by the Building Energy Efficiency Act.

4) Environmental Education

Osaka City has created a supplemental reader called "Osaka Environmental Studies" to promote environmental education and environmental learning for the future generation. The supplementary reader is unique to Osaka City and is revised annually to keep it up-to-date with the latest information, and is used in about 90% of school classes.

2.2 Eastern Economic Corridor (EEC)

2.2.1 Outline of the EEC

In 2016, Prime Minister Prayunit announced “Thailand 4.0” and a long-term national strategy to break out of the “middle-income country trap,” which is to be unable to become a developed country, and to become a high-income country by making its industrial structure more sophisticated, high-value-added, smart and digital. The three provinces of Chachoengsao, Chonburi and Rayong were positioned as EECaa as pilot project areas for the realisation of Thailand 4.0, with the EEC Act defining the area in 2018 and establishing the EEC Policy Committee and EEC Office (EECO) as administrative bodies.

Outline of the EEC is Table 2.2.

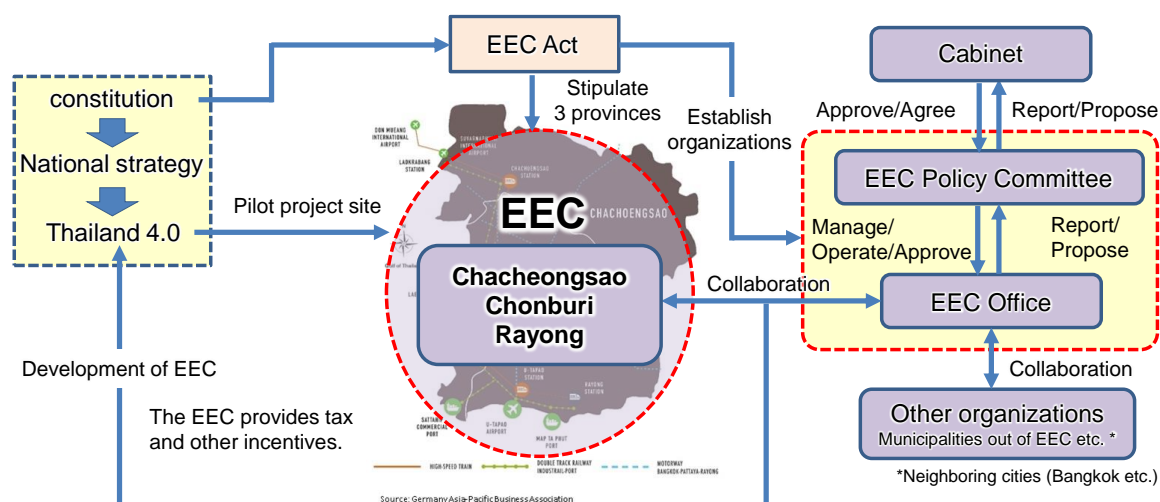
Table 2.2 Outline of the EEC

#	Item	Chachoengsao	Chonburi	Rayong	All (EEC)
1	Area	5,351km ²	4,363km ²	3,552km ²	13,266 km ²
2	Population	785,973	1,567,000	908,778	3,261,751
3	Population density	146.9 people/km ²	359.2 people /km ²	255.8 people /km ²	245.9 people /km ²
4	GDP	11.97 billionUSD	34.82 billionUSD	33.19 billionUSD	79.98 billionUSD
5	Percentage of Thailand's total GDP	2.2%	6.4%	6.1%	14.7%

Source: Prepared by Nippon Koei based on EEC's website

The EEC Policy Committee has the authority to 'make policy decisions for the development of the EEC', 'approve the overall land use plan', 'decide on tax incentives', etc., in accordance with the EEC Act (2018), and is chaired by the Prime Minister of Thailand, with the Minister of State and others as members the EECO is a government body established under the EEC Policy Committee. In collaboration with the three provinces that constituted the EEC, EEC area has been developed based on policies and plans set by the EEC Policy Committee.

A structure of the EEC is shown in Figure 2.2.



Source: Prepared by Nippon Koei based on the EEC Act, 2year of EEC (July 2019).

Figure 2.2 Structure of EEC

2.2.2 Targeted Industries in EEC

The EEC Policy Committee has designated 12 sectors of targeted industries (Table 2.3 12 Targeted Industries), as well as Promoted zones for specific industries (Figure 2.3). For (1) promoted zones for specific industries (excluding EECh and EECtp), (2) promoted zones for targeted industries and (3) other industrial estates in the EEC, incentives (EEC package) are provided in addition to the investment incentives (basic incentives) by the Board of Investment of Thailand (BOI)³.

Table 2.3 12 Targeted Industries

No.	Targeted Industries	Items
1	Next-generation Automotive	Electric Vehicles (EV), Autonomous Vehicles (AV)
2	Intelligent Electronics	Smart Appliances, Micro Electronics Design, 5G Components Manufacturing
3	High-value and Medical Tourism	Medical and Wellness Tourism, Mice and Mega Event
4	Advanced Agriculture and Biotechnology *	Bio-Refinery and Bio-Extraction, Genome Editing for Plants and Animals
5	Food for the Future	Nutrition and Supplements, Functional Food, Plant-based Food
6	Automation and Robotics	Industrial Robots, Service Robots
7	Medical and Comprehensive Healthcare	Next-generation Health Therapy, Precision Medicine and Biopharma, Regenerative Medicine and Advanced Cosmeceuticals
8	Aviation and Logistics	Smart Logistics
9	Biofuel and Biochemical*	Specialty Materials (Bioplastic), Biochemical, Biofuel
10	Digital*	Software and Platform, Artificial Intelligence, Big Data
11	Defense	Import Substitution, Maintenance, Disaster Management
12	Education and Human Resource Development	International Universities, certification Bodies for Professional Skills, EduTech

*Target Industries to be surveyed in this project, assuming a contribution to multi-benefits.

Source: Prepared by Nippon Koei

³ The Board of Investment (BOI) is the Thai Government agency responsible for encouraging investment in Thailand providing incentives to national and international investors.



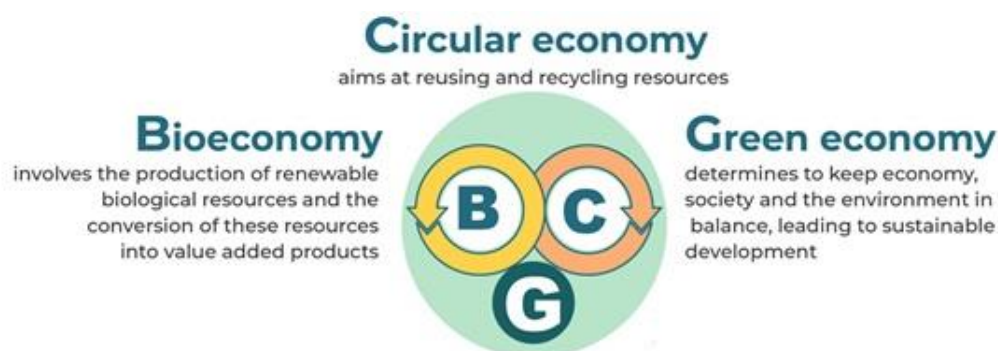
No.	Promoted Zones	Role	Location	Area	Overview
1	EECh	High-Speed Rail Ribbon Sprawl	Don Mueang, Suvarnabhumi, and U-Tapao Airport	220km	Develop Makkasan and Si Racha stations, a high-speed railway area between airports and the transit-oriented development (TOD) area.
2	EECg	Genomics Thailand	Burapha University, Chonburi	0.6ha	Establishment of a collaborative research network and a center for EEC genome testing using next-generation sequencers.
3	EECd	Digital Park	Si Racha District, Chonburi	132.8ha	Consist of the world-class data center, digital innovation testbed and IoT institutes which are fully equipped with high-tech facilities.
4	EECmd	Medical Hub	Bang Lamung District, Chonburi	93.6ha	Thailand's first medical hub offering comprehensive medical services and healthcare.
5	EECa	Eastern Airport City	U-Tapao International Airport, Rayong	1,040ha	Construction of a third terminal and the establishment of an aircraft maintenance center.
6	EECtp	Tech Park Ban Chang	Ban Chang, Rayong	83.4ha	Aiming to become a central center for advanced technological innovation in EEC.
7	EECi	Innovation Platform	Wangchan Valley, Rayong	552.6ha	Develop industrial cities for (1) advanced agriculture and food, (2) biofuels and bioscience, and (3) AI and automation/robotics.

Source: Prepared by Nippon Koei based on EEC Fact Sheet

Figure 2.3 Outline of Promoted Zones for Specific Industries

2.2.3 Realization of the BCG Economy Model in EEC

As green recovery from the economic damage caused by COVID-19, Thailand has positioned the Bio-Circular-Green (BCG) economy⁴ model as the National Strategy in January 2021. The BCG economy model was proposed in 2019 and is being promoted as a new economic model for sustainable growth in Thailand. “Bio-economy” involves the production of renewable biological resources, “Circular-economy” aims at reusing and recycling resources, and “Green-economy” works to keep economy, society and the environment in balance, and leading to sustainable development. The image of BCG economy model is illustrated in Figure 2.4.



Source: NSTDA HP

Figure 2.4 Image of BCG Economy Model

The EEC has developed a 5-year Action Plan for the Green & Circular Economy Investment Promotion in Targeted Industries (2024-2028) as a region to promote the BCG economic model. This action plan aims to reduce GHG emissions in the industrial sector by 20% and increase new investments in the EEC by 40% by 2030 and promotes initiatives that contribute to the BCG model. To reduce GHG emissions, especially in the industrial sector, efforts are underway to improve energy efficiency, increase the ratio of renewable energy in manufacturing, improve the efficiency of production resource use, and calculate carbon footprints.

Therefore, as Phase 2 activities of this project, this project decided to study the introduction of technologies for decarbonization in the industrial sector, utilizing the extensive knowledge of Osaka City and participating companies, and to study the use of bio-resources and the recycling of resources and energy through waste power generation and other means. Through a multi-faceted approach that contributes to multi-benefits, this project aims to contribute to the promotion of the BCG model in the EEC region and, by extension, to support the realization of the Thai government's national guideline, Thailand 4.0.

⁴ BCG Economy is the Thai government's economic strategy and policies for the after-covid, which will be implemented from January 2021. It stands for the main themes of Bio (Bio), Circular (Circular), and Green (Green).

