

FY2022 Project for Ministry of the Environment Japan

FY2022
City-to-City Collaboration Programme for
Zero-Carbon Society

Promotion of Carbon Neutrality based on Climate Change
Policies in Ho Chi Minh City and Thu Duc City

Report

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Nippon Koei Co., Ltd.
Osaka City

FY2022
City-to-City Collaboration Programme for
Zero-Carbon Society

Promotion of Carbon Neutrality based on Climate Change Policies
in Ho Chi Minh City and Thu Duc City

Report

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- 1.2 Ho Chi Minh City (Vietnamese)
- 1.3 Nippon Koei

Attachment 2 Presentation Materials of Workshop

[Part 1]

- 2.1.1 Nippon Koei -Introduction of JCM Model Projects and City-to-City Collaboration Project-
- 2.1.2 Ho Chi Minh City (Vietnamese)
- 2.1.3 SOGEC/Osaka Gas
- 2.1.4 Yuasa Trading
- 2.1.5 ENDO Lighting Viet Nam
- 2.1.6 SMTDFC/BSL

[Part 2]

- 2.2.1 Osaka City
- 2.2.2 Nippon Koei-Introduction of JCM Model Projects-
- 2.2.3 Yuasa Trading
- 2.2.4 ENDO Lighting Viet Nam
- 2.2.5 Nippon Koei -Introduction of City-to-City Collaboration Projects-

[Others]

- 2.3 Press release

Attachment 3 Organization Structure of Ho Chi Minh City People's Committee and DONRE

Abbreviations

ASEAN	Association of Southeast Asian Nations
BaU	Business-as-Usual
BRT	Bus Rapid Transit
CCAP	Climate Change Action Plan
CFC	Chloro Fluoro Carbon
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
COP	Conference of the Parties
COVID-19	Coronavirus disease 2019
CTC	Carbon Tetrachloride
DOC	Department of Construction
DOIT	Department of Industry and Trade
DONRE	Department of Natural Resources and Environment
DOT	Department of Tourism
DOT	Department of Transportation
DX	Digital Transformation
EMS	Energy Management System
EPC	Engineering Procurement Construction
EV	Electric Vehicle
FIT	Feed-in Tariff
FY	Financial Year
GDP	Gross Domestic Product
GEC	Global Environment Centre Foundation
GHG	Greenhouse Gas
GIZ	German Agency for International Cooperation
GRP	Gross Regional Product
HCMC	Ho Chi Minh City
HEPZA	Ho Chi Minh City Export Processing and Industrial Zones Authority
HFCs	Hydrofluorocarbons
IFC	International Finance Corporation
INDC	Intended Nationally Determined Contribution
IP	Industrial Park
IUCN	International Union for Conservation of Nature
JCCH	Japanese Chamber of Commerce and Industry in HCMC
JCM	Joint Crediting Mechanism
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JPY	Japanese Yen
LED	Light-emitting Diode
LEED	Leadership in Energy and Environmental Design
LPG	Liquefied Petroleum Gas
LULUCF	Land-Use, Land-Use Change and Forestry
MICE	Meetings, Incentives, Conference and Exhibitions
MOE	Ministry of the Environment, Government of Japan
MOIT	Ministry of Trade and Industry

MOT	Ministry of Transport
MOU	Memorandum of Understanding
MPI	Ministry of Planning and Investment
MRT	Mass Rapid Transit
MRV	Measurement, Reporting and Verification
NDC	Nationally Determined Contribution
NO _x	Nitrogen Oxides
NKV	Nippon Koei Viet Nam
OCCI	Osaka Chamber of Commerce and Industry
PC	People's Committee
PDP	Power Development Plan
PJT	Project
PV	Photovoltaic
REF	Reference
SAWACO	Saigon Water Corporation
SDGs	Sustainable Development Goals
SHP	Saigon Hi-Tech Park
SMTPFC	Sumitomo Mitsui Trust Panasonic Finance Co., Ltd.
SOGEC	Sojitz Osaka Gas Energy Company Ltd.
SPEC	Special Presidential Envoy for Climate
SRHMC	South Regional Hydrometeorological Center
TDEM	Toyota Daihatsu Engineering & Manufacturing
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VCCI	Vietnam Chamber of Commerce and Industry
VGBC	Vietnam Green Building Council
VND	Viet Nam Don
VRF	Variable Refrigeration Flow
WtE	Waste to Energy

CHAPTER 1 BACKGROUND AND OBJECTIVE

1.1 Background of the Programme

The 26th session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC), held in November 2021, confirmed a new global goal of limiting the temperature increase to 1.5°C above pre-industrial levels. To achieve this goal, it is essential for each country to accelerate its efforts at various levels, such as state, city, and district levels. In Japan, the goal of a decarbonized society with zero greenhouse gas (GHG) emissions by 2050 has been declared, and the number of municipalities declaring virtually zero CO₂ emissions has rapidly increased to more than 600 (as of April 30, 2022). Under the regional decarbonization roadmap formulated in June 2021, advanced measures are being created in each region, and efforts are being made to expand these measures throughout the country.

As described above, the role of cities and municipalities in considering and implementing specific regional climate change measures and projects is becoming increasingly important. To realize a decarbonized society in the whole world, it is necessary to accelerate the movement toward building a sustainable decarbonized society, especially in Asia, where economic growth is remarkable, and there is a growing international movement to support cities' efforts to decarbonize their cities, which are places of activity that support social and economic development.

In addition, under the current situation of the spread of COVID-19, cities are being forced to recalibrate and consider new measures to achieve sustainable development at the same time as dealing with challenges related to the spread of the virus.

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 municipalities in forming decarbonized societies and introducing facilities that will contribute to forming decarbonized societies.

The City-to-City Collaboration Programme between Osaka City and Ho Chi Minh City has completed Phase 1 (2019-2021), and this fiscal year is positioned as the first year of Phase 2 for next three years. Through discussions between the two cities in the last year, surveys have been conducted aiming at promoting zero-emission initiatives in the areas of energy conservation and renewable energy, transportation infrastructure, and CFC recovery and destruction, which are highly needed in Ho Chi Minh City and Thu Duc City.

1.2 Participating Cities in the Project

1.2.1 Osaka City Government

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 the 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. Overview of statistics for Osaka City is as follows.

