



Ministry of the Environment

FY2022 City-toCity Collaboration Programme for
Zero-Carbon Society

**Realizing carbon neutral under the Bangkok
Master Plan on Climate Change
Report**

March 2023

Overseas Environmental Cooperation Center, Japan

City of Yokohama

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Abbreviations

ADB	Asian Development Bank
AEDP	Alternative Energy Development Plan
AIM	Asia Pacific Integrated Model
APEX	Advanced Practices for Environmental Excellence in Cities
BAU	Business As Usual
BMA	Bangkok Metropolitan Administration
C40	C40 Cities Climate Leadership Group
CCS (DOE/CCS)	Sub-division for Climate Change Strategies/Department of Environment
COP	Conference of the Parties
DOE	Department of Environment
DPW	Department of Public Works
EEDP	Energy Efficiency Development Plan
GHG	Greenhouse Gas
IFC	International Finance Corporation
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
M&E	Monitoring and Evaluation
MRV	Measurement, Reporting and Verification
NAP	National Adaptation Plan
NDC	Nationally Determined Contributions
PCD	Pollution Control Department
PPP	Public-Private Partnership
SC	Steering Committee
SED	Strategy and Evaluation Department
TF	Task Force
TGO	Thailand Greenhouse Gas Management Organization
UNFCCC	The United Nations Framework Convention on Climate Change
WG	Working Group

I Background of the project

Since the late 2000s, the BMA has been planning and implementing climate change measures with support from the Japanese government. In 2009, the BMA developed the "BMA Action Plan on Global Warming Mitigation 2007-2012" with the support of the Japan International Cooperation Agency (JICA), followed by the JICA technical cooperation project "Project for Bangkok Master Plan on Climate Change 2013 - 2023" and its successor project "Project for Strengthening Institutional Capacity for the Implementation of Bangkok Master Plan on Climate Change 2013-2023", BMA has been working on the formulation and implementation of the Climate Change Master Plan. BMA has also promoted cooperation with the City of Yokohama to form mitigation projects, including the JCM Model Project, through the "City-toCity Collaboration Programme for Zero-Carbon Society " launched by the Ministry of the Environment in 2013. In addition, the Thai government has recently set mitigation target for 2030 and long-term target for 2050 and beyond, and from the perspective of GHG emissions, Bangkok, the largest city in Thailand, is required to take more proactive climate change measures toward decarbonization.

In response to the efforts of the BMA, the City of Yokohama has been providing support for climate change measures through dispatching officials to BMA and accepting training visits to Japan since 2009 based on a memorandum of understanding with BMA on technical cooperation for sustainable urban development, and the two cities have built a longstanding relationship of trust. The City of Yokohama is actively pursuing climate change initiatives and has a "Zero Carbon Yokohama" goal of decarbonization by 2050, and Yokohama has many useful insights for the BMA to use in its decarbonization efforts. The BMA has strong expectations for learning from Yokohama's experience and expertise in climate change policy as well as for forming projects through collaboration between the private sectors of the two cities.

At the start of this project, the Director of the Yokohama International Bureau and the Board member of OECC paid a courtesy visit to the Department of Environment of BMA in December 2021, and held director-level discussions in a hybrid meeting, and reached a basic agreement to cooperate in the implementation of this project.

This project built on the existing cooperative relationship between the two cities and further strengthened and utilized a public-private partnership platform involving the private sector to promote the implementation of the new Bangkok Climate Change Master Plan at both the policy and project levels.



Photo: Signing of MOU for cooperation between BMA and City of Yokohama



Photo: Online meeting with Director of Department of Environment of BMA and Director of International Bureau of City of Yokohama (December 2021)

II Overview of the project

1. Climate change policies of Thailand and Bangkok

(1) Climate change policies of Thailand

Thailand has incorporated climate change measures into its National Economic and Social Development Plan since 2007, and is implementing climate change measures based on its plans including Climate Change Master Plan and Electricity Development Plan. In addition, Thailand, as a party to the Paris Agreement, submitted the NDC in 2016 that set a mitigation target of a 20-25% reduction in GHG emissions compared to BAU by 2030. Furthermore, the second updated NDC submitted in November 2022 updated the mitigation target of 30% to 40% reduction in GHG emissions compared to BAU by 2030. In November 2021, Thailand set long-term goals of becoming carbon neutral by 2050 and achieving net-zero emissions by 2065. The table below provides a summary of the second updated NDC, primarily related to the mitigation component.

Table 1: Outline of second updated NDC (November 2022)

Mitigation target	Mitigation target: Thailand intends to reduce its greenhouse gas emissions by 30 percent from the projected business-as-usual (BAU) level by 2030. The level of contribution could increase up to 40 percent, subject to adequate and enhanced access to technology development and transfer, financial resources and capacity building support. (BAU emissions in 2030 is approximately 555 million tCO ₂ e)
Sectors	Economy-wide (excluding land use, land-use change, and forestry)
GHGs	<ul style="list-style-type: none">- Carbon dioxide (CO₂)- Methane (CH₄)- Nitrous oxide (N₂O)- Hydrofluorocarbons (HFCs)- Perfluorocarbons (PFCs)- Sulphur hexafluoride (SF₆)
Support needs on technology development and transfer	Development of energy efficiency and renewable energy technologies, including innovative and cost-effective technologies and advanced energy storage and demand-side management approaches
International	Thailand welcomes discussion to explore international market-based

market-based cooperation	cooperation in the context of Article 6 of the Paris Agreement, that promotes development and transfer of advanced technologies and innovation and provides access to financial resources that support Thailand's achievement of NDC and LT-LEDS.
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Sectoral mitigation measures, targets, and responsible agencies based on the NDC for energy, transportation, industry, waste, agriculture, and other sectors will be clarified in sectoral action plans to be developed in the future.

Regarding cooperative approaches under Article 6.2 of the Paris Agreement, Thailand has concluded bilateral agreements with Japan and Switzerland to promote the transfer of mitigation outcomes and project development, and has begun cooperation with Singapore in anticipation of a bilateral agreement. A summary of bilateral cooperations under Article 6.2 of the Paris Agreement is shown in the table below.

Table 2: Bilateral agreements based on Article 6.2 of the Paris Agreement

Japan	A bilateral agreement for the implementation of the Joint Crediting Mechanism (JCM) was signed in 2015. As of the end of February 2023, 51 projects have been adopted as JCM Model Projects under the JCM Financing Programme by the Ministry of Environment and 11 projects have been registered as JCM projects.
Switzerland	A bilateral agreement on the implementation of mitigation activities under Article 6 of the Paris Agreement was signed in June 2022. As the first initiative in the bilateral cooperation, it was announced that the two countries will support the 'Bangkok E-Bus Program', a project to convert the fleet of private bus companies operating route buses in the Bangkok metropolitan area from diesel to electric vehicles.
Singapore	In a letter on economic cooperation adopted at the 6th Ministerial Conference on Enhanced Economic Cooperation in Singapore and Thailand held in October 2022, it was announced that the two countries will work together to develop a bilateral cooperation agreement on carbon trading under the guidelines of Article 6 of the Paris Agreement by COP28 in 2023.

Of the 51 projects that have been selected for JCM Model Project to date, renewable energy projects account for the majority, with solar power generation projects accounting for the largest number of 24. On the other hand, since the adoption of Article 6 rulebook of the

Paris Agreement at COP26 in 2021, the Thai government has shown an intention to reconsider the scope of cooperation under Article 6 of the Paris Agreement. At this time, no document clearly stating this policy has been released, but it is likely that priority will be given to technologies and sectors that are subject to cooperation under Article 6 of the Paris Agreement, taking into account the role of mitigation measures through domestic measures and international support based on NDC targets.

In this project, JCM is assumed to be one of the important exit strategies for project formation. Therefore, this point was kept in mind during the project identification survey, and the status of policy discussions was interviewed from Thai government officials as appropriate.

(2) Climate change policies of Bangkok

① Bangkok Master Plan on Climate Change

BMA released the “BMA Action Plan on Global Warming Mitigation 2007-2012” in May 2007, and has since been working to develop and implement the "Bangkok Master Plan on Climate Change 2013-2023" and its successor, the "Bangkok Master Plan on Climate Change 2021-2030," with the support of JICA's technical cooperation projects of Phases 1 through 3.

The Bangkok Master Plan on Climate Change covers five sectors, including environmentally sustainable transportation (Transportation Sector), energy efficiency and renewable energy deployment (Energy Sector), waste and wastewater management (Waste and Wastewater Sector), green urban planning (Green Urban Planning Sector), and adaptation planning (Adaptation Sector). Of these, GHG emission reduction targets have been set in four mitigation sectors, excluding the adaptation sector. The "Bangkok Master Plan on Climate Change 2021-2030" sets an overall GHG reduction target of 19% in 2030 relative to BAU and a long-term vision of net zero emissions in 2050. (see table below).