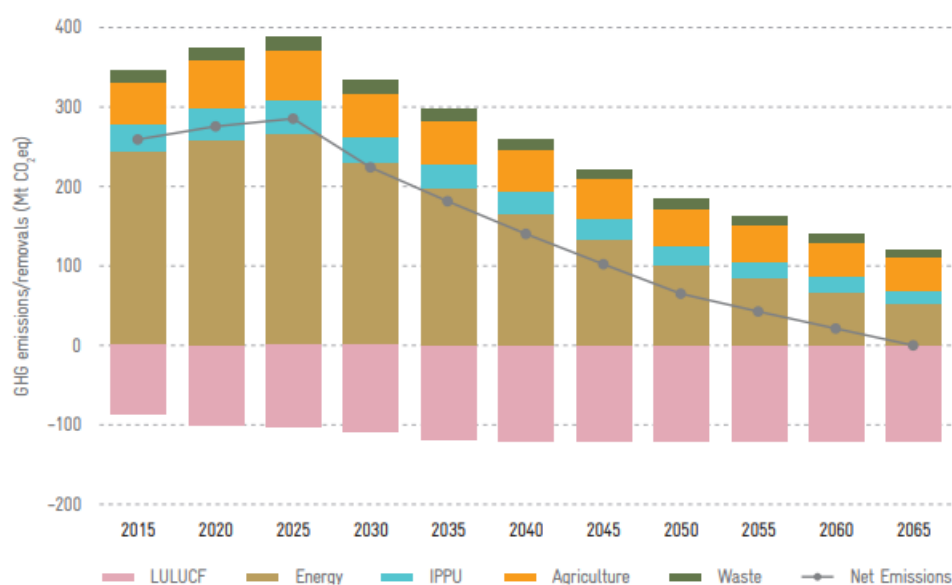
2.2.4 Efforts to Contribute to Climate Change Action in Thailand and the EEC

(1) Climate Change Measures of the Thai Government

The Thai government announced at COP26 that it aims to be carbon neutral by 2050 and net zero by 2065. The Thai government also raised its reduction target at COP27, announcing that it will reduce GHG emissions to 30-40% of BAU by 2030. At COP28, the government also announced that it will reduce GHG emissions to peak in 2025 and increase the share of renewable energy in its power supply mix to 68% by 2040 and 74% by 2050.

The Thai government, as a party to the Paris Agreement, also submitted its Nationally Determined Contribution (NDC) in 2016 and an updated version in November 2022, as well as a Long-Term Low Emission Strategy (LTS) to the UNFCCC at the same time. GHG absorption by the land use and forestry (LULUCF) sector will play an important role in achieving net zero in 2065. In addition, coal phase-out and technologies combining biomass power generation and CCS (BECCS) will be necessary.

The emission targets for each sector toward net zero as indicated in the LTS are shown in the figure below.



Source: Thailand's Long-Term Low Greenhouse Gas Emission Development Strategy (revised version)

Figure 2.5 2065 Net Zero Target in Thailand

(2) EEC Net Zero Roadmap and Action plan

Prior to the Thai government, EEC has set an ambitious goal of achieving net zero by 2050 with the EEC Net Zero Roadmap and Action plan in 2023.

Total GHG emissions in the EEC region in 2019 were 50,737,600 t-CO₂/year, of which the energy sector accounted for about half, with particularly high energy consumption in the manufacturing and construction sectors. GHG emissions in each sector and GHG emission reduction targets by 2030 and 2050 are shown in the table below.

Table 2.4 GHG emission reduction targets in the EEC by 2030 and 2050

Field	Baseline Emissions (2019)	Target for 2030		Target for 2050	
		GHG emissions (MtCO ₂ eq)	BAU Ratio Reduction rate (%)	GHG emissions (MtCO ₂ eq)	BAU ratio reduction rate (%)
Energy	25.30	15.56	39	6.83	88
Transportation	16.75	12.07	29	4.52	81
Waste	2.41	2.26	14	0.65	35
Agriculture	0.81	0.70	14	0.22	15
Land use and forestry	0.09	0.05	40	0.03	60
Industrial process	4.90	4.90	0	4.90	0
Total (GHG emissions)	50.27	35.53	30	17.15	73
Forest	-	0.03	-	0.45	-
CCS + BECCS*	-	0	-	17.00	-

*BECCS (Bioenergy with Carbon Capture and Storage): Technology that combines biomass power generation with carbon dioxide capture and storage technology.

Source : Prepared by Nippon Koei based on The EEC Net Zero Roadmap and Action plan

To achieve the goals of the EEC Net Zero Roadmap, the GHG Emission Reduction Action Plan 2024-2030 has been developed, which provides specific measures in each sector. The implementation of these measures will be carried out by the three provinces in EEC, which will incorporate the measures outlined in the plan into their own development plans.



EEC Office



EEC Office



Transportation -Chao Phraya River-



Transportation -Bus-



Electric lines



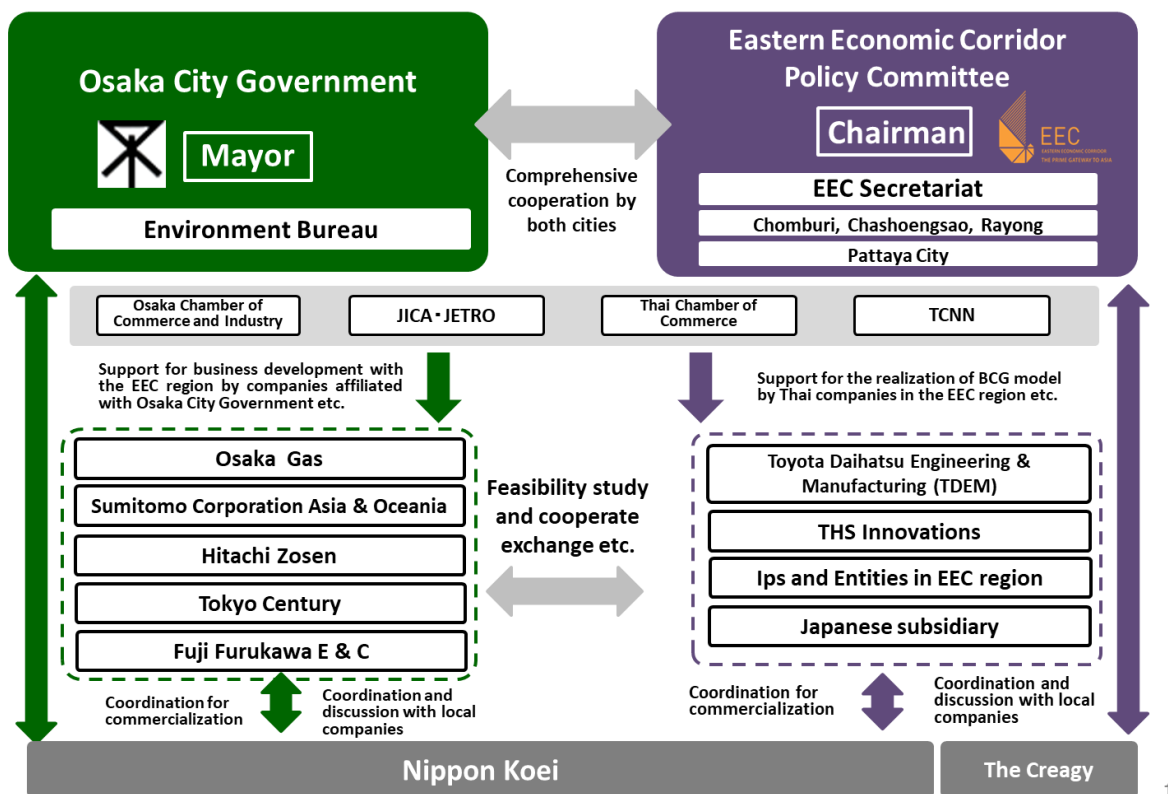
AMATA Industrial Park

Source: Taken by Nippon Koei

Figure 2.6 Photos of EEC region

2.3 Implementation Structure

Implementation structure for the City-to-City collaboration in FY2023 is shown in Figure 2.7. Osaka City and Japanese companies participated from Japanese side and EECO, and Japanese subsidiaries, etc. participated from Thai side. The project was implemented with close cooperation with members and held online meetings when necessary.



Source : Nippon Koei

Figure 2.7 Implementation Structure

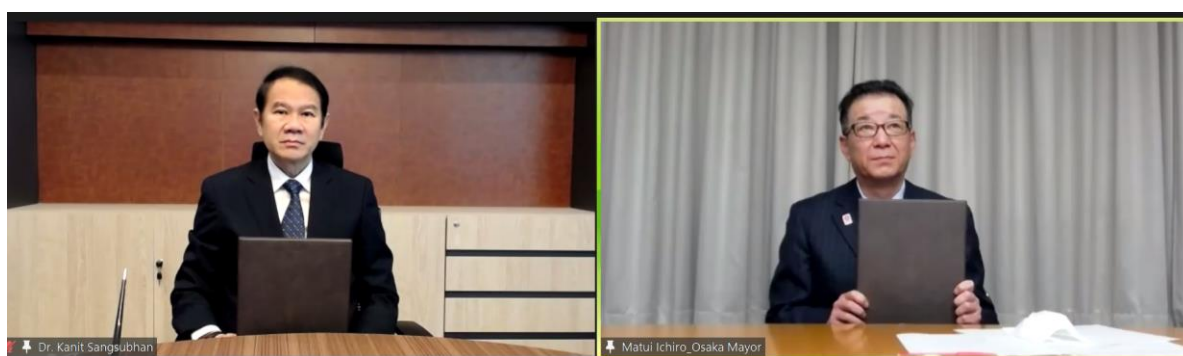
CHAPTER 3 CITY-TO-CITY COLLABORATION

The City-to-City Collaboration project consists of 2 pillars which are the collaboration between two cities and JCM model projects formulation by private companies. Activities of the collaboration between Osaka City and EEC to realize decarbonization society are explained in this chapter.

3.1 Signing MOU between Osaka City and EEC

Since October 2019, Osaka City and EEC started the City-to-City Collaboration project for the formulation of a zero-carbon society towards the realisation of Thailand 4.0, and they have established an amicable and cooperative relationship by sharing knowledge, exchanging opinions and discussions through workshops and seminars etc. On February 24, 2022, the MOU was signed to strengthen cooperation between the two cities and to realize the decarbonization of EEC. The main contents of the MOU are as follows.

1. Toward the development of a Carbon Neutrality in EEC, both Participants make efforts to promote mutual cooperation amicably in the following:
 - (1) Sharing knowledge of standard and systems supporting the Carbon Neutrality policies of EEC;
 - (2) Creating new projects toward the realization of a Carbon Neutrality;
 - (3) Sharing information and promoting projects related to green and circular economy; and
 - (4) Promoting other projects related to environmental conservation.
2. Both Participants will make reasonable efforts to continuously hold a high-level policy dialogue once a year toward the realization of Thailand 4.0 development on Carbon Neutrality.