Table 1.1 Overview of statistics for Osaka City

#	Item	Overview
1	Area	225.33 km ² (as of October 2021)
2	Population	2,757,817 (as of November 2022)
3	Population density	12,239 people/km ² (as of November 2022)
4	Number of households	1,507,887 (as of November 2022)
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

1.2.2 Ho Chi Minh City (HCMC)

HCMC located in the south of the country is the biggest commercial city in Viet Nam with population of approximately 9.1 million. Because of recent economic growth, population concentration and urban sprawl have been occurring, which has been leading to environmental issues such as air pollution and water pollution, as well as the need for waste management and forest management. HCMC has tropical climate with rain season (May to November) and dry season (December to April), 1,800-1,900 annual rainfall and 28 degree Celsius of average temperature. Geographic character of HCMC is 20 m of above sea level and location near rivers and coasts, land-use change by industrialization and effects of recent climate change lead to flooding in rain season, which has been recognized as one of the urban issues. Furthermore, because of industrialization and population growth have influenced drastic increase of energy consumption, which naturally raise Green House Gas (GHG) emissions.

In the contexts, needs of urban decarbonization is gradually increasing by installation of energy-saving and renewable energy technologies which this project promotes.

The basic statistic data of HCMC including Thu Duc City is as follows.

Table 1.2 Overview of statistics for HCMC (including Thu Duc City)

#	Item	Overview
1	Area	2,095.4 km ² (as of 2021)
2	Population	9,166,800 (as of 2021, approximately 9.3% of national total and the largest in the country.)
3	Population density	4,375 people/km ² (As of 2021)
4	Number of households	2,558,914 (as of April 2019)
5	GDP per person	USD 4,931 (As of 2019, national average is USD 3,717)

Source: Prepared by Nippon Koei from the General Statistics Office of Viet Nam



HCMC People's Committee Hall



HCMC DONRE Office



Trrafic in HCMC



Rental Cycle in HCMC



Garbage Truck in HCMC



Rubbish Bin (non-separate) in HCMC



View of Thu Duc City

Source: Taken by Nippon Koei



Rubbish Bin (separate) in Thu Duc City

Figure 1-1 Current cityscape of HCMC and Thu Duc City

1.2.3 Thu Duc City

On 1 January 2021, Thu Duc City was newly established under the administration of HCMC with the merger of three districts, District 2, 9 and Thu Duc District, pursuant to Resolution No. 1111/NQ-UBTVQH14. The concept of “city within a city” is a first model in Viet Nam, and Thu Duc City is expected to become a central city of major economic development in HCMC and southern Viet Nam. The city emblem is designed with two letters, "T" and "D," which are the initials of Thu Duc City (Figure 1-2). The bird's feathers on the "T" represent land features such as the Saigon River, the six lines on the "D" represent the Communist Party and the government, and the squares in the upper left corner represents buildings, high-tech parks, etc. Thu Duc City functions as an advanced area for science and technology, and there is the Saigon Hi-Tech Park (SHP) in Thu Duc City. In addition, eight innovation centers, including the SHP are planned to be established in Thu Duc City.



Source: Thu Duc City Official site

Figure 1-2 City Emblem of Thu Duc City

The gross regional product (GRP) of Thu Duc City is expected to contribute to 7% of national GDP, equivalent to 30% of Ho Chi Minh City's GRP. In order to expand Thu Duc City's function as a core city, the Ho Chi Minh People's Committee has decided to implement measures to expand the authority of Thu Duc City from December 23, 2022, to the end of 2024. According to Resolution No. 1538/QĐ-TTg, the population is currently about 1.01 million and is expected to reach 1.5 million by 2030, 2.2 million by 2040, and 3 million after 2040.

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The basic statistic data of Thu Duc City is as follows.

Table 1-3 Overview of statistics for Thu Duc City

#	Item	Overview
1	Area	211.56 km ²
2	Population	1,013,795 (as of 2020, approximately 10% of HCMC's population)
3	Population density	4,792 people/km ² (as of 2020)
4	GDP per person	4,931 USD (national average: 3,717 USD) (as of 2021)

Source: Prepared by Nippon Koei from the Decision No. 1111/NQ-UBTVQH14

As shown in Figure 1-3, the organization of Thu Duc City has 12 departments including the Department of Natural Resources and Environment (DONRE) under the Thu Duc City People's Committee.



Source: Prepared by Nippon Koei based on Thu Duc City Official Site

Figure 1-3 Organization Structure of Thu Duc City People's Committee

The Master Plan for Thu Duc City to 2040, approved in September 2021, is expected to encompass a wide range of initiatives, including the development of transportation systems, environmental protection measures, and social services, as well as the creation of new economic zones and residential areas. Although the Master Plan stipulates that the project's implementation duration should not exceed 12 months, implementation has been delayed due to the effect of COVID-19.

1.3 Objective of the Project

Based on the MOU between the two cities, the purpose of this project is to 1) support the implementation of the "HCMC's Climate Change Action Plan (CCAP)" through policy dialogue, strengthen institutional building and support initiatives toward decarbonization, and contribute to the decarbonization domino through information dissemination and mutual sharing to neighboring cities and third countries.

In addition, by leveraging the results of the JCM model projects so far, this project 2) promotes horizontal development of "high-efficient air conditioners, boilers, and LED lighting" for energy saving and "solar power generation projects" for renewable energy. Furthermore, as new fields, it forms new projects in "transportation infrastructure" and "CFC recovery and destruction," and utilizes/promotes the "JCM Eco Leasing Project".

1.4 Implementation Procedure and Structure

1.4.1 Institutional Support

In this project between HCMC People's Committee and Osaka City, Department of Natural Resources and Environment (DONRE) of HCMC and Environmental Bureau of Osaka City are departments in charge and develop the collaboration structure for solution of urban issues and formulation of zero-carbon society.

This year, the policy dialogue between the two cities, which had been postponed for two years due to COVID-19, will be resumed. Through technical workshop, policies and initiatives related to the environment and decarbonization will be shared with relevant organizations and private companies. Moreover, this project supports discovering new targets for JCM model projects based on HCMC's CCAP.

At this time, Tu Duc City is involved in the project in conjunction with HCMC. However, we envision assisting Tu Duc City in the environmental and decarbonization sectors as the city develops its own systems and plans.

1.4.2 Promotion of Renewable Energy and Energy-saving Equipment

There were achievements of JCM model projects formulation in HCMC and Japanese partner companies had introduced energy saving equipment and fuel conversion technology (high efficiency boiler) through the City-to-City Collaboration project.

This year, we decided to collect and organize information on companies that have factories and large facilities with high energy and fuel consumption in the city, introduce the JCM scheme to companies interested in decarbonization technologies, and identify projects.