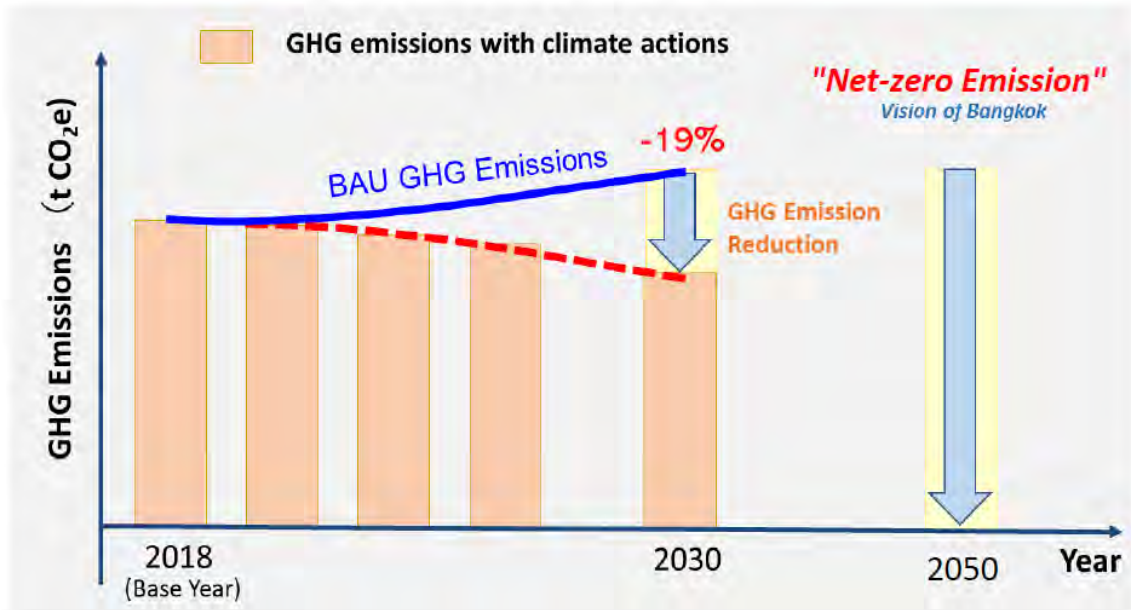


Figure 1: Mitigation targets in the Bangkok Master Plan on Climate Change 2021-2030

The scope of the Bangkok Master Plan on Climate Change includes both the implementation of GHG emission measures in which BMA directly emits emissions (so-called administrative measures section) and the implementation of emission measures by private enterprises and others within the Bangkok region (so-called regional measures section).

In this project, we conducted a study on both facilities owned by the BMA and private facilities for project formation, taking into consideration their potential and feasibility in project formation.

② Implementation structure of climate change policy

The BMA has established the Sub-division for Climate Change Strategies of Department of Environment (CCS) to address climate change in a more organized manner. The CCS, in collaboration with the five sectoral Task Forces (TFs), Working Groups (WGs), Steering Committee (SC), and Joint Coordinating Committee (JCC), plays an important role in coordinating with BMA departments and relevant national agencies. The implementation structure of the Climate Change Master Plan within the BMA is shown in the figure below.

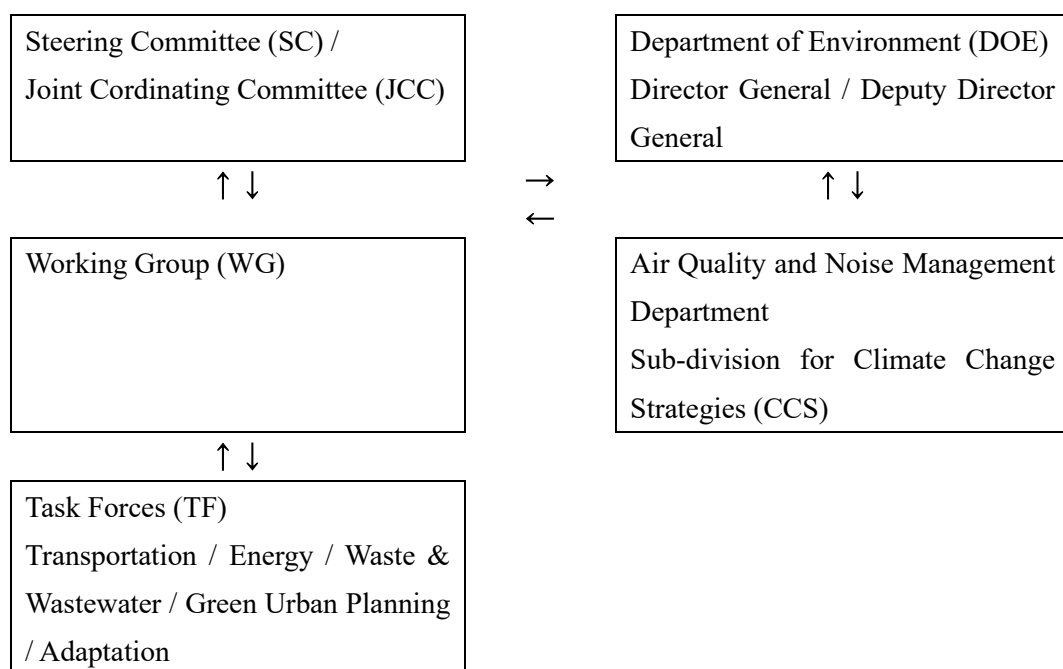


Figure2: Implementation Structure of Bangkok Climate Change Master Plan

With the CCS and the Department of Environment of BMA as the main counterparts in this project, the experts team discussed the project details and plans in advance, collaborated in conducting surveys and holding workshops, and shared the progress of the project. The workshops held under the project were also attended by members of task forces related to the topic (mainly in the energy and transportation sectors) to provide an opportunity for information sharing.

2. Overview of activities

Based on the cooperative relationship between City of Yokohama and BMA, this project promoted the implementation of the Bangkok Master Plan on Climate Change by strengthening and utilizing public-private partnerships involving the private sector in addition to supporting policy development. Major activities were carried out along the following three activity pillars.

< Three pillars of activities >

- (1) Promoting the Climate Change Master Plan
- (2) Engaging the private sector
- (3) Developing mitigation project

The overall picture of the project is shown in the figure below.

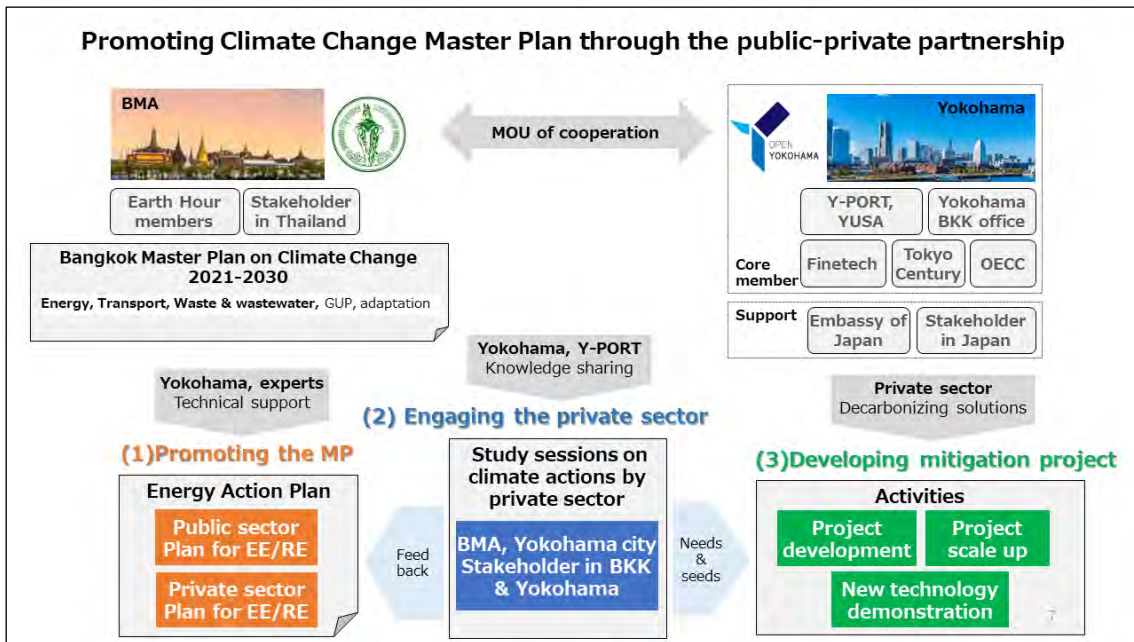


Figure3: Overall picture of the project

(1) Promoting the Climate Change Master Plan

The BMA is working on planning and implementation of the five sectors covered by the Climate Change Master Plan (energy, transportation, waste and wastewater, urban green planning, and adaptation), but the energy sector is the sector with the highest GHG emissions, making it important to consider detailed actions and implementation plans based on the Master Plan.

In this project, City of Yokohama and experts team provided support for the preparation of the Energy Action Plan, with CCS and the Energy Task Force of BMA, which is in charge of the energy sector of the Climate Change Master Plan, as the main counterparts.

In addition, as a related initiative, BMA started this fiscal year to study GHG reduction scenarios utilizing the "Asia-Pacific Integrated Model (AIM)" with support from the Ministry of the Environment of Japan, information sharing and coordination were conducted so that the two projects can proceed with their activities in a complementary manner.

(2) Engaging the private sector

In order to reduce GHG emissions from the entire Bangkok area, it is extremely important to promote measures in the private sector, which accounts for the majority of GHG emissions, as well as to address the administrative operations of the BMA.

BMA has been participating in "Earth Hour" an environmental and social campaign organized by WWF involving 190 countries and regions around the world, since 2021. Under this campaign, in addition to promoting and educating the public about energy-saving activities by companies and households, the BMA has concluded a memorandum of understanding (MOU) with 25 companies and organizations in Bangkok to jointly work on GHG reduction and has started a survey on GHG reduction efforts and potentials and monitoring of reduction effects for the 25 companies. "Earth Hour 2021" includes major local companies and organizations such as energy and power (PTT Public Co., Ltd, Metropolitan Electricity Authority, etc.), retail (Central Group, CP All Public Co., Ltd, etc.), public transportation (Bangkok Mass Transit System Public Co., Ltd, etc.), finance (The Stock Exchange of Thailand, etc.), and Japanese companies (Canon Thailand Group, Thai Wacoal Public Co., Ltd. (A list of all 25 participating companies is included in Appendix 1.)



Photo: 60+Earth Hour 2022, a partnership between the BMA and private sector

City of Yokohama has been working with companies in the city to identify and commercialize projects in emerging countries through the "Y-PORT Project," an international technical cooperation program based on public-private partnerships, and has extensive knowledge in the operation of public-private partnership platforms. In addition, YOKOHAMA URBAN SOLUTION ALLIANCE (YUSA), which was established by small and medium-sized companies in the city in conjunction with the functional enhancement of the Y-PORT project, became a joint implementer of this project, enabling smooth collaboration with YUSA member companies.