Source : Taken by Nippon Koei

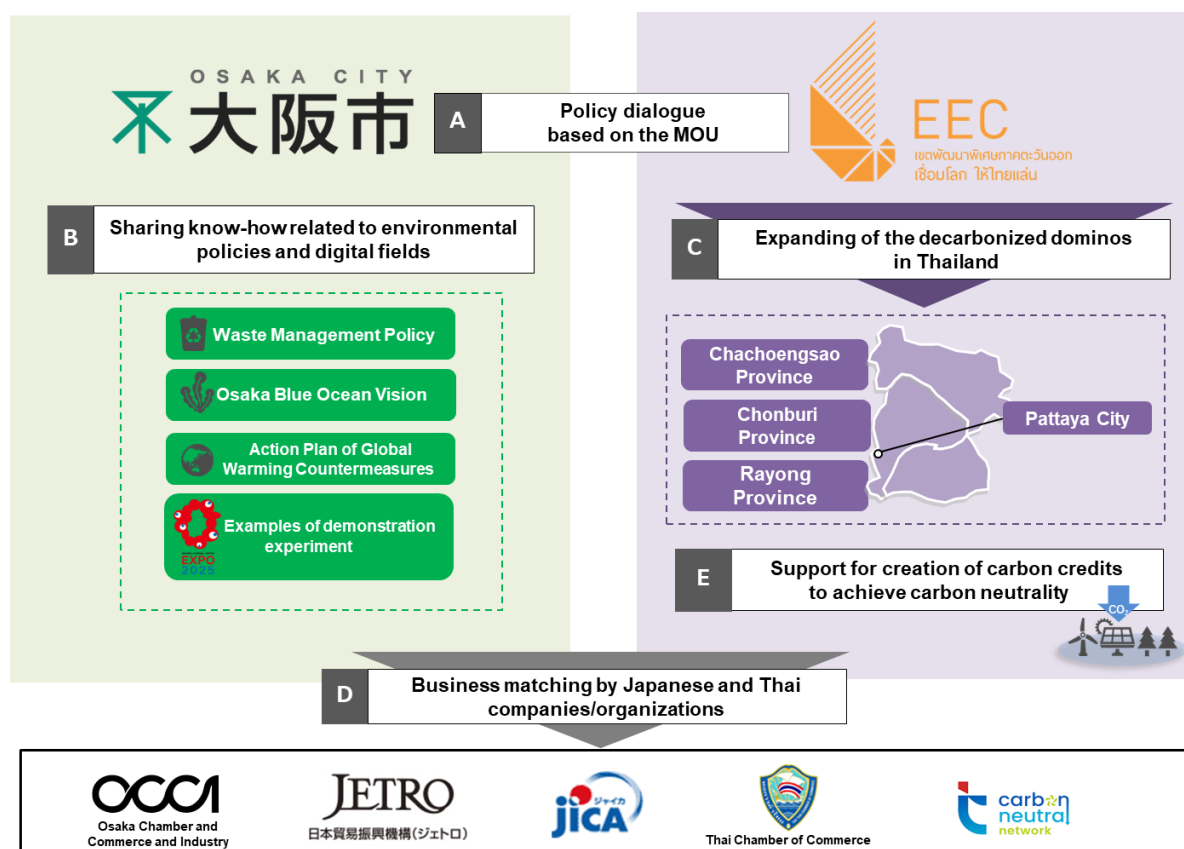
Figure 3.1 MOU Signing Ceremony (Online)

3.2 Implementation Menu and Results

Based on the previously mentioned MOU, Osaka City and EEC aim to support the implementation of the BCG economy model promoted by the Thai government to build a decarbonized society in EEC.

In this fiscal year, in addition to collaboration with EEC, the Project also collaborated with Industrial Estate Authority of Thailand (IEAT) and other organizations to promote knowledge sharing in the environmental field. In addition, several workshops were held in cooperation with the Osaka Chamber of Commerce and Industry, as in the previous fiscal year. The workshops promoted business matching between Thai and Japanese companies, and initiated cooperation with the Thai Chamber of Commerce and Industry to further expand the network.

The relation of this year's 5 activities (A-E) is shown in Figure 3.2, and implementation menu and results are shown in Table 3.1.



Source : Prepared by Nippon Koei

Figure 3.2 City-to-City Collaboration menu in FY2023

Table 3.1 Activity Menu and Results for the City-to-City Collaboration FY2023

Menu A: Policy dialogue based on the MOU	Based on the MOU between Osaka City and EEC, a policy dialogue is held about once a year to ensure cooperation toward the formation of a decarbonized society.
Result	A face-to-face mayoral-level policy dialogue was held at Osaka City Hall on January 25, 2024.
Menu B: Sharing know-how related to environmental policies and digital fields	Osaka City shares its environmental measures and digital sector experience with the EEC, which promotes the BCG economic model and aims to reduce GHG emissions, particularly in the industrial sector.
Result	At the policy dialogue in January 2024, Osaka City's Global Warming Action Plan (Area Policy Section) and other achievements were shared.
Menu C: Expanding of the decarbonized dominos in Thailand	The goal is to expand the zero-carbon area from Osaka City to the EEC and the three provinces in the EEC by implementing the "decarbonized dominos" that Japan is promoting in Thailand.
Result	By the last fiscal year, discussions were held with Pattaya City in the EEC region. In addition, the JCM scheme and activities of Japanese companies were introduced to Thai government-related organizations implementing decarbonization and energy conservation-related activities in the EEC region.
Menu D: Business matching by Japanese and Thai companies/organizations	Collaborate with Osaka Chamber of Commerce and Industry, Thai Chamber of Commerce and Industry, and Thai Carbon Neutral Network (TCNN) to expand networking with Osaka City, EEC, and private companies.
Result	In collaboration with the Chamber of Commerce and Industry and the Consulate-General of Thailand in Osaka, the Green Needs Seminar was held in June, the Business Matching Seminar in August, and the Business Workshop in January.
Menu E: Support for creation of carbon credits to achieve carbon neutrality	In order to create carbon credits, which are attracting growing interest in Thailand, the Project participates in the activities of the Thai Carbon Neutral Network (TCNN), a business organization promoting decarbonization in Thailand, and support the creation of credits through JCM and Thailand's credit system (T-VER), etc.
Result	Collected information on carbon credit trends in Thailand through TCNN and held discussions with Thai companies to create credits.

Source: Prepared by Nippon Koei

3.2.1 Menu A: Policy Dialogue based on the MOU

Based on the MOU between Osaka City and EEC indicated in 3.1, EEC officials were invited to the first policy dialogue in Osaka. At the beginning of the policy dialogue, a courtesy visit was made to the Mayor of Osaka City, and it was agreed that further cooperation will be strengthened through dialogue with the Secretary General of EECO. The following is a summary of the courtesy visit to the Mayor and the policy dialogue.

Date/Time January 25, 2024 10:30 - 12:35

Location Osaka City Hall

Participants Osaka City (13 people)

EECO (5 people)

IEAT (2 people)

Consulate-General of the Kingdom of Thailand in Osaka (2 people)

Nippon Koei (3 people)

Purpose Dialogue between Osaka City and EEC to create a decarbonized society for a BCG (Bio, Circular, Green) economy

Program

#	Agenda	Presenter
Courtesy Visit on the Mayor		
1	Opening remarks and introduction of participants	Mr. Yokoyama, Mayor of Osaka City Dr. Chula, Secretary General of EECO
2	Presentation of commemorative gifts and photo	—
Policy Dialogue		
1	Opening remarks	Mr. Takahashi, Vice Mayor of Osaka City Dr. Chula, Secretary General of EECO
2	Presentation from EEC "New EEC Development Plan and Green Investment Promotion"	Dr. Chalachit, Assistant Secretary General of EEC
3	Presentation from Osaka City "Osaka City's Global Warming Countermeasures."	Mr. Okamoto, Director of Environment Bureau, Osaka City
4	Presentation of IEAT "Development of Green Industrial Parks in Thailand"	Mr. Nalinee, Deputy Governor, IEAT
5	Presentation of Nippon Koei "Introduction of a case study of project formulation using JCM in Thailand"	Nippon Koei
6	QA, Discussion	—
7	Closing remarks	Mr. Akrapong, Royal Thai Consulate-General, Osaka

Overview of Policy Dialogue:

At the beginning of the policy dialogue, the Deputy Mayor of Osaka City made a statement on the JCM formulation based on the public-private partnership between EEC and Osaka City under the MOU, and Osaka City's efforts to achieve the goal of net zero GHG emissions in

2050. The Deputy Mayor of Osaka City stated that Osaka City attaches great importance to the international expansion of environmental business and hopes that this policy dialogue will accelerate decarbonization in the EEC.

Dr. Cholachit, Assistant Secretary General of EEC, then gave an introduction on the efforts in the EEC. The EEC is a model region for the Thai government's BCG economy, and a five-year plan to promote BCG investment is under development and will be approved soon (January 2024). In addition, there was interest in the fact that this City-to-City Collaboration would be a good investment opportunity for companies, given the focus on investment promotion in four areas: renewable energy, bioenergy, green infrastructure, and waste management.

In response, Mr. Okamoto, Director of Environment Bureau of Osaka City introduced the Osaka City's "Action Plan of Global Warming Countermeasures". In addition to specific examples such as energy efficiency improvements and waste-to-energy generation, the action plan also highlighted five concepts for a decarbonized society: (1) a city where people live with decarbonized energy, (2) a city where decarbonization mindset and actions are widespread, (3) a sustainable city that incorporates decarbonization mechanisms, (4) a city that leverages diverse ties to lead decarbonization, and (5) a city that is prepared for climate change and is not afraid to act.

Mr. Nalinee, Deputy Governor of IEAT, emphasized that the three provinces in the EEC region are priority areas for IEAT's green industrial park development, and that Japan is one of the most important investment countries in Thailand, accounting for 30% of total investment. IEAT has announced a policy to reduce GHG emissions to achieve carbon neutrality by 2022, and it is expected that this City-to-City Collaboration will build a cooperative relationship for specific initiatives toward decarbonization in the coming year and beyond.

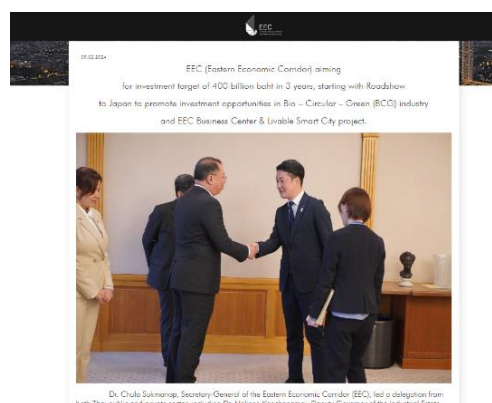
In the last presentation, Nippon Koei introduced a case study of project formulation using JCM in Thailand. More than 50 JCM projects have already been formulated in Thailand, and the presentation looked ahead to the future implementation of decarbonization activities in cooperation with the Japanese and Thai private sectors with the support of both cities.

In the exchange of opinions between the two cities following each presentation, they agreed that Osaka/ Kansai companies have strengths in the BCG economy, which is the focus of the EECO, and that they will further cooperate to form decarbonization projects through this alliance.