1.4.3 Study for Transportation Infrastructure and Logistics Sector

The study of transportation infrastructure and logistics is a new area added in Phase 2 this year. HCMC, the largest city in Viet Nam, and its sub-city, Thu Duc City, have high potential and many options for decarbonization, such as reducing traffic congestion, improving logistics efficiency, and introducing compressed natural gas (CNG) and EVs for public transportation. This year, we decided to gather information on local and Japanese companies involved in automobile manufacturing and logistics services in Viet Nam.

1.4.4 Study for Fluorocarbon Recovery and Destruction

The study in CFC recovery and destruction is a new area added in Phase 2 this year. In HCMC and Tu Duc City, proper disposal of air conditioning equipment, destruction or reuse, in the renewal of facilities such as office buildings, commercial facilities, and hotels, will contribute to the reduction of CFC gas derived from the equipment, which has a higher greenhouse effect than CO₂. Currently, there are no CFC recovery systems or destruction facilities in Viet Nam. Therefore, this year, interviews were conducted with air conditioning manufacturers to study possible improvement measures and estimate CFC reductions.

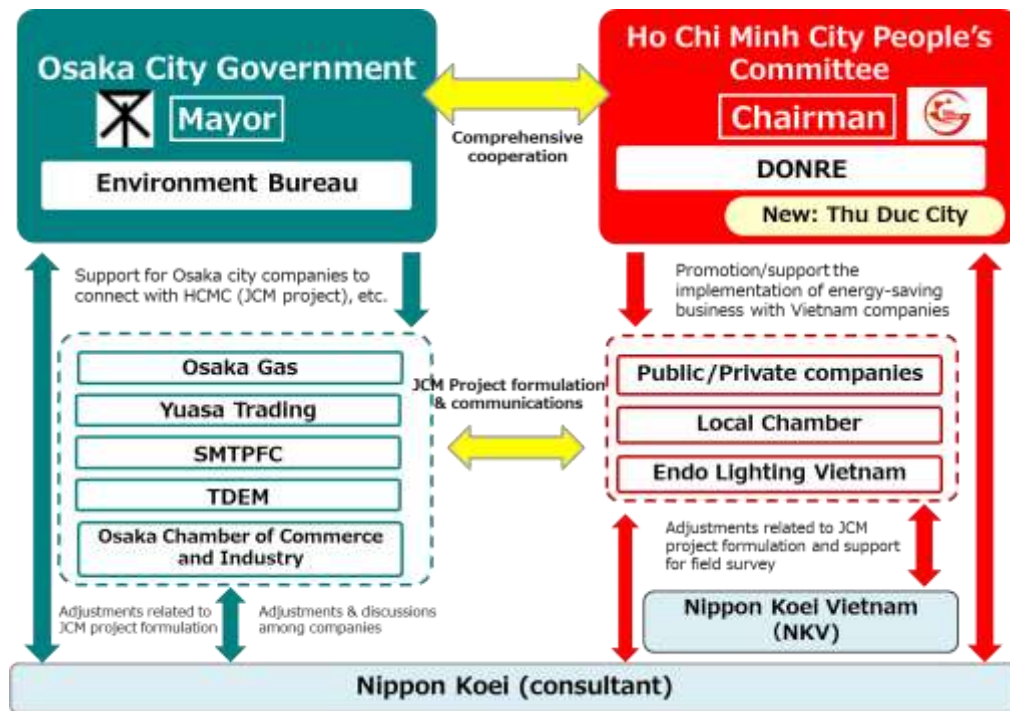
1.4.5 Implementation Structure

Under the collaboration between HCMC-DONRE and Environment Bureau of Osaka City, the implementation structure was formulated to discuss city issues and share information. Thu Duc City was also able to participate in various consultations and activities in this year.

Studies for development of JCM model projects were implemented by cooperating with companies with experiences of businesses in Viet Nam, Osaka Gas Co., Ltd. (gas supplier of fuel switching projects), Yuasa Trading Co., Ltd. (trading company with experience in JCM model projects in Viet Nam) and ENDO Lighting Viet Nam (manufacturer of highly efficient LED lighting). In addition, TDEM (a joint venture company of Toyota and Daihatsu with a strategic base in Thailand) and Osaka Chamber of Commerce and Industry for promotion of business of companies in Kansai area joined this project in this year.

Nippon Koei Co. Ltd. (hereafter “Nippon Koei”) has supported these City-to-City Collaboration activities and carried out studies for introducing zero carbon technology and advanced environmental technologies. Nippon Koei Viet Nam (NKV, local subsidiary of Nippon Koei) supported the data collection and survey of candidate facilities and companies for project formulation.

The implementation structure of this project is as follows.



Source: Prepared by Nippon Koei

Figure 1-4 Implementation structure

1.5 Project Schedule

The project period is from 17 June 2022 to 10 March 2023. The schedule is shown below.

#	Activities	2022						2023			
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1. City-to-city Collaboration Activities											
1)	Discussion on City-to-city Collaboration/policy dialogue (online meetings)	▽ (policy dialogue, kick-off)				▽ (progress report)				▽	
2)	Plan and implement technical workshops in cooperation		.....	.....	.....	.....	.....	.....	.....
3)	Collect information and share knowledge on carbon-neutral policies	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4)	Support for horizontal/domino-like expansion of the JCM model project (consider the support program domestically)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5)	Consider third country cooperation in City-to-City Collaboration						.....	.....	.....
6)	Collect information on local environmental regulations, including CFC recovery			.....	.....	.....	.....	.....	.....	.....	.....
2. JCM Model Project Formation											
(The application period of the JCM model project in FY 2022)											
1)	Discuss with/supporting companies related to potential JCM model projects (from application preparation to grant decision)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2)	Discuss online with companies/collect information domestically for JCM model project formulation	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3)	Collect information via local office and employees		▽ (online)			▽ (online)			▽ (online)		
4)	Preparation for JCM model project formulation later than FY2023								.....	.....	.....
3. Events											
1)	Online workshop (once)				▽ (assuming a business match) ※TBD				▽ (policy support assuming themes such as third-country cooperation etc., if needed)		
2)	Participation in City-to-City Collaboration seminars and introduction of projects (online)								▽ (TBD)		
4. Reporting											
1)	Monthly report to MOE (at the beginning of every month in Word format)		▽	▽	▽	▽	▽	▽	▽	▽	▽
2)	Progress meeting with MOE (around 4 times)		▲ (kick-off)			▲ (progress report 1)		▲ (progress report 2)		▲ (final)	
3)	Domestic meetings with Osaka City/companies (face-to-face or online)	▽		▽		▽		▽		▽	
4)	Final report								.....	.....	▲ (submission)