With the aim of developing collaboration between the BMA and the private sector, this

project held workshops utilizing the knowledge and experience of the Y-PORT project in Yokohama and business pitches by YUSA member companies to Thai companies to form an ongoing public-private partnership platform involving the two cities and related companies. These activities also led to business matching for the formation of mitigation projects and the discovery of project seeds. For the study of individual mitigation projects, the results are described in "(3) Developing mitigation project".

Because participation in the platform by Japanese companies other than those in Yokohama City would promote project formation, we actively guided member companies of the Ministry of the Environment's "Japan Platform for Overseas Development of Environmental Infrastructure (JPRSI)" to the event and collaborated with events held by other organizations.

An overview of the activities of the Public-Private Partnership Platform is shown in the figure below.

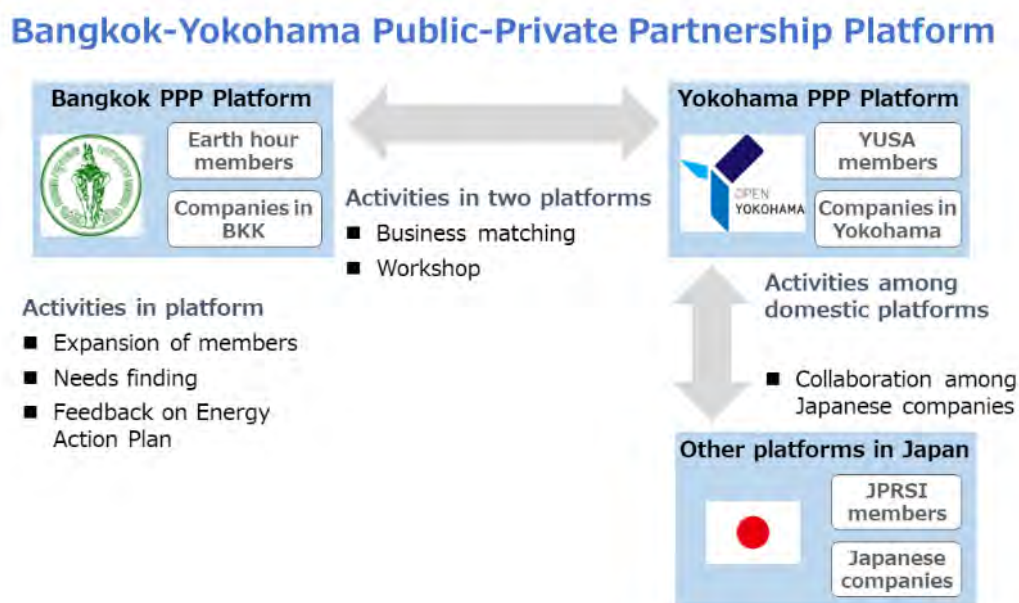


Figure4: Overview of the activities of the Public-Private Partnership Platform

(3) Developing mitigation project

In order to realize GHG reduction in Bangkok, it is necessary to build up implementation of energy conservation and renewable energy projects in companies and facilities in Bangkok. This project provided support for matching to form mitigation projects by companies in both countries, surveyed reduction potential, and prepared for the use of financing programmes.

3. Implementation structure

The table below shows the project implementers and their roles in the project.

Table 3: project implementers and their roles

Implementers	Role in the project
City of Yokohama	<p>The City of Yokohama is actively pursuing climate change initiatives and has a "Zero Carbon Yokohama" goal of decarbonization by 2050, and Yokohama has many useful insights for the BMA to use in its decarbonization efforts.</p> <p>Based on the knowledge of climate change policy and the relationship of trust that has been established with the BMA, City of Yokohama will provide advice on the activities of the public-private partnership and co-host events, provide advice on the formulation of an energy action plan, and support the formation of projects by companies in Bangkok.</p>
BMA	<p>As one of the largest cities in Southeast Asia, Bangkok is required to implement aggressive climate change measures to achieve Thailand's decarbonization goal of 2050 carbon neutrality.</p> <p>BMA will organize events and other activities as part of the public-private partnership, develop an energy action plan, and study mitigation projects at facilities owned by the BMA.</p>
Tokyo Century Corporation	<p>In addition to operating 80 solar power plants and wood biomass power generation projects in Japan, Century Tokyo is also actively engaged in overseas expansion, particularly in the promotion of environmental equipment through the JCM Financing Programme.</p> <p>The company will consider forming mitigation projects and providing financing by leveraging its leasing services and ESCO business in Thailand, as well as its extensive experience in the JCM financing Programme.</p>
Finetech CO.,LTD.	<p>Finetech Co., Ltd. conducts environmental and renewable energy projects in Thailand as an R&D-oriented company.</p> <p>Finetech will focus on survey to identify projects by utilizing experience of the JCM Model Project in Thailand and local network in the renewable energy field.</p>
Yokohama Urban	<p>YUSA is an organization established to strengthen the functions of</p>

Solution Alliance (YUSA)	<p>the Y-PORT Project, Yokohama's international technical cooperation through public-private partnership, with the aim of expanding overseas infrastructure business opportunities for companies in the city and contributing to solving urban issues in emerging countries.</p> <p>YUSA will coordinate the matching of member companies and their participation in the public-private partnership platform, and support the formation of mitigation projects by member companies.</p>
Overseas Environmental Cooperation Center, Japan (OECC)	<p>OECC has conducted a number of technical cooperation projects related to climate change in Asian countries, including Thailand, as well as various surveys, project identification, and project implementation support.</p> <p>OECC will liaise and coordinate among the stakeholders of the project and manage the progress of the project, taking advantage of its experience in supporting the formulation and implementation of the Bangkok Master Plan on Climate Change under the JICA Technical Cooperation Project and its close network with the BMA and Thai counterparts.</p>

The implementation structure of the project is shown in the figure below.

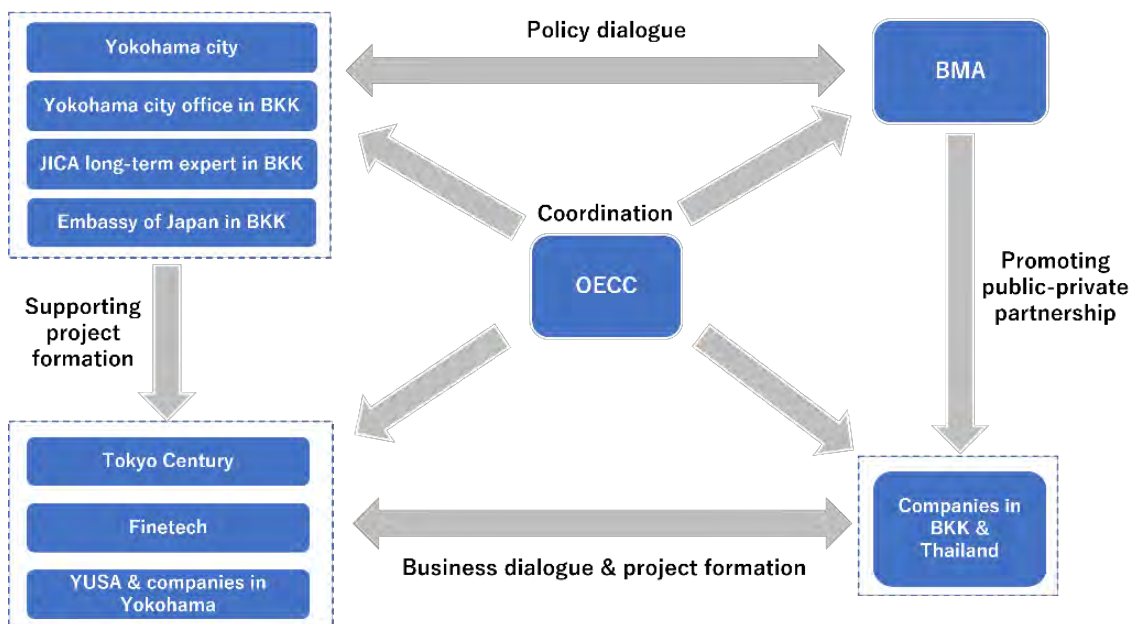


Figure 5: Implementation structure of the project

III Result of activities

The activities and results of each of the three pillars of activities implemented in this project are shown as following. In addition, major activities such as workshops, meetings, and onsite surveys are listed in chronological order in the table below.

Table 4: Workshops, conferences and meetings, and field trips

Date	Activities
July 5, 2022	<u>Kick-off meeting with BMA and City of Yokohama</u> : Project details and plans were discussed and agreed upon by the parties concerned, including the International Bureau of the City of Yokohama, Department of Environment of BMA, and OECC.
Early-July 2022	<u>Field survey</u> : Visits and inspections of local companies were conducted by Finetech and OECC to identify projects.
August 25, 2022	<u>Bangkok Climate and Energy Action Conference toward Net Zero GHG Emission</u> : City-to-city collaboration session were held at the conference.
August 30, 2022	<u>Seminar for YUSA members</u> : A seminar was held for YUSA members to explain the project and to introduce Thailand's renewable energy and energy conservation policies and business environment from a Thai consultant.
Mid-September 2022	<u>Lecture on Yokohama City's Climate Change Policy</u> : Information was shared for the preparation of the Energy Action Plan during the BMA staff's study visit to Japan conducted by the JICA Technical Cooperation Project.
October 17, 2022	<u>Meeting with SENA Development</u> : As part of the Yokohama Y-PORT project, we explained and discussed the City-to-city collaboration project and the JCM with SENA Development, a Thai housing developer.
November 9, 2022	<u>Presentation at COP27 side event</u> : Activities of the project were introduced at the side event "Toward Net Zero of Bangkok " held at the Thailand Pavilion.
November 14, 2022	<u>Interim progress reporting to the Ministry of the Environment</u>
November 29, 2022	<u>1st Workshop on Net Zero Emissions Business Opportunity under Bangkok Yokohama City to City Program</u> : A workshop consisting of four thematic workstreams was held online.