Policy Dialogue

Source : Prepared by Nippon Koei



Courtesy visit on the Mayor (from EEC news release)
(Dr. Chula, EECO and Mr. Yokoyama, Osaka City)

Figure 3.3 Policy Dialogue of Osaka City and EEC

3.2.2 Menu B: Sharing Know-how related to the Environmental Policies and Digital Fields

EEC aims to become a "Net Zero Carbon Emission area for industrial Sector" through the implementation of the BCG economy model. In addition, the Eastern Economic Corridor of Innovation (EECi), located in Rayong Province within EEC region, is promoting innovation using the advanced technologies under the leadership of the National Science and Technology Development Agency (NSTDA).

Osaka City visited EECi in August 2023 and heard an explanation of EEC's efforts regarding the bio-industry and smart economy. A summary of the visit is shown below.

Date and Time:	August 29, 2023 11:00 - 14:00
Location:	EECi, Rayong Province
Participants:	Osaka City Environment Bureau: 2 people EECi: several people Nippon Koei: 2 people
Overview of EECi:	As a platform for promoting innovation, EECi supports the following priority industries. <ul style="list-style-type: none">- BIOPOLIS : Innovative Agriculture, Chemical and Bioprocess Technology- ARIPOLIS: Automation, Robotics- FOOD INNOPOLIS : Food Automation- SPACE INNOPOLIS : Aviation, Aerospace



Source : EECi HP

Figure 3.4 Platform in EECi

Visit Overview:

Dr. Prapat of EECi gave an overview of EECi and introduced that Sumitomo Heavy Industries has been active in EECi since July 2023, setting up a booth in EECi. EECi expects other companies in Osaka City to actively invest and conduct joint research in EECi in the future.

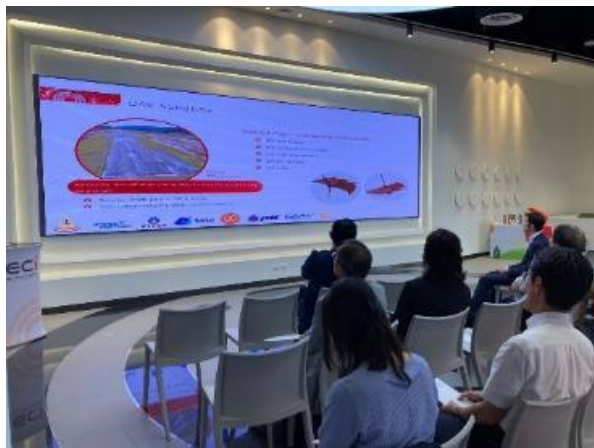
After the explanation, a tour of the facilities in EECi was conducted. After visiting the SMC (Sustainable Manufacturing Center) to observe the status of research on various types of automation in the industrial sector, the group visited Bio Polis. The tour observed the status of research on advanced demonstration projects and practical applications for various agricultural issues in Thailand's major industries.



EECi



EECi



EECi Visit



EECi Visit

Source : Taken by Nippon Koei

Figure 3.5 Photos of EECi Site Visits

3.2.3 Menu C: Expanding of the Decarbonization Dominos in Thailand

1) Meeting with Pattaya City (1st year in Phase 2-)

As part of Phase 2 activities, the EEC has started working with municipalities in the region with the aim of extending the decarbonization dominoes from the EEC to the three provinces in the EEC region and to cities in the region. In the last fiscal year, the Project reviewed the target cities with the EEC and Pattaya City, which has its own financial resources as a special city along with the Bangkok Metropolitan Administration, was selected as a target for collaboration. Face-to-face discussions with Pattaya City have started in November 2022, accompanied by the EEC. An overview of Pattaya City and City Hall are shown below and the environmental needs identified through the interviews are shown in Table 3.3.

Table 3.2 Overview of Pattaya City

Area	53.4 km ²
Population	119,500 (2019)
Major Industry	Tourism
Location	Chonburi Province (165 km southeast of Bangkok)

Source : Prepared by Nippon Koei based on the Pattaya City HP



Source : Taken by Nippon Koei

Figure 3.6 Pattaya City Hall

Table 3.3 Environmental Needs in Pattaya City

#	Item	Current Situation and Needs
1	Waste Management	<ul style="list-style-type: none"> A waste treatment plan is being developed at Lan Island off the coast of Pattaya City. Current processing capacity is 50 t/day and has not yet reached the waste power generation phase. Pattaya City is aiming for 100% waste disposal rate in the city. Disposal of household food waste is an urgent issue, and there is a high level of interest in separating garbage.
2	Sewerage Management	<ul style="list-style-type: none"> Sewage management in the city is collected and treated in one location. In the future, Pattaya City will consider introducing efficient sewage treatment technology by introducing decentralized and space-saving treatment technology within the city. Although storage tanks are installed in each building, Pattaya City does not monitor its operation, so the proper maintenance practices need to be monitored.
3	Rainwater and Brackish Water Management	<ul style="list-style-type: none"> There is frequent heavy rainfall, management techniques are needed to predict rainfall and drain it to the sea. Though brackish water management has not been discussed so far, maintaining brackish water quality will be an issue and measures need to be considered in the future
4	River Management	<ul style="list-style-type: none"> Pattaya City would like to know about how to comprehensively manage the entire river by the city.
5	Land Management	<ul style="list-style-type: none"> A master plan for land use is being developed with EEC, so Pattaya City would like to know how to develop a master plan. To realize a green economy, Pattaya City will aim to implement the plan in accordance with a master plan over one year.

Source : Prepared by Nippon Koei

It was confirmed that Pattaya City, one of the most popular tourist attraction areas in Thailand, has environmental needs, particularly waste management and water management. With regard to waste disposal, Hitachi Zosen, which already has experience constructing waste disposal facilities in Rayong Province in the south, has been in discussions with Pattaya City since FY2022 regarding the establishment of specific waste disposal facilities.

2) Collaboration with Thai Organizations and Companies

To expand the decarbonization effect in Thailand, it is essential to work with relevant organizations that grant tax benefits and with companies that are actually considering decarbonization in order to promote decarbonization activities in the EEC. Therefore, in this fiscal year's activities, the Project held discussions with IEAT, Thai IPP companies, and others who are implementing activities related to decarbonization and energy savings in the EEC region and examined ways to develop projects.

IEAT

IEAT, established in 1972 under the jurisdiction of the Ministry of Industry, is responsible for the development of sustainable industrial parks in Thailand, with a focus on three provinces in the EEC region under the concept of a green industrial park. In particular, the Smart Park Industrial Estate located in Rayong Province is one of the most important industrial estates because of its proximity to Map Ta Phut port.

Information has been exchanged with IEAT in previous years' projects and concrete discussions are underway, especially following the participation of IEAT's Deputy Governor in the policy dialogue and business workshop held in January 2024. Since IEAT is capable of providing information on various incentives, etc. that contribute to green industrial parks, the Project plans to promote the formulation of the projects by utilizing IEAT's network and information.

BCLP Power Ltd.

The company is an IPP operator in Thailand and is currently implementing an ammonia co-firing project and other projects under the METI scheme. Discussions began this year and will continue toward formulating a project, as there is a high level of interest in applying to the JCM model project.



Information sharing through IEAT

Source: Taken by Nippon Koei



Meeting with BCLP

Figure 3.7 Meeting with IEAT and BCLP

3.2.4 Menu D: Business Matching by Japanese and Thai Companies/organizations

During the three years of Phase 1, Osaka City and EEC strengthened their collaboration to build relationships between the two cities and to realize a decarbonized society. In this year, the second year of Phase 2, the Project has expanded its network with related organizations and hold the multiple opportunities for companies from both cities to interact with each other with the aim of forming decarbonization projects utilizing JCM model projects and other schemes. Table 3.4 shows the main target organizations and activities of collaboration in this year.

Table 3.4 Target Organizations and Activities for Collaboration

#	Organization Name	Activities
1	Osaka Chamber of Commerce and Industry (OCCI)	<ul style="list-style-type: none"> On June 27, 2023, "Green Needs Seminar in Thailand" related to the Japan-ASEAN Business Promotion Platform was conducted online with about 150 participants (details are shown in 1) below). A business matching seminar was held in Bangkok, Thailand on August 30, 2023, with about 40 participants (details are shown in 2) below). A business workshop was held in Osaka on January 25, 2023, with about 70 participants (details are shown in 3) below). On January 26, 2023, a meeting was held with the EEC and related organizations and companies in the conference room of the Osaka Chamber of Commerce and Industry.
2	JICA Thailand Office	<ul style="list-style-type: none"> The Project introduced this year's City-to-City Collaboration projects and examples of Osaka City's overseas collaboration efforts and got the comments on JICA's efforts in Thailand and the possibility of collaboration by JICA Thailand Office.
3	Embassy of Japan in Thailand	<ul style="list-style-type: none"> The Project introduced this year's City-to-City Collaboration projects and examples of Osaka City's overseas collaboration efforts, and also discussed the prospects for JCM credits and T-VERs.
4	Thailand Carbon Neutral Network (TCNN)	<ul style="list-style-type: none"> Nippon Koei joined TCNN last fiscal year for the purpose of understanding credit trends and strengthening the network in Thailand. This year, information was collected through participation in regular meetings and discussions with board members.

Source : Prepared by Nippon Koei

As in the previous year, the Project has continued to strengthen our partnership with the Osaka Chamber of Commerce and Industry (OCCI) this year, holding a total of three related business matching events with the aim of discovering Osaka and Kansai companies that are considering overseas deployment of energy-saving and renewable energy technologies in the ASEAN region. A summary of each event and the activities that took place on the day are shown below.

1) OCCI Green Needs Seminar in Thailand

Date/Time: June 27, 2023 16:00 - 17:00 (Japan)

Venue: Online: Zoom

Participants Total: 154 people

:

Thai side: EECi, A.J. Plast Pcl., SCG Packaging Pcl.

Japan side: Osaka City Environmental Bureau, OCCI, JETRO, National Institute of Agriculture, Forestry and Fisheries Policy, Nippon Koei, private companies, etc.

Purpose: Introduction of carbon neutral technologies, products, etc. required by local companies and organizations

Program:

#	Agenda	Presenter
1	Speech: Trends in the Green Sector in Thailand	Nippon Koei
2	Presentation 1: Business Description by Thai Company (1)	A.J. Plast Pcl.
3	Presentation 2: Business Description by Thai Company (2)	SCG Packaging Pcl.
4	Presentation 3: Industry-academia-government collaboration in Thailand and possible collaboration with Japanese companies	EECi
5	QA	—
6	Introduction of the activities of the "ASEAN-Japan Business Promotion Platform" and future plans	OCCI

Overview: The purpose of this seminar was to share with the Japanese side the technology and other needs in Thailand and match them with interested Japanese companies. Nippon Koei opened the session with a presentation on "Trends in Thailand's Green Sector," explaining the main points of Thailand's National Energy Plan and the potential of climate change mitigation measures, followed by an introduction of the City-to-City Collaboration, JCM, and JCM model projects.