※Dotted line: online activities ▽: Domestic activities ▲: Activities by local office/employees

Source: Prepared by Nippon Koei

Figure 1-5 Project schedule

CHAPTER 2 ACTIONS TO CLIMATE CHANGE BY OSAKA CITY AND HO CHI MINH CITY

2.1 Actions to Climate Change by Osaka City

2.1.1 Osaka City Action Plan of Global Warming Countermeasures (Area Measures) updated in October 2022

Former Mayor of Osaka City, Mr. Yoshimura announced to aim at realizing 2050 Zero-Carbon City in Osaka City Council of 27 November 2020 and reported it to the Ministry of the Environment, Japan (MOEJ) on 9 December 2020. Also, implementation of measures to achieve goal of FY2030 and an approaches and measures to realize “Zero-Carbon Osaka”, that is, zero-carbon society leading to the maturity of Osaka City are clearly stated in “Osaka City Action Plan of Global Warming Countermeasures (Area Measures)” which was prepared in March 2021. The Action Plan was revised in October 2022, in accordance with the acceleration of efforts to achieve carbon neutrality in Japan and the world.

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

Target of the Action Plan

To reduce 50 % of GHG emission reduction by FY2030, compared with FY2013 to achieve net zero emission of GHG in 2050. (target raised from 30% to 50%)

Vision for 2050

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

“Zero Carbon Osaka” is defined as the situation that five kinds of cities below have been formulated. Also, approach to each City is illustrated in the Action Plan.

- City with decarbonized energy
- City disseminated decarbonized actions with full of zero-carbon mind
- Sustainable City integrated decarbonized method
- City leading decarbonization by utilizing various connections
- City well-prepared for climate change

2.1.2 Osaka City’s Environmental Education

The City of Osaka has prepared a supplemental reader of "Osaka Environment Studies" for elementary and junior high schools to enhance environmental education to promote a sustainable society in areas such as global warming, biodiversity, waste reduction, and urban environment conservation. They distribute the books to public elementary and junior high schools, including prefectural junior high schools (combined junior and senior high schools).

(Source: Osaka City HP¹)

Through this initiative, Osaka City aims to foster knowledge of children to understand the relationship between human life and the environment, including nature, through research activities, experience, and practice and lives while cherishing the environment. Environmental issues are categorized into five areas: "biodiversity," "circulation," "global warming," "energy," and "urban environment conservation". In addition, the content has been devised to match the development stages of the students based on the opinions of teachers who use this material.

Ho Chi Minh City DONRE recognizes that efforts at the household level and education are essential in solving environmental issues. Therefore, Osaka City introduced this environmental education with DONRE during this fiscal year's activities.

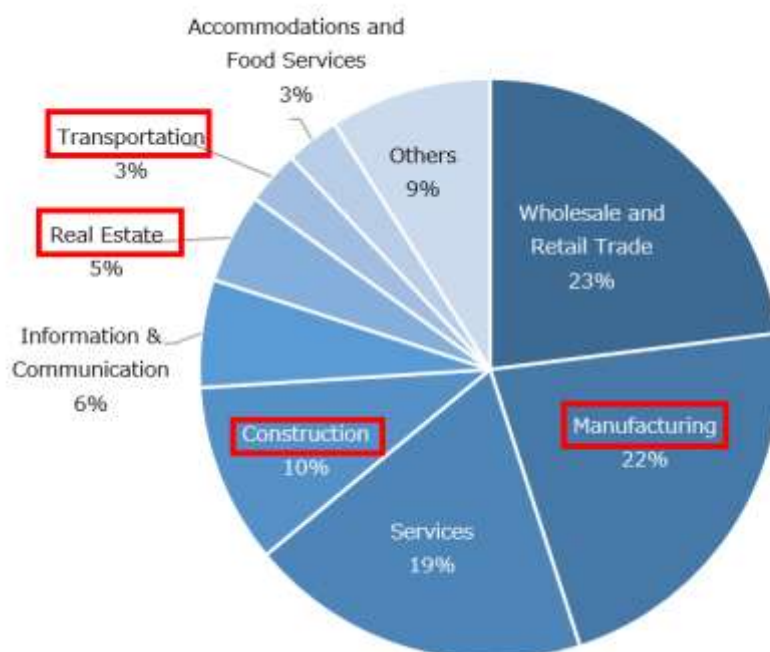
2.1.3 Osaka Chamber of Commerce and Industry

Osaka Chamber of Commerce and Industry (OCCI), established in 1878, is a comprehensive regional economic organization with 30,252 members (as of March 31, 2022), mainly companies in Osaka City. OCCI membership consists of a wide range of companies from manufacturing and wholesale to information and telecommunications, and it has promoted industry in Osaka by providing services such as business management support and overseas business development.

As 2023 marks the 50th anniversary of friendship and cooperation between ASEAN and Japan, an ASEAN Business Promotion Platform will be established by four chambers of commerce and industry from Osaka, Thailand, Singapore and Viet Nam. Through this platform, OCCI will encourage the new overseas collaborative business by companies in Osaka City and Kansai region.

JCM Model projects formation has been considered targeted in the manufacturing, construction, real estate and rental, and transportation industries among the membership of the OCCI are shown in Figure 2-1.

¹ <https://www.city.osaka.lg.jp/kankyo/page/0000307615.html>



Source: Prepared by Nippon Koei based on Osaka City Chamber of Commerce and Industry official site

Figure 2-1 Composition of member companies of Osaka Chamber of Commerce and Industry

2.1.4 Team Osaka Network

In June 2016, Osaka City established “Team Osaka Network” as a platform that private companies located in Osaka and Kansai area collaborate with Osaka City and Universities and the Network support for formulating projects that can contribute to development of zero-carbon society of cities in Asia. As of December 2021, 155 organizations in a wide range of sectors are participating the Network. Characteristics of the member companies are sorted in the table below.

Table 2-1 Sectors and technologies and services of members of Team Osaka Network

#	Sectors	Technologies and services
1	Plant engineering/sales	Environmental plant (Water treatment, Waste treatment Biogas etc.)
2	Energy business	Gas production/supply/sales, power generation business, renewable energy projects etc.
3	Consultant	Construction consulting (study, engineering, supervision etc.), Energy-saving consulting, Business consulting etc.
4	Manufacturing	Lighting, Boiler, Air conditioning, pump etc.
5	Financing	Bank, Leasing, Financing
6	Think-tank	Study, research of policies, research & development
7	Others	Materials, Sales, Real estate, Tourism, Trading, Telecommunication, construction, education etc.