Late November 2022	<u>Field survey</u> : Visits and inspections of local companies were conducted by Finetech, OECC, and other organizations to identify projects.
December 21, 2022	<u>Presentation at the Yokohama Y-PORT Workshop</u> : Activities of this project were introduced.
February 10, 2023	<u>Final report to the Ministry of the Environment</u>
Mid-February 2023	<u>Field survey</u> : Conducted field interviews to discuss projects for decarbonization of the BMA in cooperation with JICA and IFC.
March 2, 2023	<u>1st Workshop on Net Zero Emissions Business Opportunity under Bangkok Yokohama City to City Program</u> : The workshop was held at a venue in Bangkok.
Early March 2023	<u>Field survey</u> : Visits and inspections of local companies were conducted by Finetech, OECC, and other organizations to identify projects. In addition, discussions were held with JICA, IFC and BMA regarding the BMA net-zero plan.

1. Formulation of an energy action plan

(1) Positioning of the Energy Action Plan

Along with the transportation sector, the Bangkok Master Plan on Climate Change places emphasis on GHG emission reduction efforts in the energy sector. In the energy sector, GHG emissions are to be reduced to 28.33 million t-CO₂e in 2030, a 16% reduction (5.55 million t-CO₂e) compared to BAU. On the other hand, these mitigation targets are based on the Energy Efficiency and Development Plan (EEDP) and Alternative Energy Development Plan (AEDP) scenarios under the NDC of the Thai government, prorated to the Bangkok area level, and need to be incorporated into more specific activities and measures to be reflected in substantive GHG emission reduction. New Governor Chadchart also expressed his intention to make the GHG emissions directly attributable to the BMA (the "administrative part" in Japan's local climate action plan) as carbon neutral as possible during his term of office after he takes office in June 2022. In response to this, for this fiscal year's project, a quantitative evaluation of GHG emissions from facilities belonging to the BMA (metropolitan and ward government buildings, metropolitan hospitals, etc.) and a study of measures to deal with them were conducted in the Energy Action Plan.

(2) Sharing of experience on the energy action plan in Yokohama City

In Yokohama City, based on the Act on Promotion of Global Warming Countermeasures, the "Yokohama City Energy Action Plan" was formulated in the implementation of the "Yokohama City Action Plan for Global Warming Countermeasures" formulated in March 2014, and presents a short-term action plan in the energy field that requires focused implementation. Since the above needs for specific short-term initiatives required by Governor Chadchart are very similar to Yokohama's experience, we sought advice from officials who were involved in the development of this plan in Yokohama regarding these issues and shared their knowledge.

In October 2022, a study meeting was held between the BMA Public Works Department and Yokohama City officials to discuss the items in the Yokohama Energy Action Plan and the most recent points to be addressed in the Energy Action Plan in the BMA. As a result, it was decided that the BMA's Energy Action Plan would specifically examine the structure of the "Chapter 4: Key measures" highlighted in Table 5 below, as well as "1. Development of energy management, 2. Utilization of renewable and unused energy, 4. Introduction of technologies to support energy conservation measures, and 5. Actions integrated with urban development.

Table 5: Yokohama Energy Action Plan and Focus of Study in BMA

Chapter 1: About the Energy Action Plan	Chapter 4: Key Measures
1. Background	1. Development of energy management
2. Significance of the Energy Action Plan	2. Utilization of renewable energy and unused energy
3. Positioning of the Energy Action Plan	3. Utilization of hydrogen
Chapter 2: Energy Situation in the City	4. Introduction of technologies to support energy conservation measures
1. Energy Supply and Demand Status	5. Measures integrated with urban development
2. Goals of the Yokohama Action Plan for Global Warming Countermeasures	Chapter 5: Promotion of initiatives by citizens and businesses
Chapter 3: Basic Matters	1. Important points for promoting initiatives
1. Direction of Actions - Aiming to be an Energy-Circulating City	2. Cooperation system for promotion of initiatives
2. Pillars of measures and basic ideas	3. Key measures to promote initiatives
3. Implementing Entities of the Action Plan	4. Practical actions by citizens and businesses

(3) Quantification of GHGs in the administrative section of the Master Plan

As shown in Figure 6, in the "Second Comprehensive Review for Confirmation of

Achievement of the Bangkok Master Plan on Climate Change 2013-2023" conducted by the JICA Technical Cooperation Project, the energy-originated GHG emissions in the BMA's office operations are 240,000 tCO₂e for the BMA buildings. In addition, a walk-through survey conducted by JICA also found that 16 of these buildings covered by the energy efficiency and conservation reporting system have annual savings of 5,823.79 tCO₂e, or 40,019,160.96 baht. These were used as the basis for a study by the BMA Public Works Department for budget applications in future years.

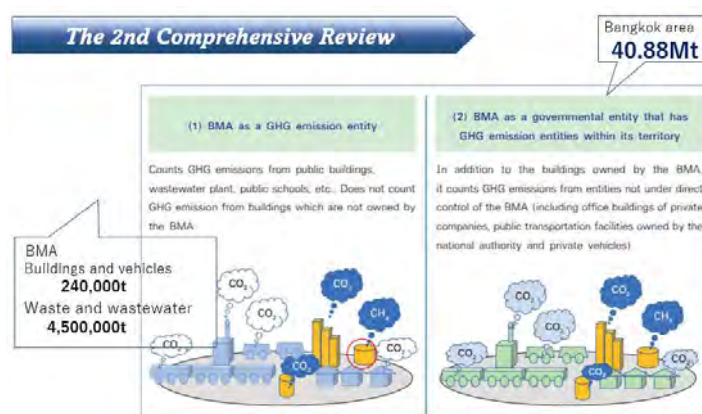


Figure 6: Emissions from Administrative Operations Section in the Second Comprehensive Review of the Bangkok Master Plan on Climate Change

(4) Future plans

In this fiscal year's project, the positioning of the Energy Master Plan in the Climate Change Master Plan was organized and the findings from the Yokohama Energy Action Plan were transferred. In addition, a portion of the quantitative assessment of GHG emissions in the administrative project section has been conducted. These will be finalized in accordance with the BMA's Public Works Department's project plan, and budget applications will be submitted.

In Figure 7 below, the budget application for the project is organized chronologically with reference to the implementation of the activities in FY2020. The BMA's fiscal year begins on October 1, but in order to prepare a budget proposal for this purpose, the departments need to begin reviewing it about 13~15 months in advance and submit and pre-screen it to the budget department 10 months in advance. Final confirmation will be made upon approval of the budget at the BMA Metropolitan Council meeting in August.

Energy efficiency and conservation measures at metropolitan and ward government buildings and metropolitan hospitals that are subject to GHG reduction activities in the Administrative

Operations Section of the Bangkok Master Plan on Climate Change should be applied for in advance, in accordance with the budget cycle. Furthermore, in the case of using the JCM in "3. Formation of Mitigation Projects" or taking measures using external funding from international organizations, it will be essential to secure a budget from the BMA side, so the finalization of the Energy Action Plan will be discussed in the next fiscal year along with the status of the BMA's budget application procedures.

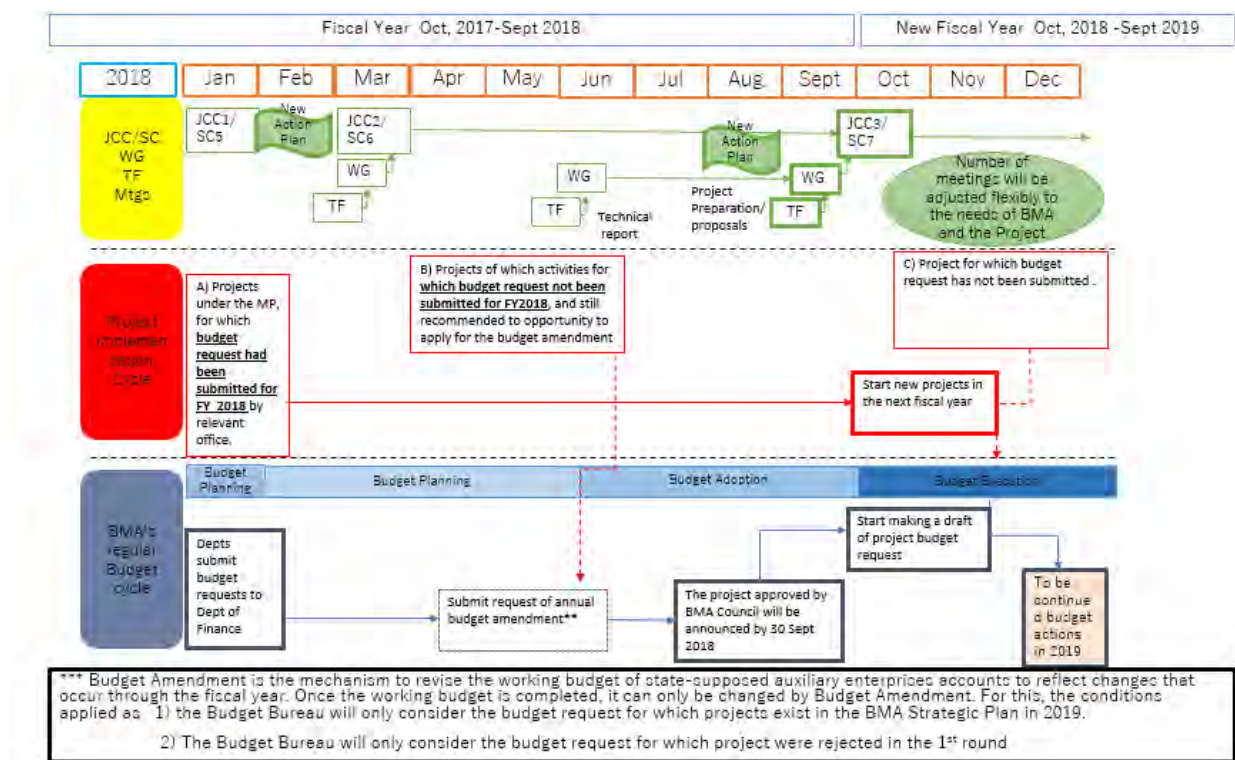


Figure 7: Fiscal years and budget cycles in the BMA (example for FY2020)

2. Engaging the private sector

(1) Bangkok Climate and Energy Action Conference toward Net Zero GHG Emission

The new Governor of Bangkok Metropolitan Administration, Mr. Chadchart, assumed office in the June 2022 election. The Bangkok Climate and Energy Action Conference for Net Zero Greenhouse Gas Emission, which aims to promote climate change countermeasures in Bangkok, is being held under the strong initiative of the new Governor of Bangkok, who has made climate change countermeasures one of the issues to be addressed.