After introducing two Thai companies interested in introducing renewable energy and energy conservation and case studies from the EECi, OCCI introduced the activities of the "ASEAN-Japan Business Promotion Platform".

日本アセアンビジネス促進プラットフォーム

現地企業・団体が求めるカーボンニュートラル
関連技術・製品等を一挙に紹介いたします！

**タイにおける
グリーンニーズ発表会**

世界的に脱炭素への動きが加速する中、タイは2050年までのカーボンニュートラルを掲げており、昨年のCOP27ではプラユット首相が気候変動への取り組み強化を表明しました。さらに同国政府は**自国産業の高度化と環境対応の実現を目指すBCG(バイオ(Bio)-循環(Circular)-グリーン(Green))経済モデル**を積極的に推進しているなど、グリーンビジネスの海外展開において大いに注目を集めている国です。そこで今回は、タイで求められている技術等のニーズについて日本側と共有し、関心を持つ**日本企業とのマッチングイベントを開催します**。あわせて、タイで行われるグリーン分野の現地視察ミッション(8月頃を予定)の視察についてにもご案内いたしますので、奮ってご参加ください！

こんな方におすすめ！

- ✓ グリーンビジネスへの事業参入に関心がある方
- ✓ 省エネ・再生技術で海外展開を検討中の方
- ✓ 他国・地域で既に展開実績をお持ちの方

開催概要

日 時 2023年6月27日(火)
16:00~17:00(日本時間)

開催方法 オンライン(ZOOMウェビナー)

参加費 無料

言語 日本語
※日本語通訳あり

主催 大阪商工会議所
共催 日本工務局

協力 (一社)貿易・産業協力振興財団(THCI)
※本事業はTHCIを主催機関として実施しております

プログラム

1.開演(16:00-16:20)
タイにおけるグリーン分野の動向
・日本工務局株式会社

2.演説(16:20-16:50)(1社10分程度×3社・団体)
・(1)A.J. Plast Pcl.
事業内容：包装フィルムの製造・販売
関心分野：JCMを活用した省エネ設備導入
・(2)SCG Packaging Pcl.
事業内容：パッケージング事業及び環境事業
関心分野：2050年までのネットゼロを実現するための省エネ・省エネ導入
・(3)タイ東部経済回廊イノベーション特区 (EECI)
・数字化業務、日系企業との連携可能性について発表
・質疑応答

3.本事業要約紹介(16:50-17:00)
・日本アセアンビジネス促進プラットフォームの活動紹介
ならびに今後の予定について
・大阪商工会議所 国際部

申込方法 下記URL、もしくは右記QRコードから参加申込ください。
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お問い合わせ 大阪商工会議所 国際部(管・南米) TEL：06-6944-6400 / メール：info@osaka.cci.or.jp

Japan-ASEAN Business Promotion Platform

Introduce carbon-neutral technologies and products needed by companies/organizations in Thailand

Green Needs in Thailand

While the global movement toward decarbonization is accelerating, Thailand has pledged to be carbon neutral by 2050, and at COP27 last year, Prime Minister Prayut announced that the Thai government would strengthen its efforts to address climate change. In addition, the Thai government is actively promoting the BCG (Bio-Circular-Green) economy model, which aims to reform its existing industries and promote environmental responsiveness. Therefore, this event share with the Japanese side the technology and other needs required in Thailand, and hold a matching event with Japanese companies interested in collaboration. In addition, the overview of the Green Field Visitation to Thailand (scheduled for around August) will be announced. We look forward to your active participation!

Expected Participants

- ✓ Those who are interested in entering the green business markets
- ✓ Those who are considering overseas expansion of energy-saving and renewable energy technologies
- ✓ Those who already have experience in other countries/regions

Overview

Date and Time June 27, 2023
14:00-15:00 (Thai)
16:00-17:00 (Japan)

Venue Zoom

Fee Free

Language Simultaneous Interpretation (Japanese-English)

Sponsor Osaka Chamber of Commerce and Industry

Co-Sponsor Nippon Koei Co., Ltd.
Foundation for International Trade and Industrial Co-operation

Program

1. Introduction (14:00-14:20)
Green Trends in Thailand
(1) Eastern Economic Corridor (EEC) Office
(2) Nippon Koei

2. Presentation (14:20-14:50)
(1) A.J. Plast Public Company Limited.
(2) SCG Packaging Public Company Limited.
(3) EECI
Q&A

3. Introduction of OCCI (14:50-15:00)
Introduction of activities of "Japan-ASEAN Business Promotion Platform" and future plan

Registration

Please register for the seminar at the URL below or QR code.
URL: <https://www.osaka.cci.or.jp/event/seminar/20230627/11230620012.html>
The registered information will be shared with the speakers as a list of participants.

Contact Osaka Chamber of Commerce and Industry (Mr. Naki, Mr. Shimizu)
Mail: info@osaka.cci.or.jp

#1 Seminar flyer (Japanese)

#2 Seminar flyer (English)

Source : Prepared by Nippon Koei

Figure 3.8 Seminar Flyers

2) Thai-Japan Green Business Matching Seminar

Date/Time: August 30 2023 14:00 - 17:30 (Thai)

Venue: Holiday Inn Bangkok Silom (Bangkok)

Participants Total: 40 people

:

Thai side: Royal Thai Consulate-General, Osaka, Thai Chamber of Commerce, Thai companies etc.,

Japan side: Osaka City, OCCI and member companies, Nippon Koei etc.,

Purpose: Matching of Thai needs and Osaka companies' technologies

Program:

#	Agenda	Presenter
1	Opening Remarks	Royal Thai Consulate-General, Osaka
2	Presentations by Thai companies 1	A.J. Plast Pcl.
3	Presentations by Thai companies 2	Mitr Phol Group
4	Presentations by Thai companies 3	Somboon Advance Technology Pcl.
5	Greetings from Japan	Osaka City
6	Presentations by Japanese companies 1	Jikantechno.inc
7	Presentations by Japanese companies 2	MARINEX CO,Ltd,
8	Presentations by Japanese companies 3	Si Sare International
9	Presentations by Japanese companies 4	THAI C.A.P
10	Closing Remarks	Nippon Koei
11	Networking Reception	—

Overview:

After three Thai companies introduced their needs and activities, Osaka companies introduced their technologies, and time was set aside for individual matching. The introductions by each company were as follows.

[Introduction of needs by Thai companies]

- A.J. Plast Pcl. : A packaging film manufacturer. In addition to the company's business activities and its efforts to become carbon neutral, the presentation introduced the introduction of EV trucks and chillers, which the company is considering utilizing JCM.
- Mitr Phol Group: A sugar refinery company. The presentation introduced the company's business operations and its efforts to become carbon neutral by 2030 through the use of bio-based resources.
- Somboon Advance Technology : A manufacturer of automotive components. The presentation introduced the company's business activities and its aggressive efforts to introduce renewable energy and energy-saving equipment and to utilize credits.

[Technology Introduction by Japanese Companies]

- Jikantechno.inc : Utilization of biomass, such as rice silica
- MARINEX CO.,Ltd. : Utilization of plant-derived resources
- Si Sare International : Seabed purification system using micro-nano bubbles
- THAI C.A.P CO.,LTD. : ESCO business, air purification technology



#1 Opening Remarks (Mr. Nijanant Buranasiri consul)



#2 Presentation by Thai Company

Source: Taken by Nippon Koei

Figure 3.9 Thai-Japan Green Business matching Seminar

3) Business Workshop Seminar

Date/Time: January 25 2024 15:00 - 17:30 (Japan)
 Venue: Obic Hall C, Obic Midosuji Building (Osaka City)
 Participants: Total : 68 people
 : Thai side: EEC, Royal Thai Consulate-General, Osaka, IEAT, etc.
 Japan side: MOEJ, Osaka City, OCCI, private companies, etc.
 Purpose: Foster interest in Osaka companies to enter the EEC by introducing incentives for green investment in the EEC and decarbonization and initiatives in both cities

Program:	#	Agenda	Presenter
	1	Opening Remarks	EEC and Osaka City
	2	New EEC development plan and Green Investment Promotion	Assistant Secretary General, EEC
	3	Green industrial estate development	Deputy Governor, IEAT
	4	FTI's development plan for renewable energy sector in Thailand and carbon neutrality supporting system	Vice Chairman of FTI (video message)
	5	Decarbonization in power generation sector	Managing Director, BLCP
	6	Green Investment and Support from the Banking Sector	Executive Vice President, Bangkok Bank Public Company Limited
	7	Introduction to City-to-City Collaboration Program by MOEJ	MOEJ
	8	Introduction of our Waste-to-Energy Business and possibility in EEC area	Hitachi Zosen Corporation
	9	Sumitomo Corporation / Decarbonization business introduction	Sumitomo Corporation Asia & Oceania
	10	QA	—
	11	Closing Remarks	Royal Thai Consulate, Osaka and OCCI

Overview: In addition to EEC, related public corporations and companies in the industrial, power, and financial sectors presented their initiatives. MOEJ explained the City-to-City Collaboration and introduced two of the participating companies in the City-to-City Collaboration: Hitachi Zosen Corporation's waste-to-energy business and Sumitomo Corporation Asia & Oceania's decarbonization-related business.



#1 Opening Remarks by Dr. Chula, EEC



#2 Opening Remarks by Mr. Horii, Osaka City



#3 Presentation by EECO



#4 Presentation by IEAT



#5 Presentation by BLCP



#6 Presentation by FTI



#7 Presentation by Bangkok Bank Public Company Limited



#8 Presentation by MOEJ



#9 Presentation by Hitachi Zosen Corporation



#10 Presentation by Sumitomo Corporation Asia & Oceania



#11 Closing Remarks by Mr. Nijanant, Royal Thai Consulate, Osaka



#12 Closing Remarks by Mr. Shimizu, OCCI



#13 Business Workshop Seminar (1)



#14 Business Workshop Seminar (2)

Source : Taken by Nippon Koei

Figure 3.10 Business Workshop Seminar

3.2.5 Menu E: Support for Creation of Carbon Credits to Achieve Carbon Neutrality

The Thai government has been operating the Thailand Voluntary Emission Reduction Program (T-VER), a domestic carbon trading program, since October 2013. T-VER is managed and operated by the Thai Greenhouse Gas Management Organization (TGO) to promote and support voluntary participation of all sectors in GHG emission reduction activities and trading of carbon credits in the domestic market. In addition, the Thai Carbon Neutral Network (TCNN) was launched in 2021 as a decarbonization initiative, with a growing number of companies endorsing decarbonization.

With the growing momentum toward carbon neutrality, many Thai companies have confirmed a high level of interest in credit generation, including T-VERs. Therefore, the Project considered providing support to companies that are highly interested in environmental initiatives and credit generation, which were identified in previous years' projects.