Source: Prepared by Nippon Koei based on Osaka City’ s website
<https://www.city.osaka.lg.jp/kankyo/cmsfiles/contents/0000366/366046/154sankajigyoushaichiran.pdf>

2.1.5 Osaka Smart Energy Plan

Osaka Prefecture and Osaka City have newly developed the “Osaka Smart Energy Plan” in March 2021. This plan aims to lead the formulation of “new energy society” in the decarbonization era, realizing the growth of Osaka and the safe and secure living of the people in Osaka Prefecture. It presents the direction of energy-related initiatives to be implemented by Osaka Prefecture and Osaka City by 2030. Overview of the plan is shown below.

Table 2-2 Overview of Osaka Smart Energy Plan

Period	From FY2021 to FY2030
Vision	An environment-friendly and disaster-resistant smart energy city which realizes the growth of Osaka and the safe and secure living of the citizens in Osaka Prefecture
Target	1) Double the utilization rate of renewable energy for electricity in large consumption areas, Osaka 2) Improve energy efficiency which lead to the growth of Osaka
Target value by 2030	Independent/ distributed energy introduction: 2.5 million kW or more Renewable energy utilization rate: 35% or more Energy utilization efficiency: 40% or more improvement (compared to FY2012)
Pillars of measures	1) Expansion of renewable energy 2) Improvement of energy efficiency 3) Strengthening resilience and abilities of power supply and demand adjustment 4) Promotion of energy-related industries and sustainable growth of companies in all fields

Source :Prepared by Nippon Koei based on Osaka Smart Energy Plan

2.2 Actions to Climate Change by the Central Government of Viet Nam and HCMC and Thu Duc City

2.2.1 Actions to Climate Change by the Central Government of Viet Nam

(1) Carbon Neutrality by 2050

Viet Nam Prime Minister Pham Minh Chinh has announced the country's aim to achieve carbon neutrality by 2050 at UN Climate Change Conference (COP26) held in November 2021. It is an ambitious target compared to the NDC target of reducing GHG emissions by 9% unconditionally and 27% with international cooperation by 2030.

The draft of the 8th National Power Development Plan (PDP8) submitted by the Ministry of Trade and Industry (MOIT) in October 2021 states that Viet Nam will reduce the proportion of coal-fired thermal power and increase the power generation capacity of renewable energy. It is currently being reviewed, and a specific roadmap for carbon neutrality in Viet Nam will be also formulated in parallel.

(2) National Climate Change Strategy toward 2050

In March 2022, the Vietnamese government formulated the “National Climate Change Strategy for 2050”. The strategy set targets that a 43.5% reduction in GHG emissions relative to BAU by 2030, peaking in 2035, and achieving net zero by 2050. The GHG reduction targets for each sector by 2030 are as high as 32.6% for energy, 43.0% for agriculture, 70% for land use, land use change and forestry (LULUCF), 60.7% for waste, and 38.3% for industrial processes.

(3) Green Building Regulation in Viet Nam

Green building regulations in Viet Nam aim to promote sustainable building practices and reduce the environmental impact of buildings. As of 2020, Viet Nam has nearly 150 certification cases that have been recognized as Green Building² according to different technical standards: LEED (USA), EDGE (IFC), LOTUS (VGBC), and Green Mark (Singapore). In Hanoi and Ho Chi Minh City, specific regulations are in place to support green building practices.

In Hanoi, the city has adopted the Viet Nam Green Building Council's (VGBC) green building rating system and requires that all new buildings of a certain size meet certain green building criteria. Additionally, the city has implemented a policy requiring all new public buildings to be certified green.

Ho Chi Minh City has also adopted the VGBC green building rating system and implemented similar regulations for new public buildings. Additionally, the city has established a green

² Hanoi City People's Committee – Hanoi Urban Planning Institute
<http://vqh.hanoi.gov.vn/index.php?language=vi&nv=news&op=tin-lien-ket/phat-trien-cong-trinh-xanh-trong-dinh-huong-phat-trien-kien-truc-1492.html>

building fund to provide financial support for green building projects.

Up to now, there are quite a few strategies, orientations, and action plans of the State on sustainable development, environment, and energy. Directly related to green buildings, the following legal documents can be mentioned:

- Decision No. 1658/QĐ-TTg dated October 01, 2021, Approval for National green growth strategy for the 2021 - 2030 period, with a vision by 2050;
- Resolution No. 136/NQ-CP dated September 25, 2020, Resolution on Sustainable Development;
- Decision No. 280/QĐ-TTg dated March 13, 2019, Approval for National program for thrifty and efficient use of energy for the period of 2019 – 2030;
- Law No. 62/2020/QH14 dated June 17, 2020, Law on Amendments to Construction law.

Green building assessment and certification on the territory of Viet Nam is being supported by international organizations in Viet Nam, but it has not been managed by the Government. The assessment and certification of the green building is an existing demand in the market. Therefore, the establishment of criteria, standards, and methods of assessment and certification of the above works need to be regulated by competent state agencies as a legal basis for evaluation activities and certified green buildings in Viet Nam. The above contents have been shown (amended and supplemented) in the requirements of Law No.: 62/2020/QH14 dated June 17, 2020, the Law on Amendments to the Construction Law, in details specified in additional Clause 4 of Article 10, and amending Clause 2 of Article 162.

(4) Legal System and Current Countermeasures for Waste Management in Viet Nam

According to the International Union for Conservation of Nature (IUCN) report of the monitoring and assessment program on plastic waste in Viet Nam shoreline in 2020, 80 tons of plastic bags are released in Hanoi and Ho Chi Minh City. Notably, the amount of plastic waste and plastic bags nationwide accounts for about 8-12% of domestic solid waste. On average, one person uses and discards 1 plastic bag/day, and more than 31.4 billion plastic bags are discarded each year, of which only 17% are reused.

Ho Chi Minh City generates about 9,500 tons of domestic waste daily. The huge amount of the above-mentioned solid waste is mainly treated by landfill, accounting for 69%. While incineration, composting, and recycling accounted for only 31%, of which plastic recycling accounted for only 1%.