The conference was supported by the BMA, JICA, the City of Yokohama, and the Embassy of Japan, and included a session on climate change initiatives by the BMA and the private sector, as well as a session on City-to-City Collaboration Project between City of Yokohama and BMA.

Session 1, "Big Picture of Energy for Net Zero in Bangkok," introduced the policies of the Ministry of Energy in Thailand and BMA toward net zero emissions, and a panel discussion was held with the participation of major Thai private companies and organizations to discuss initiatives and solutions towards net zero emissions.

Session 2, "New landscape for climate and energy action in Bangkok," introduced the progress of the Bangkok Master Plan on Climate Change and featured a panel discussion involving the City of Yokohama, companies in Yokohama, and YUSA. Yokohama's decarbonization efforts and companies' decarbonization technologies and solutions were introduced, and a proposal was made to hold a workshop with the participation of companies from both cities to promote Intercity cooperation projects.

A summary of the meeting and its agenda are as follows.

Title: Bangkok Climate and Energy Action Conference for Net Zero Greenhouse Gas Emission

Date: August 25, 2022

Venue: The Sukosol Bangkok Hotel

Language: English-Thai (Simultaneous interpretation)

Agenda: (Table below)

Time	Contents
8:30-9:00	<i>Registration and Video Presentation</i> - The Bangkok's Climate Action
<i>Opening Session</i>	
9:00-9:15 (15 mins)	"Opening Speech" Mr. Chadchart Sittipunt, Governor, Bangkok Metropolitan Administration (BMA)
9:15-9:20 (5 mins)	"Opening Speech" (Video message) Mr. Takeharu Yamanaka, Mayor, the City of Yokohama.
9:20-9:30 (10 mins)	"Welcome Speech" Mr. Takahiro Morita, Chief Representative, JICA Thailand Office
9:30-10:00 (30 mins)	Photo Session/giving gift and Coffee Break/Networking

Session I: Big picture of Energy for Net Zero in Bangkok	
10:00-10:20 (20 mins)	<p>Big picture of Energy for Net Zero in Thailand and Bangkok (10 mins)</p> <p>Mr. Watcharin Boonyarit, Director of Strategy and Planning Division, Department of Alternative Energy Development and Efficiency, Ministry of Energy</p> <p>Climate Action in Bangkok (10 mins)</p> <p>- Mr. Wirat Manassanitwong, Director-General of Department of Environment, BMA</p>
10.20– 12.00 (100 mins)	<p><u>Panel discussion</u></p> <p>Perspectives from the Private Sector/ Academia and educational Institute/ Public organization</p> <p>Ms. Gloyta Nathalang, Executive Vice President, Corporate Sustainability, Branding and Communication at Bangchak Corporation Public Company Limited</p> <p>Samatcha Promsiri, Chief of Staff at Sansiri PLC., Stock Exchange of Thailand KMUTT Central Group</p> <p>Facilitator: Mr. Pornphrom Vikitsreth, Advisor to the BMA Governor</p>
12:00-13:00 (60 mins)	Lunch Break
Session II: New landscape for climate and energy action in Bangkok	
13:00-14:15 (75 mins)	<p>Updates of the Bangkok Master Plan on Climate Change</p> <p>1. Achievement of 2020 GHG mitigation Target (The Creagy Co.,Ltd.) (10 mins)</p> <p>Mr. Boonrod Yaowapruerk, Director of The Creagy Co.,Ltd.</p> <p>2. New Bangkok Master Plan on Climate Change 2021-2030 (BMA, Department of Environment/Climate Change Strategy Sub-Division) (10 mins)</p> <p>Mrs. Sermsook Noppun, Head of Climate Change Strategy Subdivision, Air Quality and Noise Management Division, DOE, BMA</p> <p>BMA's action by the Energy Sector (10 mins)</p> <p>Dr. Manaswee Arayasiri, Sanitary Engineer, Professional level, Building Engineering Group, Construction Design 1 Sub-division, Construction Design Office, Department of Public Works, BMA.</p>

<p>14:15-15:50 (95 mins)</p>	<p>4. BMA’s action by the Transport Sector (10 mins) Mr. Jakrapon Wannagul, Chief of The Rail System Project office, Traffic and Transportation Department, BMA</p> <p><u>Panel discussion/Q&A</u> Facilitator: Mr. Boonrod Yaowapruerk, Director of The Creagy Co.,Ltd.</p> <p>Presentations on the Case of the City of Yokohama and Bangkok’s Potential Yokohama City’s actions for Net Zero (10 mins) Dr. Takahashi Kazuaki (Executive Director for Planning and Coordination Department Climate Change Policy Headquarters, City of Yokohama) (online)</p> <p>Potential energy solutions in Bangkok and expectations for the City-to-City Cooperation (10 mins) - Assoc. Prof. Wongkot Wongsapai, Deputy Director of Science and Technology Research Institute, Chiang Mai University</p> <p>City-to-City Cooperation for Innovative Approach for Net Zero Ms. Mahoyo Yamamoto, JFE engineering corporation (online) Mr. Masao Tsutsumi, Nissan Motor Co. Ltd Mr. Hiroshi Abe, Macnica Co. Ltd. Ms. Nozomi Hishida, YUSA</p> <p>Panel discussion/Q&A Facilitator: Mr. Makoto Kato: Member, Board of Directors, OECC</p>
<p>15:50-16:00 (10 mins)</p>	<p>Closing Remarks by Mr. Khachit Chatchawanit, Permanent Secretary of Bangkok Metropolitan Administration (BMA)</p>



Photo: Opening remarks by Mr. Chadchart Governor of Bangkok



Photo: Discussion by Thai companies in Session 1



Photo: Discussion by Yokohama City companies in Session 2

(2) 1st Workshop on Net Zero Emissions Business Opportunity under Bangkok Yokohama City to City Program

After the Energy Action Conference held on August 25, survey was conducted with a number of major Thai private companies that attended the conference, to gather and discuss their interest and support needs for decarbonization. Based on the results, and in light of the interest of Thai companies related to decarbonization, a workshop for companies was organized, consisting of workstreams covering the following four themes. In addition, as a plenary session, the results of COP27 held in the same month were introduced.

The workshop's agenda is structured as follows.

Plenary session: Results of COP27

Theme A: Energy transition (Hydrogen, Ammonia, CCUS)

Theme B: Smart city and energy management

Theme C: Electric Vehicle (EV)

Theme D: Carbon credit and ESG finance

In each workstream, Japanese companies introduced related technologies and solutions, City of Yokohama introduced its initiatives, and Thai experts provided information, followed by discussions by the speakers and Q&A from the participants.

The workshop's outline and agenda are as follows.

Title: (2) 1st Workshop on Net Zero Emissions Business Opportunity under Bangkok Yokohama City to City Program

Date: November 29, 2023

Venue: Online seminar

Language: Japanese-Thai (Simultaneous interpretation)

Participants: Thai companies. Japanese companies, BMA, City of Yokohama etc., Approximately 170 persons (Energy: EGAT, PPT, BCPG, Bangchak, Steel and Cement: SSI, SCG, Food and retail: CP, Central Pattana, Real estate: Sena, Sansiri, Manufacturer: Canon, Daiki, University: Chulalongkorn University, Kasetsart University, etc.)

Agenda: (Table below)

Time	Sessions
9:00-09:10 (10 mins)	Welcoming remarks and introduction to Bangkok-Yokohama City-to-City program and its goal towards net-zero society by MANASSANITWONG Wirat, Director General, Department of Environment, Bangkok Metropolitan Administration (BMA) by Noriaki YOKOUCHI, Director for Development Cooperation, International Affairs Bureau, City of Yokohama
9:10-09:40 (30 mins)	Keynote Session: Results of COP27 in Sharm El-Sheikh Highlight and key takeaways from COP27 Implications of COP 27 to businesses by Makoto Kato, Board Member/Principal Researcher, OECC
(10 mins)	Interval
9:50-10:50 (60 mins)	Work Stream A: Energy Transition (Hydrogen, Ammonia, CCUS etc.) Case Presentation (CCUS): To achieve our Carbon neutral society, Gen Takahashi, JFE Engineering Case Presentation (Hydrogen and/or Ammonia), Dr. Visarn Lilavivat, Researcher, National Energy Technology Center (ENTEC) Presentation: Energy Transition in City of Yokohama, City of Yokohama Panel Discussion (Moderated by Creagy): What are potential applications of hydrogen, ammonium, CCUS etc. in the context of Japan and Thailand toward Net Zero Emission? What are key challenges and barriers? Example of government intervention and/or support to encourage private

	sector investment in Japan
(10 mins)	Interval
11:00-12:00 (60 mins)	<p>Work Stream B: Smart-City and Energy Management System (Commercial, Residential Buildings and Others)</p> <p>Presentation: Development of “Smart City” in Yokohama, City of Yokohama, Japan <i>(15 mins)</i></p> <p>Case Presentation: Macnica's Zero Carbon Initiatives, Hiroshi Abe, MACNICA, Inc. <i>(15 mins)</i></p> <p>Case Presentation: Solutions for smart city and smart building, Atsushi Kakimoto, Senior Manager/Group Leader, Solution Business Development Group, Global Operations Division, DAIKIN Industries, ltd. <i>(15 mins)</i></p> <p>Panel Discussion (Moderated by Creagy):</p> <p>What are potentials offered by development of Smart-City and Energy Management System in commercial, residential buildings and others?</p> <p>What are new business models?</p> <p>What are financial aspects of smart city development?</p>
(60 mins)	Interval
13:00-14:20 (80 mins)	<p>Work Stream C: Electric Vehicle (EV) – focusing on commercial vehicles and public vehicles</p> <p>Presentation: Development on Public Transport Electrification in Thailand, Wasintara KhuaiKhoen, Senior Consultant, The Creagy</p> <p>Presentation: Efforts of Yokohama City to promote the expansion of next-generation vehicles (EV/PHV/FCV), Environmental Planning Bureau, City of Yokohama, Japan</p> <p>Case Presentation: Toward a sustainable future: EV as Energy Solution, Victoria Chiu, Senior Manager, Global EV, External & Government Affair Dept., Nissan Motor Co., Ltd.</p> <p>Panel Discussion (Moderated by Creagy):</p> <p>How can companies use EVs in the context of Net Zero Emission in future (commercial vehicles)?</p> <p>What are expected government interventions for accelerated introducing of EVs?</p> <p>What are potential collective efforts by companies for increasing the benefit of EV introduction?</p>
(10 mins)	Interval