Table 3.5 Survey Overview and Progress

No.	Item	Progress/Result
1	Desktop Survey (FY2022)	<ul style="list-style-type: none"> Identified 31 Thai companies participating in TCNN that have factories in the EEC region and are related to the industrial, biomass, and digital sectors. For the 31 targeted companies, a desk review was conducted to identify key initiatives related to decarbonization.
2	Interview Survey (FY 2022)	<ul style="list-style-type: none"> Of the 31 companies listed above, interviews were conducted with 15 companies that were deemed to be actively working toward decarbonization to confirm their current challenges and needs.
3	Conducting individual meetings and business matching (FY2023)	<ul style="list-style-type: none"> Of the 15 companies interviewed, face-to-face meeting were held with companies that were particularly interested in the project. In addition, the needs of these companies were communicated through business matching. Interviewed companies : A.J. Plast Pcl., SCG Packaging PCL, Sena Development, Somboon Advance Technology PCL. etc.,

Source : Prepared by Nippon Koei

In addition, information was collected on the EEC Net Zero Roadmap and Action Plan being developed by the TGO (details are described in 1.1.1(2)) and the climate change plans of each prefecture in the EEC region. Based on these plans, the possibility of cooperation as a City-to-City Collaboration will be discussed in the future.

3.3 Activities of the City-to-City Collaboration

To promote the City-to-City collaboration between Osaka City and EEC, various meetings and events with related organizations and companies have been arranged for providing opportunity to exchange opinions, share know-how. In addition, meetings were held with the Ministry of the Environment, Japan to report the progress and results of the activities.

Furthermore, presentations were made at seminars to inform about the City-to-City Collaboration Project and JCM model projects. The details of the City-to-City collaboration activities are shown in Table 3.6.

Table 3.6 Activities related to City-to-City Collaboration

Date	Event	Activities
27 Jun. 2023	OCCI Green Needs Seminar in Thailand (Online)	A seminar for Osaka/Kansai companies to introduce the needs of Thai companies for decarbonization technologies was conducted with OCCI. Nippon Koei made presentations on trends in the green sector in Thailand, City-to-City Collaboration, and examples of JCM utilization.
10 Jul. 2023	Kick-off meeting with MOEJ	The report included details of this year's implementation (policy dialogue, workshops, JCM projects formation, etc.).
28 Aug.-1 Sep. 2023	1st Field Survey	Osaka City officials and Nippon Koei travelled to Thailand and held discussions with EEC, participating companies, the Embassy of Japan in Thailand, the JICA Thailand Office, and others. Factory visits to EECi and JCM candidate projects were conducted. Also, participated in the ASEAN Sustainable Energy Week to gather information.
30 Aug. 2023	Thai-Japan Green Business Matching Seminar	During the 1st Field Survey, a business matching seminar was held under the auspices of OCCI. After three Thai companies introduced their needs, Osaka companies introduced their technologies, and time was set aside for individual matching.
6 Nov. 2023	Progress report to MOEJ	The progress of this year's activities (policy dialogue, workshops, JCM model project formulation, etc.) were reported.
12-17 Nov. 2023	2nd Field Survey	The meeting with EECO to discuss the policy dialogue and workshop scheduled for January was held. The discussion about JCM model projects formulation with participating companies was conducted and began contacting new Thai companies.
25 Jan. 2024	Policy Dialogue	A mayoral-level policy dialogue was held at Osaka City Hall. Both cities shared their efforts toward decarbonization and confirmed that they will further strengthen their collaboration.
25 Jan. 2024	Business Workshop Seminar	A business workshop was held for the purpose of business matching between Japan and Thailand for the promotion of decarbonization, hosted by EEC and Osaka City and co-hosted by OCCI. The presentation materials are attached in Attachment 1.

Date	Event	Activities
26 Jan. 2024	Individual meetings with EEC	The following individual meetings with the EEC were conducted. (1) Osaka Gas (2) OCCI
14 Feb. 2024	Final meeting with MOEJ	The results of this year's activities and explained the planned activities for the following year and beyond were reported.
26 Feb. 2024	City-to-City Collaboration Seminar	Participated in "Seminar on City-to-City Collaboration for Zero Carbon Society" hosted by MOEJ and supported the invitation of EEC official.

Source: Prepared by Nippon Koei

CHAPTER 4 STUDY FOR JCM MODEL PROJECTS FORMULATION

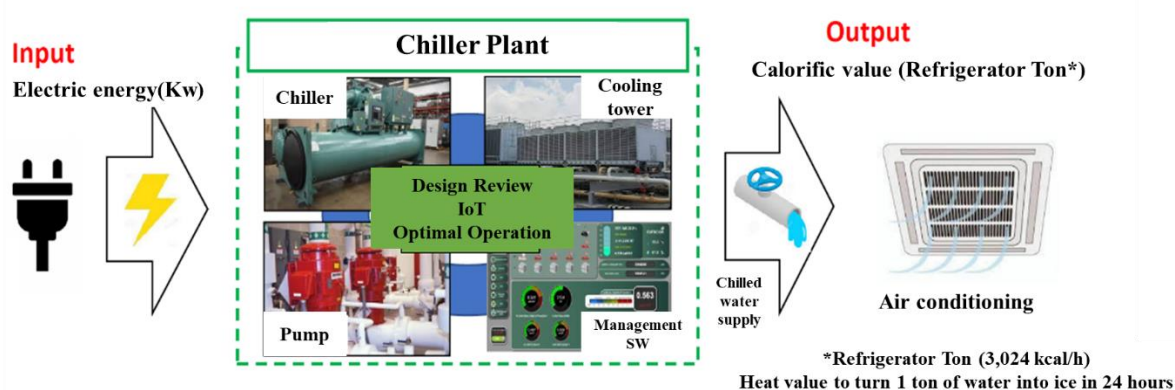
This City-to-City Collaboration project consists of two pillars: (i) City-to-City Collaboration which is exchange between local governments, and (ii) JCM model projects formation by private companies. This chapter shows the implementation status of JCM model projects formulation by Japanese private companies in this fiscal year.

FY2022 was a year in which the economy recovered from the COVID-19 pandemic, so JCM model projects formation by Japanese companies was generally a slow start. From FY2023, Thai companies and Japanese subsidiaries in Thailand have gradually begun to show demand for new capital investment to promote the transition to a decarbonized society in line with their own initiatives. We have also confirmed the corresponding interest in the JCM model project.

However, for various reasons, Thailand was excluded from the JCM model project scheme this year. For this reason, we have received inquiries in anticipation of applications for the next fiscal year, as well as consultations for future project formation. The following is a list of JCM projects that we have supported this year.

4.1 JCM Model Projects Formulation on ESCO Project Utilizing IoT Technology

THS Innovations Co., Ltd. (THS Innovations), which specializes in ESCO, is currently providing ESCO services that make full use of the company's IoT, mainly in the EEC region. Although THS has over 40 years of ESCO experience in Thailand, the company has no experience of JCM projects, and this fiscal year it began various feasibility studies.



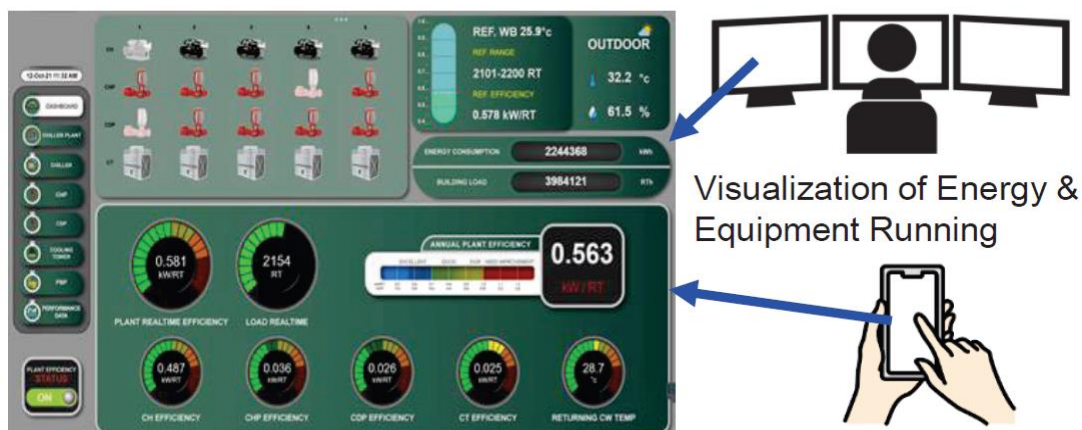
Source: Presentation material of THS Innovation

Figure 4.1 Example of ESCO services by THS Innovations

In addition, THS Innovations is also developing a service that achieves even better results than regular ESCO services by linking its ESCO services to the company's IoT for forecasting and other services. (See diagram below).

[Visualization of Energy and Equipment Running through Cloud]

Can see energy consumption and equipment running by PC or Smart Phone



Source : Presentation material of THS Innovation

Figure 4.2 Example of ESCO services with IoT by THS Innovations

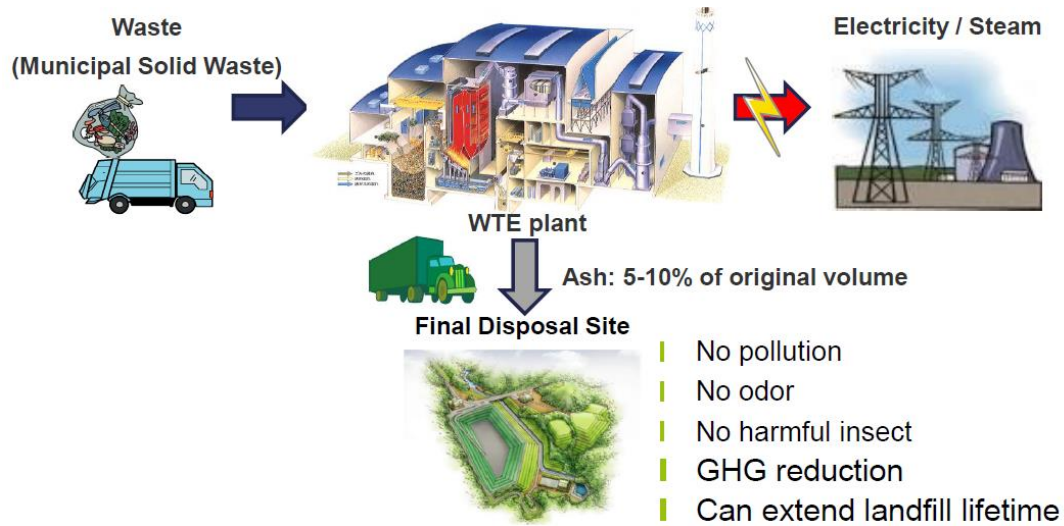
To realize ESCO services, it is necessary that the level of energy prices in the target country and interest in reducing maintenance and management costs are aligned. In Thailand, where there is increasing interest in energy-saving operations in commercial facilities and industrial facilities (factories etc.), ESCO business is expected to become a ways of business management considering decarbonization and BCG in the future. As mentioned above, this year, it was difficult to develop into a JCM model project in Thailand. However, it can be said that the country is moving from the stage of decarbonization= introduction of renewable energy facilities to the stage of promotion of energy conservation in a country where economic development is progressing.