Ho Chi Minh City has implemented several initiatives to promote plastic bottle collection and recycling. According to the Ho Chi Minh City environmental status report in 2021, some achievements in the management, collection and treatment of plastic waste in Ho Chi Minh City below:

- Aquaculture: plastic waste collection rate is 70% - 90%, the plastic waste classification rate is 40% - 50%, and the plastic waste reuse rate is more than 70%.
- Fishing: plastic waste collection rate from 30% - 50%, plastic waste recycling rate 30%.
- Scrap is sold to individuals/organizations who buy or give it to collectors.
- The classification of industrial solid waste at source is now done at the manufacturing factory/plant. Some components can be reused and recovered materials right at the factory,

such as plastic, paper, metal, etc. Others are collected, stored, and transported to recycling and treatment plants.

- After making full use of recyclable and reusable components, normal industrial solid waste with the remaining inert substance will be treated by contracted units with the collection and treatment function.
- By the end of 2021, 100% of supermarkets, commercial centers, etc., have used environmentally friendly packaging to replace non-biodegradable plastic bags; small traders in residential markets reduced their use by 50%.
- Striving 2030, by using non-degradable plastic bags in packaging and storing products for customers., the city minimizes the use of single-use plastic products.

Regulations and activities at the central level

At the central level, the government has set up regulations and policies to reduce plastic waste, including restricting single-use plastics.

- Law No. 72/2020/QH14 dated November 17, 2020, Law on Environmental Protection: Article 73. Reduction, reuse, recycling, and treatment of plastic waste, preventing and controlling ocean plastic waste pollution.
- Decree No. 08/2022/ND-CP dated January 10, 2022. Article 64. Roadmap for restricting production and import of single-use plastic products, non-biodegradable plastic packaging, and products and goods containing microplastics

Regulations and activities at the municipality level

At the municipality level, Ho Chi Minh City has taken steps to increase public awareness of plastic waste management through education and outreach programs and the development of recycling facilities and collection systems.

- Action plan for Ocean Plastic Waste Management of the fishing industry for the period of 2020 - 2030 in Ho Chi Minh City (Attached to Decision No. 4306/QD-UBND dated December 24, 2021, of the City People's Committee)
- Plan for increase Plastic Waste Management, reduction, reuse, recycling, and treatment in Ho Chi Minh City, period of 2022 - 2025, vision 2030 (Attached to Decision No. 1667/QD-UBND dated May 19, 2022, of the City People's Committee)

Regulations and activities at the community level

At the community level, various initiatives, such as community-based recycling programs and public-private partnerships, are underway to encourage residents to participate in plastic bottle collection and recycling. Some communities also offer incentives, such as discounts on utility bills, for those who regularly recycle. Several documents have been prepared related to propaganda and classification of domestic solid waste, such as guidelines for sorting, collecting, transporting and handling solid waste management, leaflets and posters on classification of daily-life solid waste.

It is worth noting that despite these efforts, plastic waste management continues to be a challenge in Ho Chi Minh City, and there is a need for further action to collect and recycle plastic bottles effectively.

(5) MOT Action Plan for Climate Change (2021-2025)

The Ministry of Transport (MOT) formulated the Action Plan for active response to climate change, enhancement of natural resources management and environmental protection pursuant to Resolution No. 452/QĐ-BGTVT approved on 24 March 2021. The Action Plan is a 5-year plan from 2021 to 2025 and it specifies implementation of the guidelines, policies and instructions by the Government on the natural resources, as well as environment work in the transport sector for development in a sustainable and environmentally friendly manner.

The Action Plan lists the following solutions to the challenges of the transportation sector.

- i. Improvement of awareness of organizations and individuals in response to climate change
- ii. Improvement of resilience to climate change for the transport infrastructure
- iii. Improvement of management capability of GHG emissions
- iv. Strengthening economical and efficient energy use
- v. Efficient management and utilization of natural resources
- vi. Reinforcement of environmental protection in development and maintenance of transportation infrastructure
- vii. Controlling emission of the exhaust gas by transportation
- viii. Promotion of green transportation in the private sector

Regarding iv, the Action Plan describes in detail the strategy for decarbonization. For example, it plans d) to improve the capacity and service quality of public passenger transport in the cities; to accelerate investment into highway transport such as Mass Rapid Transit (MRT) and Bus Rapid Transit (BRT) in Hanoi and Ho Chi Minh City; to prioritize investment and operation of energy-saving and environmental-friendly buses and taxis, such as hybrid vehicles, vehicles using Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG); electric vehicles, etc. and e) to strengthen application of renewable energy, energy-saving technologies such as solar battery and LED lighting for lighting and traffic signals in the transport infrastructure investment projects and maintenance works.

(6) Power Development Plan 8 (PDP8)

The Power Development Plan 8 (PDP8) is being formulated under the initiative of MPI. According to the information as of February 2023, PDP8 is still being revised in the Ministry to present best option based on the important issues "power supply", "power load", "transmission and distribution", "highly efficient use of power" and "electricity rates". After government approval, it plans to review the contents of the plan and consider the consistency and cooperation with the City-to-City collaboration activities.

(7) Nationally Determined Contribution (NDC)

Vietnamese Government firstly submitted Nationally Determined Contribution (NDC) in November 2016 and then revised it in September 2020 and November 2022. To achieve the long-term targets of Viet Nam's National Climate Change Strategy to 2050, the latest version of the NDC (2022) significantly increases the GHG reduction targets from the previous update (2020). Compared to the previous NDC (2020), the GHG reduction targets in the latest NDC (2022) have been updated from 9% to 15.8% unconditional and from 27% to 43.5% conditional by 2030 compared with Business-as-Usual (BaU) scenario. The target GHG reduction reductions by 2030 for each sector are shown in the table below.

Table 2-3 Reduction targets by sector in revised NDC (2022)

Sector	Contribution with domestic resources		Contribution with international support		Total contribution with both domestic resources and international support	
	Compared to BAU scenario (%)	Reduction amount (Mil. tonnes of CO _{2eq})	Compared to BAU scenario (%)	Reduction amount (Mil. tonnes of CO _{2eq})	Compared to BAU scenario (%)	Reduction amount (Mil. tonnes of CO _{2eq})
Energy	5.5	51.5	11.2	104.3	16.7	155.8
Agriculture	0.7	6.8	2.8	25.8	3.5	32.6
LULUCF*	1.0	9.3	1.3	11.9	2.3	21.2
Waste	1.0	9.1	2.6	24.0	3.6	33.1
IP	0.8	7.2	0.1	0.8	0.9	8.0
Total	9.0	83.9	18.0	166.8	27.0	250.8

Note (): increase in GHGs sequestration*

Source: Updated Nationally Determined Contribution (NDC), The Socialist public of Viet Nam

Based on the targets of NDC, Vietnamese Government has been implementing various policies. Under the national policies, each municipality is carrying out individual policies. The main national policies are shown below.