<p>14:30-15:50 (80 mins)</p>	<p>Work Stream D: Carbon credit and ESG finance</p> <p>Presentation: Trends of voluntary carbon markets in Thailand (e.g., T-VER) and international (e.g., Gold Standard, VCS). Potential carbon market opportunities under Article 6 and bilateral program (e.g., JCM), Boonrod Yaowapruerk, Director, The Creagy</p> <p>Case Presentation: OECC’s activities on JCM project development -Potential of JCM in Thailand, Jun Watanabe, Researcher, OECC</p> <p>Panel Discussion (Moderated by Creagy):</p> <p>How can companies use carbon market to support and finance their low carbon emission projects.?</p> <p>What are challenges and opportunities to access carbon markets?</p> <p>Recommendation to access the JCM funding</p>
<p>15:50-16:00 (10 mins)</p>	<p>Closing remark and next steps by Makoto Kato, Board Member/Principal Researcher, OECC</p>



Opening remarks: BMA



Opening remarks: City of Yokohama



Theme A: JFE Engineering



Theme A: ENTEC



Theme B: Creagy



Theme B: Macnica



Theme C: Nissan



Theme C: City of Yokohama



Theme D: Creagy



Theme D: OECC

(3) 2nd Workshop on Net Zero Emissions Business Opportunity under Bangkok Yokohama City to City Program

Following the first online workshop on November 29, the second workshop was held on March 2, 2023, in a hybrid format (at the venue in Bangkok and online) to further promote effective exchange and collaboration between Japanese and Thai companies.

Sessions were held to address the four themes covered in the first workshop, as well as a session to share climate change measures taken by BMA. Just prior to the workshop, a press conference was held by the Governor of Bangkok to announce the development of the new Bangkok Metropolitan Administration Climate Change Master Plan, which was attended by

the Minister of the Embassy of Japan and the Chief Representative of the JICA Thailand Office.

In addition, the Institute for Global Environmental Strategies (IGES) and OECC co-hosted the "First Seminar on Supporting the Development of Environmental Infrastructure in the Thai Market: Current situation of the Thai market and tips for business development in Thai" as a related event in conjunction with the workshop. The seminar aims to support Japanese companies with excellent infrastructure in the environmental field to enter the Thai market by sharing information on the current situation of the Thai market and tips for successful business development. Since the themes of the WS are closely related, it was decided to hold them consecutively in anticipation of synergistic effects, such as attracting more audience.

The workshop's agenda is structured as follows.

Press Conference of Governor of Bangkok

Session 1: BMA's plan and action for Climate Change

Session 2: Carbon credit and ESG finance

Session 3: Smart City and Energy Transitions: Experiences from Thailand

Session 4: Smart City and Energy Transitions: Experiences from Japan

Joint seminar: First Seminar on Supporting the Development of Environmental Infrastructure in the Thai Market: Current situation of the Thai market and tips for business development in Thailand.

The meeting's summary and agenda are as follows.

Title: 2nd Workshop on Net Zero Emissions Business Opportunity under Bangkok Yokohama City to City Program

Date: March 2, 2023

Venue: Mandarin hotel, Bangrak

Language: Japanese-Thai-English (Simultaneous interpretation)

Participants: Thai companies. Japanese companies, BMA, City of Yokoham etc., Approximately 200 persons (170 persons at the venue) (Energy: EGAT, PPT, BCPG, Bangchak, Steel and Cement: SSI, SCG、 Food and retail: CP, Central Pattana、 Real estate: Sena, Sansiri, Manufacturer: Hatari, Uni Charm Tahiland、 University: Chulalongkom University、 Kasetsart Univiersity, etc.)

Agenda: (Table below)

Time	Detailed Activities	
8:00-8:15 (15 min)	Registration for the Press Conference	
8:15-8:45 (30 min)	Press conference on the Achievements (Kannika Room, 2 nd fl.)	Registration for the Workshop (Mandarin Grand Ballroom. 2 nd fl.)
8:45-9:15 (30 min)	<p>Welcoming remarks (15 min)</p> <p>by Mr. Toru Hashimoto, Director General of International Affairs, City of Yokohama (Online speech reading message from Mr. Takeharu Yamanaka Mayor of the City of Yokohama)</p> <p>by Mr. Hiroshi Ono, Vice Minister for Global Environmental Affairs, Ministry of the Environment, Japan (online)</p> <p>by Mr. Takuro Tasaka, Minister for Economic Affairs, Embassy of Japan</p> <p>Opening remarks (5 min)</p> <p>by Mr. Chadchart Sittipunt, Governor of Bangkok</p> <p>Group Photos</p>	
9:15 - 10:00 (45 min)	<p>Plenary session 1: BMA's plan and action for Climate Change</p> <p><u>Presentation</u>: Bangkok Master Plan on Climate Change by Ms. Woranuch Suaykakaow, Deputy Director, Department of Environment, BMA</p> <p><u>Presentation</u>: Experiences from JICA's Technical Cooperation Project with the BMA by Mr. Suzuki Kazuya, Chief representative, Japan International Cooperation Agency (JICA)</p> <p><u>Presentation</u>: Bangkok a pleasant city towards Net Zero Emissions by Mr. Boonrod Yaowapruerk, Director of The Creagy Co., Ltd.</p>	
10:00-10:15 (15 min)	Break	

Time	Detailed Activities
10:15-11:45 (90 min)	<p>Plenary session 2: Carbon credit and ESG finance</p> <p><u>Presentations</u></p> <p><i>Thailand Voluntary Emission Reduction Program: T-VER</i> by Dr. Paweena Panichayapichet, Manager, Carbon Credit Certification Office, Thailand Greenhouse Gas Management Organization (Public Organization)</p> <p><i>Renewable Energy Certificate</i> by Mr. Pakawee Silpanon, Head of Management and Promotion of Greenhouse Gas Reduction Section, the Electricity Generating Authority of Thailand.</p> <p><i>Trends of carbon credit quality and corporate net zero claim</i> by Mr. Jun Watanabe, Researcher, OECC</p> <p>Panel Discussion</p>
11:45-13:00 (75 min)	Lunch Break (Networking lunch)
13:00-13:50 (50 min)	<p>Smart City and Energy Transitions: Experiences from Thailand</p> <p><i>ESG: Passion for Better</i> by Surachai Vanrattanchai, CCUS Director, Siam Cement Group</p> <p><i>Sena Development: 2023 Sustainability</i> by Ms. Kamolpat Swaengkit, Managing Director, Sena Development Plc.</p> <p><i>2519-2565 Change for the Future</i> by Mr. Norasak Suphakornthanakit, Deputy Director of Strategy Development and Investment Planning Department, Energy Absolute Co., Ltd.</p> <p><i>EXIM Bank's Climate Finance for Sustainable Export</i> by Mr. Ittipol Lertsakthanakul, Executive Vice President, Export-Import Bank of Thailand</p> <p>Panel discussion</p>

Time	Detailed Activities
13:50-14:40 (50 min)	<p>Smart City and Energy Transitions: Experiences from Japan</p> <p><i>JGC's Capabilities & Solutions on Hydrogen & Ammonia</i> by Mr. Daisuke Umayabashi, Associate Executive Officer, Senior General Manager, Business Development & Marketing Division, Vice President, Sustainable Solution Sales, JGC Corporation</p> <p><i>Deployment of EV in Thailand and Japan</i> by Takayuki Ueda, Acting CEO, FOMM</p> <p><i>Energy Saving Service in Thailand</i> by Mr. Takashi Aoki, Deputy General Manager, Global Business Division 1 and Mr. Kenji Kakumoto, Global Business Division 1 Senior Associate, Tokyo Century Corporation (Online)</p> <p>Panel discussion</p>
14:40-14:50 (10min)	<p>Closing remarks by Mr. Pornphrom N.S. Vikitsreth, Advisor to Governor of Bangkok</p>

Joint event

Time	Detailed Activities
15:00-16:15 (75 min)	<p>Current situation of the Thai market and tips for business development in Thai (MC: Tetsuo Kuyama, Director of Bangkok Regional Centre, Institute for Global Environmental Strategies (IGES))</p> <p><u>Presentations:</u> Green Business Development in Thailand by Ms. Rio Miyaguchi, Director, Manufacturing Industry Department, JETRO Bangkok</p> <p><u>Presentations:</u> "Mechanism of Success" of Business in the Thai Market by Mr. Yoshitsugu Katsuki, Managing Director, LiB Consulting</p> <p>Presentations: How to deal with local Thai companies by Mr. Kantatorn Wannawas, CEO, Mediator</p> <p>Panel discussion (Facilitator: Mr. Toru Terai, First Secretary, Embassy of Japan in Thailand)</p>



Press conference by Governor of Bangkok



Group photo of the workshop



WS opening remarks: City of Yokohama



WS opening remarks: MOEJ



Session 1: BMA



Session 2: JICA Thailand Office



Session 2: EGAT



Session 2: Panel discussion



Session 3: SENA



Session 3: Energy Absolute



Session 4: FOMM



Session 4: Panel discussion



WS closing remarks: BMA



Joint seminar

(4) Business pitch to Central Pattana

In conjunction with the second workshop, a business pitch was held by Japanese companies to propose the introduction of environmental technologies and cooperation to individual Thai companies.