Based on the above, the company expects to form new JCM model projects in the future by utilizing its technology to provide ESCO services at factories and commercial facilities.

4.2 JCM Model Projects Formulation on Waste to Energy

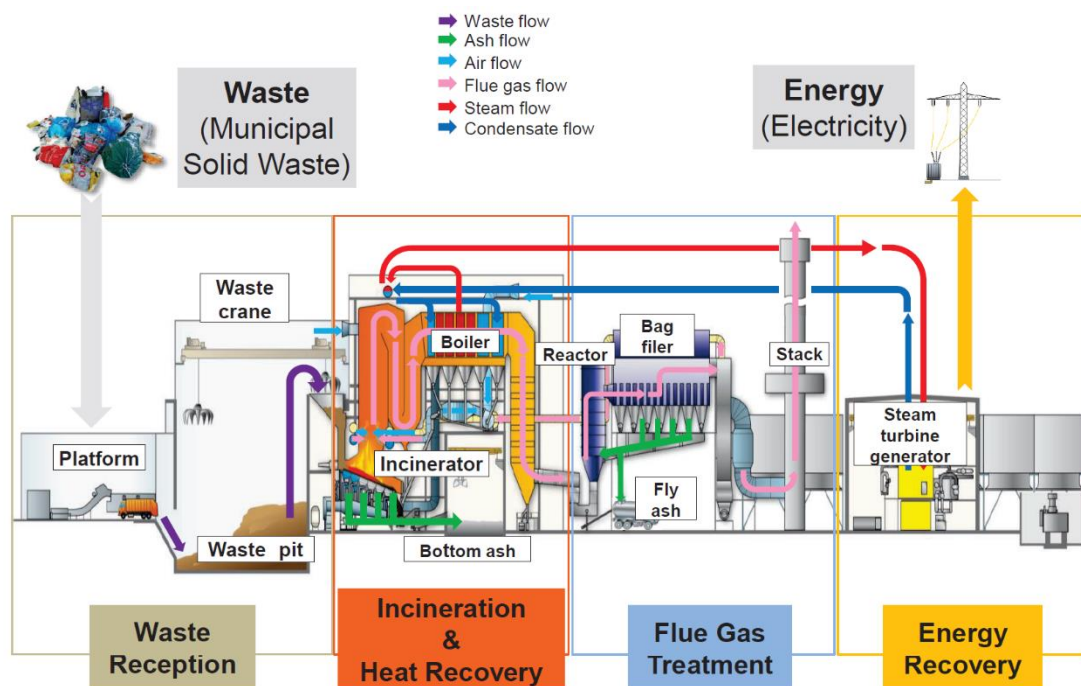
Hitachi Zosen Corporation (Hitachi Zosen) has been participating in this City-to-City Collaboration projects since this fiscal year. The company has experiences of delivering a waste to energy project in Rayong Province in 2021 as an EPC business operator together with a private business operator. Based on this achievement, Hitachi Zosen is proposing a power generation business using refuse-derived fuel (RDF) in the EEC region.

Through this City-to-City Collaboration, Hitachi Zosen has implemented promotion of RDF power generation etc., which conducts actual introduction of facilities along with the realization of decarbonization, together with waste management operation by Osaka City. In 2024 January, Hitachi Zosen explained its activities to the EECO and Thai officials who will visit Japan, and we plan to continue to support this project in the following fiscal years and beyond, with the aim of introducing the technology in the EEC region.



Source : Presentation material of Hitachi Zosen

Figure 4.3 Project Image of Waste to Energy (1/2)



Source : Presentation material of Hitachi Zosen

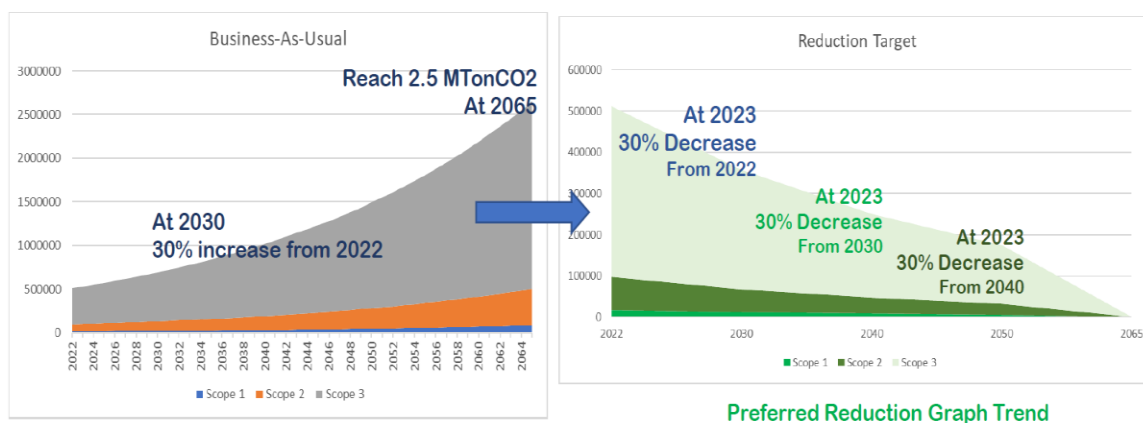
Figure 4.4 Project Image of Waste to Energy (2/2)

4.3 JCM Model Projects Formation Discussions with Thai Companies

This project has been promoting networking between Japanese and Thai companies, and every year deepens exchanges with Thai companies interested in JCM to discuss factory energy conservation and other issues.

A.J. Plast, a food wrapping and paper processing company in Thailand, has been active in decarbonization activities, and is working to obtain T-VERs in Thailand to achieve carbon neutrality by 2050. In addition, the company is a member of the Thailand Carbon Neutral Network (TCNN), an association of companies aiming to become carbon neutral in Thailand.

In addition, the company is considering updating equipment in the plant as Scope 1 and procuring low-GHG emission electricity and installing renewable energy facilities as Scope 2. For Scope 3, the company is aiming for carbon neutrality through the use of recycled materials and carbon absorption/sequestration. The company's decarbonization roadmap is shown below.

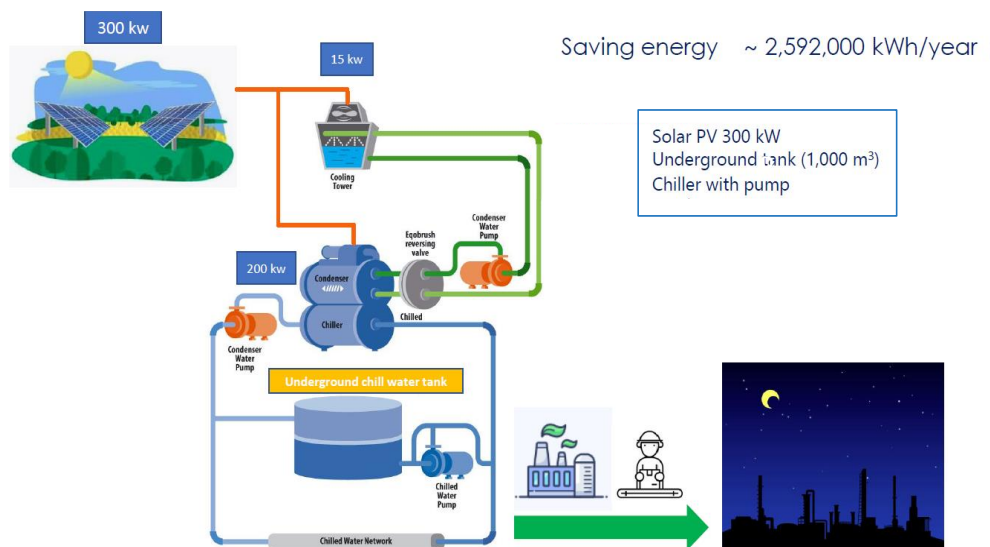


Source : Presentation material of A.J. Plast

Figure 4.5 Decarbonization Roadmap by A.J. Plast

A.J. Plast is currently planning to install a solar power generation system on the roof of its new plant and to operate a high-efficiency refrigeration system using the electricity generated by the system under the JCM model project. In addition, the company is considering converting its existing diesel-powered vehicles to EV vehicles for product delivery. A diagram of the project is shown below.

1: Energy conservation project in factory air conditioning



Source : Presentation material of A.J. Plast Note: The figures in the above chart are tentative.

Figure 4.6 A.J. Plast's proposed factory energy conservation project

A.J. Plast's factory air conditioning system will be energy-efficient with a rooftop solar power generation system and high-efficiency chillers. For nighttime air conditioning, chilled water generated by the chiller will be stored in an underground tank for nighttime use.

2: Project to introduce EV trucks for shuttle delivery



Source : Presentation material of A.J. Plast

Figure 4.7 A.J. Plast's Proposed Project to install delivery EV trucks

Converting the delivery of goods to the Laem Chabang port located near A.J. Plast

(approximately 7 km one-way) from the current diesel vehicles to EV vehicles to achieve a fuel conversion and reduce GHG emissions.

4.4 Discussions on the Formation of JCM Projects by Green Industrial Estates

With the visit of the EECO and Thai officials to Japan in January 2024, discussions with the IEAT were started. The following is IEAT's carbon neutral roadmap as IEAT's decarbonization vision for the future.