Table 2-4 National policies for climate change and energy use in Viet Nam

Name of regulation (Date of enforcement)	Objectives
National Climate Change Strategy to 2050 (Decision 896/QD-TTg of the Prime Minister) 07 March, 2022	<u>Specific objectives</u> - Adaptation to climate change: To reduce vulnerability and risks to the impacts of climate change through improved resilience and the adaptability of natural, economic and social systems, minimizing losses harm caused by natural disasters and climate extremes increased due to climate change Reduce greenhouse gas emissions: To meet emissions targets net zero by 2050, actively contributing responsibly to the national community protecting the Earth's climate system; improve the quality of growth and competitiveness picture of the economy

Name of regulation (Date of enforcement)	Objectives
<p>National Target Program to Respond to Climate Change period 2012-2015 (Decision 1183/QD-TTg of the Prime Minister) 30 August, 2012</p>	<p><u>Specific objectives</u></p> <ul style="list-style-type: none"> - To gradually realize the National Strategy on climate change - To increase awareness and capacity to adapt to climate change - To orient to reduce greenhouse gas emissions - To develop low-carbon economy - To actively cooperate with international communities to protect the global climate system
<p>Action Plan for Implementation of Paris Agreement on Climate Change (Decision 2053/QD-TTg of the Prime Minister) 28 October, 2016</p>	<p><u>Overall objectives</u> To identify and implement appropriate activities and solutions until 2020 and 2030 to gradually carry out all the provisions in the Paris Agreement applicable to Viet Nam.</p> <p><u>Specific objectives</u></p> <ul style="list-style-type: none"> - To fulfil commitments in the Intended Nationally Determined Contribution (INDC) to mitigate GHG emissions - To fulfil commitments in the Intended Nationally Determined Contribution to adapt to climate change - To prepare human, technical and financial resources to fulfil commitments in the Intended Nationally Determined Contribution and contribute to the transition to a low-carbon, highly resilient economy - To establish and operate the transparency system (MRV system) to monitor and assess the implementation of adaptation, mitigation, and resource preparation - To revise institutions and policies to establish a favourable environment and focus national efforts to respond to climate change
<p>National Strategies on Green Growth 2011-2020 with a vision by 2050 (Decision 1393/QD-TTg of the Prime Minister) 25 September, 2012</p>	<p><u>Overall objectives</u> Green growth, towards the low-carbon economy, natural capital enrichment has become a decisive tendency in sustainable economic development; reduction in emissions and increase in the possibility to absorb greenhouse gases is becoming mandatory and important targets in socio-economic development.</p>
<p>National Program on Economical and Efficient Use of Energy for the period 2019 – 2030 (Decision 280/QD-TTg of the Prime Minister) 13 March, 2019</p>	<p><u>Overall objectives</u> "National program on economical and efficient use of energy in the period of 2019 - 2030" is the implementation step to concretize the energy development strategy, an important element in the National Sustainable Development Strategy, with the aim to turn Viet Nam into a country using energy saving and efficiency.</p> <p><u>Specific objectives</u></p> <ul style="list-style-type: none"> - To mobilize all the national and international resources for stimulating economical and efficient use of energy through the synchronous implementation of assignments and solutions of State management, technical assistance, science and technology research and product development, market transition, human resource training and development, and also utilization of support from the international community in the field of economical and efficient use of energy. - To formulate the habit of using energy economically and effectively in all social activities; to reduce intensive use of energy in a variety of economic sectors and industries; energy efficiency becomes a regular activity in key energy users and key economic sectors that consume a lot of energy, with an aim at green growth and sustainable development.

Source: Prepared by Nippon Koei based on each policy.

2.2.2 Actions to Climate Change by HCMC

(1) Climate Change Action Plan (CCAP)

In 2021, HCMC regulated Climate Change Action Plan from 2021 to 2030 with a vision to 2050 (CCAP 2021-2030). CCAP shows that HCMC strives to reduce emissions 10% by 2030 and moving towards a low carbon economy, this figure will be 30% if there is international support. The overview of CCAP is shown in Table 2-5.

The period of 2021-2025 focus on formulating mechanisms and policies to cope with climate change and implementing solutions, tasks and priority projects, and in the period of 2026-2030, it plans to strengthen coordination and integration of tasks and improve the capability of each sector, community and ecosystems to increase resilience to climate change.

CCAP declare that HCMC improves efficient use of energy and other resources under socio-economic development to contribute to national GHG reduction target and aims at development of low-carbon society. Important sectors for promotion of climate change countermeasures, designated in CCAP are “Agriculture”, “Industry”, “Construction Industry and Urban Planning”, “Transportation Industry”, “Culture and Tourism Industry”, “Medical Industry”, “Natural Resources and Environment Industry” and “Energy sector”. However, specific solutions in the eight priority sectors are not decided in CCAP, so companies and organizations in each sector need to formulate and implement actions.

Table 2-5 Overview of CCAP

Name of Plan	Climate Change Action Plan until 2015	Climate Change Action Plan 2017-2020 with vision to 2030	Climate Change Action Plan 2021-2030 with vision to 2050
Date of enforcement	15 May, 2013	17 March, 2017	8 September, 2021
Objectives	<p>To upgrade mechanisms and policies to manage, administer and guide the implementation of CCAP</p> <p>To consolidate and strengthen management capacity and strengthen linkages among departments and branches in HCMC to respond to climate change</p> <p>To evaluate the level and impacts of climate change in Ho Chi Minh City and the degree of climate change impacts on the fields and industries</p> <p>To raise public awareness about climate change</p> <p>To identify tasks and projects that prioritize</p>	<p>To develop solutions to strengthen the capacity to respond to climate change of Ho Chi Minh City when implementing socio-economic development planning and plans</p> <p>To contribute to the national goal of reducing greenhouse gas emissions by improving the efficiency of energy and resource use in socio-economic development activities of Ho Chi Minh City, towards low-carbon social development</p> <p>To improve the efficiency of the state management system in response to</p>	<p>In the period 2021-2025 focus on perfecting mechanisms and policies to cope with climate change; implement solutions, tasks and priority projects to enhance the capacity to cope with climate change and minimize the damage caused by climate change; increased resilience and adaptive capacity of the community, raising awareness to be ready to adjust to climate change. The period 2026-2030, with a vision to 2050, the city will strengthen coordination and integration activities in implementing solutions, tasks and improve the capacity of sectors,</p>

	climate change adaptation and mitigation.	climate change, contributing to promoting sustainable socio-economic development.	community and ecosystems to increase resilience to climate change.
Target sectors	Urban Planning, Energy, Transportation, Industry, Water management, Waste management, Construction, Safety, Agriculture, Tourism/Culture/Public awareness”		Agriculture, Industry, Construction Industry and Urban Planning, Transportation Industry, Culture and Tourism Industry, Medical Industry, Natural Resources and Environment Industry, Energy sector