Central Pattana Public Company Limited, a real estate developer in Thailand that participated in the business pitch, aims to achieve net-zero emissions by 2050 and goals in

line with the SDGs, and had begun looking for partners to promote environmental measures and energy efficiency improvements at commercial facilities operated by the company from the end of 2022.

The Central Pattana Group operates and manages 38 shopping centers (15 in Bangkok metropolitan area, 22 in rural areas, and 1 in Malaysia), 10 office buildings, 2 hotels, 22 residential projects, and 17 community malls, and is considering measures in the areas of green building technology, energy efficiency improvement technology, and water and wastewater management technology for these facilities. The following figure outlines the company's policy toward net-zero emissions in 2050.

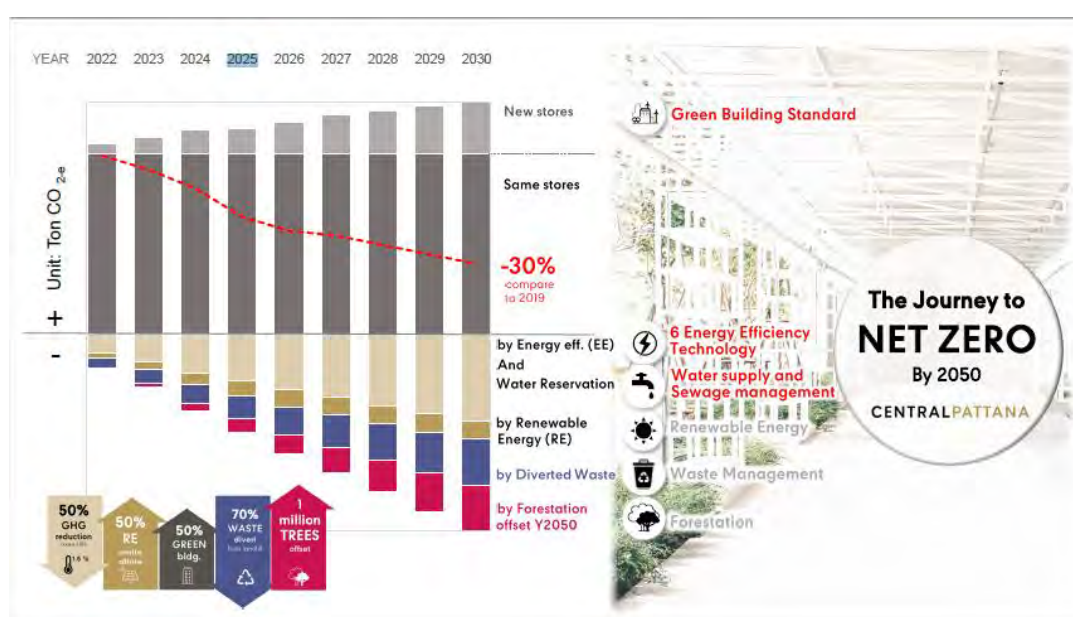


Figure 8: Central Pattana's Policy for Efforts to Achieve Net Zero in 2050

In response to these needs, several Japanese companies with related technologies, mainly YUSA member companies, expressed interest, and a business pitch was planned and implemented in cooperation with the YUSA.

The meeting's summary and agenda are as follows.

Title: Business matching meeting between Central Pattana and Japanese companies

Date: March 2, 2023

Venue: Mandarin hotel, Bangrak

Language: Japanese-Thai (Consecutive interpretation)

Participants: Thai side: Central Pattana (Sustainable development department, Energy and environment management department, etc.), Japanese side: Macnica, Inc., T.K.K. Evolution

Co.,Ltd., Tripac Co.,Ltd., R&U Resolution, YUSA, City of Yokohama, OECC

Agenda: (Tabel below)

Time	Agenda items	Speakers
15:00-15:05 (5 mins)	Introduction	YUSA
15:05-15:20 (15 mins)	Introduction of participants	(All)
15:20-15:35 (15 mins)	Macnica's Ciecular Economy Zero Carbon proposal Q&A	Macnica, Inc.
15:35-15:50 (15 mins)	Aztec Superlight Q&A	Tripac Co.,Ltd.
15:50-16:05 (15 mins)	Living in harmony with Rainwater in Thailand Q&A	R and U Resolutions Inc.
16:05-16:20 (15 mins)	Energy saving & Electric power saving by NCSC method Q&A	T.K.K. Evolution Co.,Ltd.
16:35-16:45 (10 mins)	Wrap up	(All)
16:45	Closing	YUSA



Photo: Business pitch with Central Pattana

The Central Pattana attendees actively questioned the business pitches given by the companies, and it was agreed that detailed data for business discussions would be shared and that the next meeting would be held, which is expected to lead to the formation of future projects.

3. Developing mitigation projects

(1) Outline of potential projects

To identify and formulate mitigation project, OECC worked with the project's co-implementers and Japanese companies to conduct activities such as business trips to meet with local companies, online interviews, site visits, study of project implementation systems, and preparation for the utilization of financing programmes. The potential projects identified through this year's survey were classified into the following three categories based on the status of the survey.

- (1) Consideration for project formulation
- (2) Consideration of Japan-Thailand business collaboration
- (3) Consideration of project formation at BMA-owned facilities

A summary of the potential projects and their plans are shown in the table below.

Table 6: Summary of the potential projects and their plans

Categories	Potential projects and related companies
(1) Consideration for project formulation	<p>1. Wastewater biogas power generation at tannery factory [Overview] Thai company A (manufacturer) has a need for energy conservation and environmental improvement of the wastewater treatment process in a tannery factory, and Finetech and OECC is conducting a technical survey. In addition, a Japanese company, Company A (trading company), is considering applying for the FY2023 JCM Financing Programme as a representative entity of the project. [Future plans]</p>

	<p>In terms of application to the JCM, project boundary setting and MRV methodology on methane avoidance need to be clarified. The experts team will continue consideration for application to the JCM Financing Programme.</p> <p>2. Wastewater biogas power generation at cassava processing factory</p> <p>[Overview]</p> <p>Thai company B (manufacturer) has a need to effectively utilize biomass waste derived from a cassava processing plant, and Finetech is conducting a technical study. In addition, a Japanese company, Company A (trading company), is considering applying for the FY2023 JCM Financing Programme as a representative entity of the project.</p> <p>[Future plans]</p> <p>Examining requirements and issues for application to the JCM Financing Programme.</p>
<p>(2) Consideration of Japan-Thailand business collaboration</p>	<p>3. Low-carbon housing area development</p> <p>[Overview]</p> <p>Thai company C (real estate development) has a need for collaboration with a Japanese company to promote low-carbon residential area development, and Japanese company B (trading company) is proposing the introduction of an energy management system for residential area development.</p> <p>[Future plans]</p> <p>Provide support for matching and study funding schemes such as JCM Financing Programme.</p> <p>4. Introduction of Zero Emission House (ZEH)</p> <p>[Overview]</p> <p>Thai company D (real estate development) has a need for collaboration with a Japanese company to develop housing based on the concept of Zero Emission House (ZEH), and Japanese company C (manufacturer), which has experience in providing ZEH, is proposing its own solution.</p> <p>[Future plans]</p>

Continue discussions to clarify the needs of company D and support for matching and utilizing financial schemes such as the JCM Financing Programme.

5. Project for decarbonization of commercial facilities

[Overview]

Central Pattana has a need for collaboration with Japanese companies to promote GHG emission reductions in commercial facilities in line with the 2050 net-zero goal. Technical proposals were submitted by Japanese companies, primarily YUSA member companies.

[Future plans]

Continue to provide support for matching between Central Pattana and Japanese companies.

6. Project for reducing GHG emissions from food processing and serving processes

[Overview]

Thai company E (food service and food processing) has needs for GHG reduction and reduction and effective utilization of food residues in food processing and food service. The experts team visited the company's central kitchen where they conduct food processing and confirmed the basic GHG reduction potential.

[Future plans]

Examine candidate Japanese companies and the possibility of introducing equipment.

7. Energy savings through replacing equipments at water treatment plant

[Overview]

Metropolitan Waterworks Authority has a need to save energy by updating equipment at its aging water treatment plant. A Japanese company, Company D, is expected to conduct a survey on the energy saving potential of the facility and introduce appropriate equipments.

[Future plans]

Conduct energy efficiency and conservation potential study and

	examine requirements and issues for application to the JCM Financing Programme.
(3) Consideration of project formation at BMA-owned facilities	<p>8. Project for reducing GHG emissions at BMA-owned facilities</p> <p>[Overview] BMA is studying plans for decarbonization of its facilities, including city halls, ward offices, and metropolitan hospitals. BMA is discussing with IFC, JICA regarding potential analysis, business models and financing to implement specific measures.</p> <p>[Future plans] Continue discussions with relevant organizations to materialize the project and coordinate proposals and participation from Japanese companies with relevant technologies.</p>

(2) Consideration of demonstration project

① Nissan's technology and initiatives in Thailand

Nissan Motor, headquartered in Yokohama, produces and sells automobiles in Thailand through its local branch, Nissan Motor Thailand Ltd. Nissan is working on Blue Switch, a program aimed at solving issues related to the environment, disaster preparedness, and energy management. In January 2022, the company announced that it will expand the program to Thailand and opened the Nissan Electrification Experience Center in Bangkok as its first initiative. The center showcases Nissan's V2X technology utilizing EVs. In addition, since the BMA is working on GHG reduction measures in the energy and transportation sectors in the Bangkok Master Plan on Climate Change, a site visit was conducted by BMA officials from the relevant departments.