Source : Presentation material of A.J. Plast

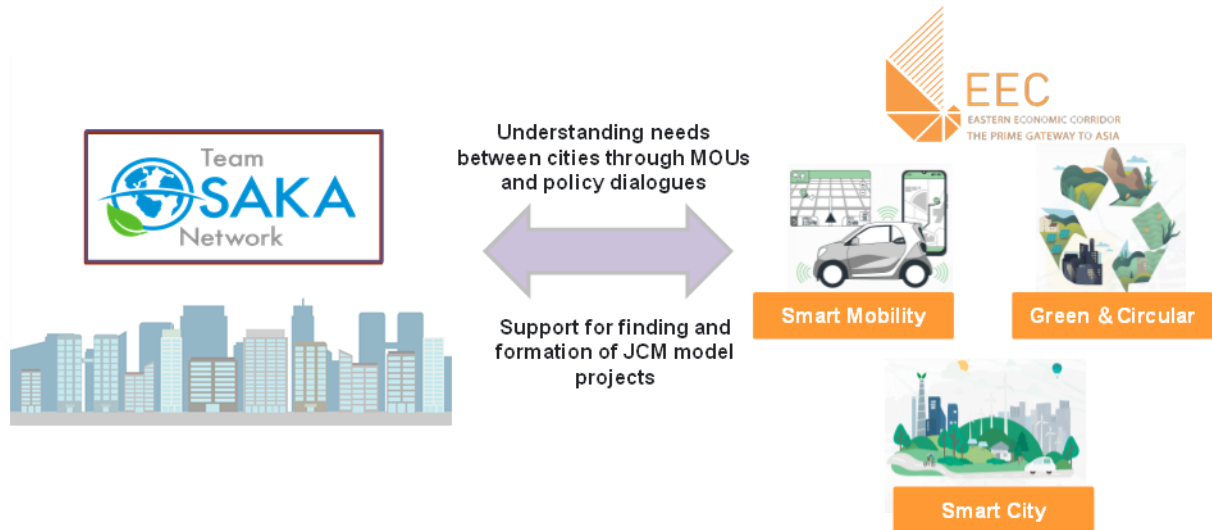
Figure 4.8 Carbon neutral roadmap by IEAT

IEAT, which belongs to the Thai Ministry of Industry, is a government-related authority that constructs, develops, and comprehensively operates and manages industrial estates and industrial estate-related infrastructure in Thailand. All industrial estates in Thailand are managed by IEAT, except for those managed by private operators.

In this City-to-City Collaboration, we have established contacts with IEAT since this fiscal year and have been discussing the promotion of the Green Industrial Park that IEAT has been advocating. Therefore, from the next fiscal year onward, IEAT and Japanese companies will work together to promote activities to realize the Green Industrial Estates.

4.5 Consideration of Future JCM Model Projects in EEC

This year, we concentrated mainly on activities focused on building a network of Japanese and Thai companies, as the adoption of a project in Thailand for the JCM model project was wait-and-see. This enabled us to grasp once again the high level of interest in decarbonization activities in the EEC region and to reconfirm the potential of activities such as carbon credits.



Source: Nippon Koei

Figure 4.9 Conduct city-initiated needs assessment

CHAPTER 5 FUTURE ACTIONS

This fiscal year, based on the results of the JCM model projects formulation survey and City-to-City Collaboration activities conducted, the Project plans to conduct the following activities in the next fiscal year and beyond.

5.1 City-to-City Collaboration Activities in the Next Fiscal Year

In this fiscal year, we focused on networking between Japanese and Thai companies and conducted business matching several times. This has allowed us to deepen our partnerships with various organizations in both Japan and Thailand (e.g., Osaka Chamber of Commerce and Industry, Thai Chamber of Commerce and Industry, IEAT, etc.).

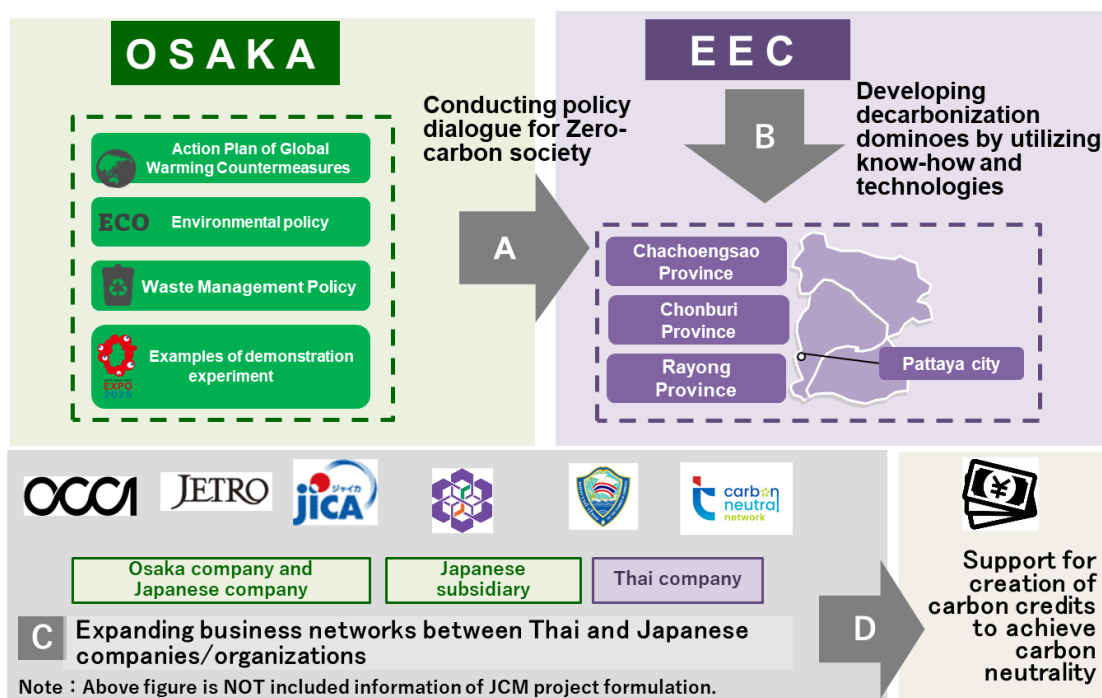
Taking advantage of this situation, we plan to take the initiatives listed in the table below at the level of City-to-City Collaboration. In the following fiscal year, "A: Implementation of policy dialogue based on the partnership agreement (MOU)" and "B: Sharing of Osaka City's know-how on environmental measures and digital fields" up to the previous fiscal year will be combined into one item and implemented as "Item A".

Table 5.1 City-to-City Collaboration activities in the next fiscal year

#	Items	Descriptions
A	Conducting policy dialogue for a decarbonized society	Based on the MOU between Osaka City and EEC, there will be at least one regular meeting and a policy dialogue to achieve a decarbonized society in both cities. To the extent possible, we will not limit ourselves to the exchange of information between the two cities, but will provide information and promote activities that will serve as an opportunity for activities in both cities.
B	Implement decarbonization dominoes by utilizing the knowledge and experience of Osaka City and Japanese companies	After sharing with EEC the know-how and achievements of Osaka City and others toward a decarbonized society, the project will be deployed to the three provinces in the EEC region and other Thai organizations (IEAT, etc.) for its realization, with the aim of achieving a decarbonization dominoes in Thailand. In particular, there are many industrial estates in the EEC region, and the need for decarbonization technologies in these estates is very high. We aim to realize green industrial estates by expanding into these areas.
C	Expansion of business network by Japanese and Thai companies and organizations	Continuing from this year, we will deepen collaboration among Japanese and Thai companies and organizations, and actively hold business matching and other events to formulate projects under the JCM model project and other schemes.
D	Support for creation of credits, etc. to achieve carbon neutrality	T-VERs already in operation in Thailand are now preparing for further development by establishing a new framework, such as Premium T-VERs, with a view to international expansion. In this regard, many Thai companies are interested in creating and acquiring credits as a means to achieve their own carbon neutrality. In light of this, we will provide support for decarbonization in EEC.

Source: Prepared by Nippon Koei

The correlation between City-to-City Collaboration activities (A-D) in the table above is shown in the figure below.



Source: Nippon Koei

Figure 5.1 Image of City-to-City Collaboration activities in the next fiscal year

This year, we did not limit our collaboration to the members at the start of the project (Osaka City, EECO, and private companies that have participated in the project from the beginning) but promoted activities with a view to interacting with a variety of companies and organizations. In addition, the activities of this City-to-City Collaboration were widely disseminated not only to Japanese companies, but also to Thai companies and others.

This allowed us to have new partnerships and exchanges with not only Japanese companies, but also with Thai companies seeking some action to address their interest in decarbonization and realization of the BCG economy. Therefore, we plan to use this opportunity to promote various initiatives in the next fiscal year.

Since last year, this project has positioned the City-to-City Collaboration as a platform for Japanese and Thai companies and organizations to decarbonize their businesses and realize the BCG economy. By utilizing this platform, it is expected that decarbonization activities will be coordinated in a win-win situation, in line with the EEC's goal of realizing a BCG economy and society, and the objectives of the participating Osaka City, Japanese companies, and Japanese organizations. This City-to-City Collaboration is scheduled to continue in the next fiscal year, with the expectation of further collaboration with the Osaka Chamber of Commerce and Industry, which joined the City-to-City Collaboration in the previous year.

5.2 Development of JCM Candidate Projects in the Next Fiscal Year

This year, the adoption of the JCM model project was postponed due to discussions by the Japan-Thailand Joint Committee. However, interest in JCM remains high among Thai companies, many of which are Japanese-affiliated and have a strong interest in decarbonization

technologies and products, and some are calling for the resumption of the JCM model project or its implementation as a private-sector JCM.

Based on the above, from the next fiscal year onward, we will aim to form JCM model projects in the following areas, focusing on the interests of Thai parties.

Table 5.2 JCM candidate projects in the next fiscal year

#	JCM candidate projects	Descriptions
1	Energy conservation implementation projects at factories	In the EEC region, companies with a high interest in developing industrial estates and introducing advanced technologies, including decarbonization, are engaged in activities. Support will be provided to these companies, especially those interested in energy conservation in their factories, along with introduction of the JCM scheme.
2	EV Vehicle Introduction Projects	In the EEC region, installation of EV stations is also being actively implemented. For this reason, the company will study the introduction of EV vehicles in the EEC region, focusing on A.J. Plast's projects.
3	JCM projects assuming the introduction of new technologies such as hydrogen	Many companies in the EEC region are interested in hydrogen production and utilization in port areas. Therefore, in the next fiscal year, we will expand the network of such start-ups and provide support through the JCM scheme.
4	Private-sector JCM projects	Since last year, we have heard from Japanese companies and others that they are interested in the "private-sector JCM" scheme that the Japanese government has announced. Therefore, in order to broaden the scope of JCM, we will also focus on the formation of projects mainly funded by the private sector.

Source: Nippon Koei

5.3 Future of City-to-City Collaboration between Osaka and EEC

This City-to-City Collaboration started in 2019, with the next year being the third year of Phase 2. The City-to-City Collaboration is a good opportunity to promote the JCM model projects and to share the knowledge and achievements of Japanese municipalities in decarbonization with partner countries and municipalities.

In particular, EEC has developed a wide variety of multilayered activities, combining with the timing of its efforts to promote cooperation with various countries and organizations under the banner of realizing the BCG concept. The accumulation of annual activities in this project has led to an increase in the number of people involved in City-to-City Collaborations, and this accumulation can be evaluated as a forum for exchange centering on Osaka and EEC.

This kind of international city-level collaboration is an unprecedented achievement in Japan's Official Development Assistance (ODA), and we believe that this opportunity must not be lost, but must be maintained as an opportunity for contact at the city level.

Based on the above, we plan to discuss how to continue this City-to-City Collaboration in the next fiscal year and beyond, and to consider expanding it from a temporary activity to a permanent one by holding discussions with the parties concerned.