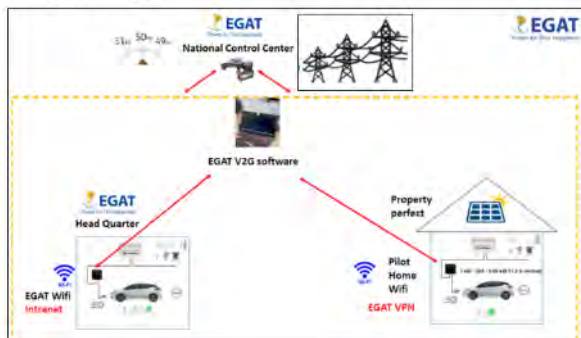
V2X is a technology and initiative to realize various values by connecting EVs to various objects such as houses, buildings, and power grids, and supplying power from the EV's high-capacity battery through a bidirectional charging device.

In collaboration with the Electricity Generating Authority of Thailand (EGAT), Nissan Thailand proposed a V2G demonstration project in December 2022 and is waiting for the approval from BMA to connect EVs (LEAF) to the power grid to charge and reverse power flow, and to collect and analyze the data to formulate future related rules and study business models. The project period is two years, and 20 LEAFs are expected to participate in the project.

EGAT & NISSAN V2G pilot project summary

- ◆ Partner : Electricity Generating Authority of Thailand (EGAT), State enterprise as Electricity generator/transmitter
- ◆ Key concept : First project to demonstrate V2G with actual EV(LEAF) owners in Thailand
- ◆ Objective
 - Gather the LEAF owners' real charge/discharge condition data for future analysis.
 - Rule making and business model establishment for V2G technology

Project Image



Bi-directional charger

Quasar (Made by Wallbox in Spain)



Vehicle

NISSAN LEAF



V2G control system

Provided and operated by EGAT

Other conditions

- 20 LEAF owner will join this project
- 2 years period (Dec 2022 to Nov 2024)

Figure 9: Outline of V2G Demonstration Project by Nissan Thailand and EGAT

② Participation in the demonstration project by BMA

As part of the BMA's study of GHG reduction measures in the energy and transportation sectors, the project considered participation in the V2G demonstration project by Nissan Thailand.

By leasing LEAF as BMA's official vehicle and installing and using a bidirectional charging equipment at the BMA city hall, the following outcomes are envisioned: 1) understanding the potential for efficient use of electricity, 2) the benefits of using EVs as official vehicles, and 3) creating opportunities for BMA staff to learn about V2G technology. An overview of the BMA's V2G demonstration project is shown in the figure below.

Social experiment using EV (NISSAN LEAF) and bi-directional charger

◆ Objective

- Investigate energy management efficiency with V2G technology
- Study the benefit to use EV (by car sharing scheme) as office car in BMA
- BMA officer to acknowledge and learn enable technology (V2G) toward carbon neutrality in near future

◆ Condition

- Utilizing "EGAT & NISSAN V2G pilot project" platform

V2G Image



Figure 10: Overview of V2G Demonstration Project by BMA

Since December 2022, the experts team, Nissan Thailand, and BMA officials have held discussions to review the details of the demonstration project and the lease contract, and the approval process by the relevant BMA departments related to this matter is currently underway. The contract will be signed and the project initiated after formal approval by the BMA.

③ Consideration of introducing external funding with the support of international organizations

Regarding "(3) Project Formation at BMA-owned Facilities" in "Table 6: Summary of the potential projects and their plans", in addition to JCM, the introduction of external funding by international financial institutions was considered in order to scale the projects. In order to support the achievement of mitigation targets set in the Bangkok Master Plan on Climate Change formulated in the JICA technical cooperation project that preceded this project, JICA has been exchanging information with the International Finance Corporation (IFC), the World Bank, the Asian Development Bank (ADB). As part of this project, OECC collected information and participated in opinion exchange meetings.

IFC, the World Bank Group dealing with the non-sovereign (private sector), has expressed interest in financing through Public-Private Partnerships (PPP) in relation to the Bangkok Master Plan on Climate Change, and information was exchanged on the formation of projects for GHG

emission reductions in the Administrative Operations Section to be implemented by the BMA. IFC has a tool called "Advanced Practices for Environmental Excellence in Cities (APEX)" to help cities develop scenarios for short-term GHG emission reductions and diagnose financing options. It also offers the EDGE certification system for green buildings with high energy-saving performance. Information was organized on these IFC tools, the role of the Ministry of Environment, JICA and other programs.

In Figure 11, the programs are classified into a hierarchical structure of planning (master plan development, scenario analysis, action plan development and implementation) and implementation (project/investment, budget/funding, platform formation). From the top, the BMA has been involved in the decision making of the Bangkok Master Plan on Climate Change Steering Committee, the development of long-term scenarios through the Asia-Pacific Integrated Model (AIM), the development of short-term scenarios and financing options through IFC's EDGE/APEX, and the development of the Energy Action Plan to support the annual planning of the BMA and part of the budgeting for the implementation of the project. In the project implementation phase, a combination of the BMA's budget, the private companies' own budget, and ADB, JICA (private finance partnership), IFC, the JCM were assumed to supplement the BMA's budget and the private companies' own budget. In addition, a public-private partnership platform to formulate projects and conduct matchmaking between companies in Bangkok, Thailand, and Yokohama, Japan, will also be addressed in this project.

It is expected that in the future, when IFC uses APEX to analyze financing options for BMA's short-term initiatives and consider funding, it will also work with this project.

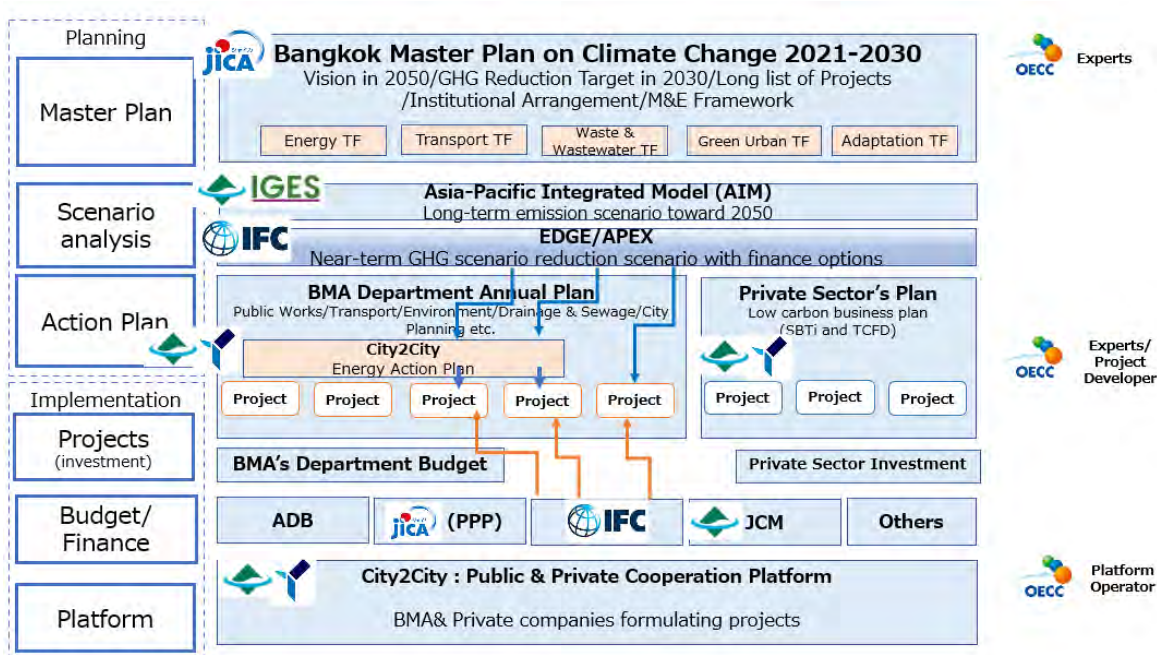


Figure 11: Consideration of scaling up with external funding from international organizations

IV Future plans

Based on the results of this year's project and the status of activities in progress, activities to be implemented in the following fiscal year are described for each of the three pillars of this project. In the formulation and determination of the activity plan, consultation with City of Yokohama, BMA, and other relevant organizations will be conducted.

(1) Promoting the Climate Change Master Plan

As of March 2023, the BMA is in the process of preparing an Energy Action Plan, and the work will continue after April. In the following fiscal year, experts including Yokohama City will continue to provide content advice and review drafts and will cooperate on the implementation of the plan's activities once the plan has been formally approved by the BMA. In particular, with regard to content input, the project will also examine candidate projects that assume the possibility of introducing decarbonization technologies and solutions provided by Japanese companies, with the aim of effectively utilizing the public-private partnership platform of City of Yokohama and BMA. It is envisioned that this will lead to the formation of businesses in collaboration with the private sector during the phase of implementation of initiatives after the plan is formulated.

(2) Engaging the private sector

This fiscal year, several meetings and workshops on decarbonization of the Bangkok were held with the participation of the City of Yokohama, BMA, and Japanese and Thai companies, forming the basis for a public-private partnership platform between City of Yokohama and BMA. The workshop will be continued in the next fiscal year to share and discuss information between Japan and Thailand. Business pitches and matchmaking targeting Thai companies interested in collaboration with Japanese companies will also be considered based on the needs information obtained from Thai companies in this fiscal year's survey.

(3) Developing mitigation project

Additional research and application work for the JCM Financing Programme will be conducted for potential projects identified in this year's survey in cooperation with the relevant companies. For Japanese and Thai firms considering collaboration for project formation, we will continue to provide lateral support for collaboration and discussions on

the use of JCM Financing Programme and other financing scheme. In addition, for Thai companies whose needs for energy conservation and GHG reduction have been identified, a quick energy audit will be conducted to determine detailed GHG reduction potential, and Japanese companies that are potential suppliers and equipment to be introduced will be considered.