Source: Prepared by Nippon Koei based on Climate Change Action Plan until 2013, Climate Change Action Plan 2017-2020 with vision to 2030 and Climate Change Action Plan 2021-2030 with vision to 2050

CCAP identifies 10 priority projects from 2021 to 2030, and one of the projects in the energy sector is installation of rooftop solar power system for administrative building of Thu Duc City People’s Committee. The priority projects are shown in the table below.

Table 2-6 List of Priority Programs, Tasks and Projects to respond to Climate Change in HCMC in the period of 2021-2030

#	Tasks/Projects	Unit in charge	Collaboration units	Stage implementation
1	Restore and protect mangroves and other forest areas of the city	Department of Agriculture and Rural Development	Relevant Departments, agencies and units	2021-2030
2	Pilot installation of water-saving devices in public works and administrative buildings.	Department of Natural Resources and Environment (DONRE)	Relevant Departments, agencies and units	2021-2030
3	Develop a project to collect and reuse rainwater at some public works.	DONRE	Departments, agencies, units and districts’ PC	2021-2030
4	Install rooftop solar power system for administrative building of Thu Duc city People’s Committee	Thu Duc city People’s Committee	DONRE	2021-2023
5	Project on improving drainage, wastewater and climate change adaptation in Tham Luong - Ben Cat basin (CRUS1)	Urban Infrastructure Construction Investment management board of Ho Chi Minh City	Relevant Departments, agencies and units	2021-2025
6	Improving drainage and wastewater systems and adapting to climate change in the West Saigon Basin (CRUS2)	Urban Infrastructure Construction Investment management	Relevant Departments, agencies and units	2021-2025

#	Tasks/Projects	Unit in charge	Collaboration units	Stage implementation
		board of Ho Chi Minh City		
7	Urban Flood Integrated Management Project in Ho Chi Minh City (loan from DANIDA - Danish)	Urban Infrastructure Construction Investment management board of Ho Chi Minh City	Relevant Departments, agencies and units	2021-2025
8	Project to improve water environment in Ben Nghe -Tau Hu-Doi-Te canal basin (phase 3)	Urban Infrastructure Construction Investment management board of Ho Chi Minh City	Relevant Departments, agencies and units	2026-2030
9	Developing a phased public bicycle system in the city, connecting the shared bicycle system with other types of public transport such as buses and subways (metro), building areas of low carbon emissions combine pedestrian streets with bicycle traffic routes in the central area.	Department of Transportation	Relevant Departments, agencies and units	2022-2030
10	Building domestic solid waste treatment plants using advanced technology in Ho Chi Minh City.	DONRE	Relevant Departments, agencies and units	2021-2030

Source : Prepared by Nippon Koei based on Climate Change Action Plan 2021-2030

(2) Difficulties in Introducing Rooftop Solar Power Generation in Public Facilities in Ho Chi Minh City

In Viet Nam, there are some legal difficulties in introducing rooftop PV (Photovoltaic power generation) facilities at government agencies and public facilities in the city. Last year, when the Vice Chairman of Ho Chi Minh City People's Committee requested the Ministry of Finance for assistance and guidance on the above-mentioned PV system installation, the Ministry of Finance responded as follows based on Decree No. 781/TB-VP (dated November 2, 2021), Article 4.34 and Article 4.54 of No. 15/2017/QH14, No. 11/2017/QD-TTg (dated April 11, 2017), No. 02/2019/QD-TTg (dated January 8, 2019), and No. 13/2020/QD-TTg (dated April 6, 2020).

According to the Ministry of Finance, the Law on Management and Use of Public Property states that "State agencies are entitled to use government buildings, intellectual property rights, application software, databases, and other public property to operate in accordance with the provisions of the Law and related laws. The management and use of revenues from those use shall comply with the provisions of the law". However, the respondents stated that there is no provision for the use of rooftops of government buildings for the installation of PV systems. In

addition, the Prime Minister's Decree on Incentive Mechanisms for the Introduction of PV System in Viet Nam stipulates that organizations and individuals holding rooftop PV projects can sell electricity only to the Viet Nam Electricity and authorized customers. There is no provision for the business of PV project to use the rooftops of office buildings. Therefore, the Ministry of Finance recommends not installing the PV facilities on the rooftops for business use.

For these reasons, it is clear that the use of rooftop PV for public facilities in Ho Chi Minh City is currently not feasible because there are no legal regulations regarding the use of rooftop PV for public facilities in Viet Nam. Additionally, it is difficult for PV developers to sell electricity due to strict legal restrictions in Viet Nam. In the future, when considering the introduction of rooftop PV facilities in Ho Chi Minh City under the JCM model projects, the above-mentioned laws must be taken into account. At least private companies should be considered for the introduction of PV system, not public facilities.

CHAPTER 3 CITY-TO-CITY COLLABORATION FOR ZERO-CARBON SOCIETY

3.1 Background of the City-to-City Collaboration

Osaka City began a collaboration with HCMC with conclusion of MOU on technology exchange with Saigon Water Corporation (SAWACO) in 2009 and has been supporting various environmental activities of HCMC. Whereas HCMC developed the Action Plan for Formulation of Low-carbon Society in HCMC in October 2013, Osaka City and HCMC concluded “MOU on Formulation of Law-carbon City in HCMC” for comprehensive cooperation to realize steady urban development of HCMC. Based on the MOU, the two cities have been implementing City-to-City Collaboration Project since 2013. In March 2022, the two cities updated the MOU for five years with a focus on zero/low carbon to support the implementation of CCAP.

A list of achievements of City-to-City Collaboration between Osaka City and HCMC are shown in Table 3-1.

Table 3-1 Achievements of City-to-City Collaboration project in HCMC

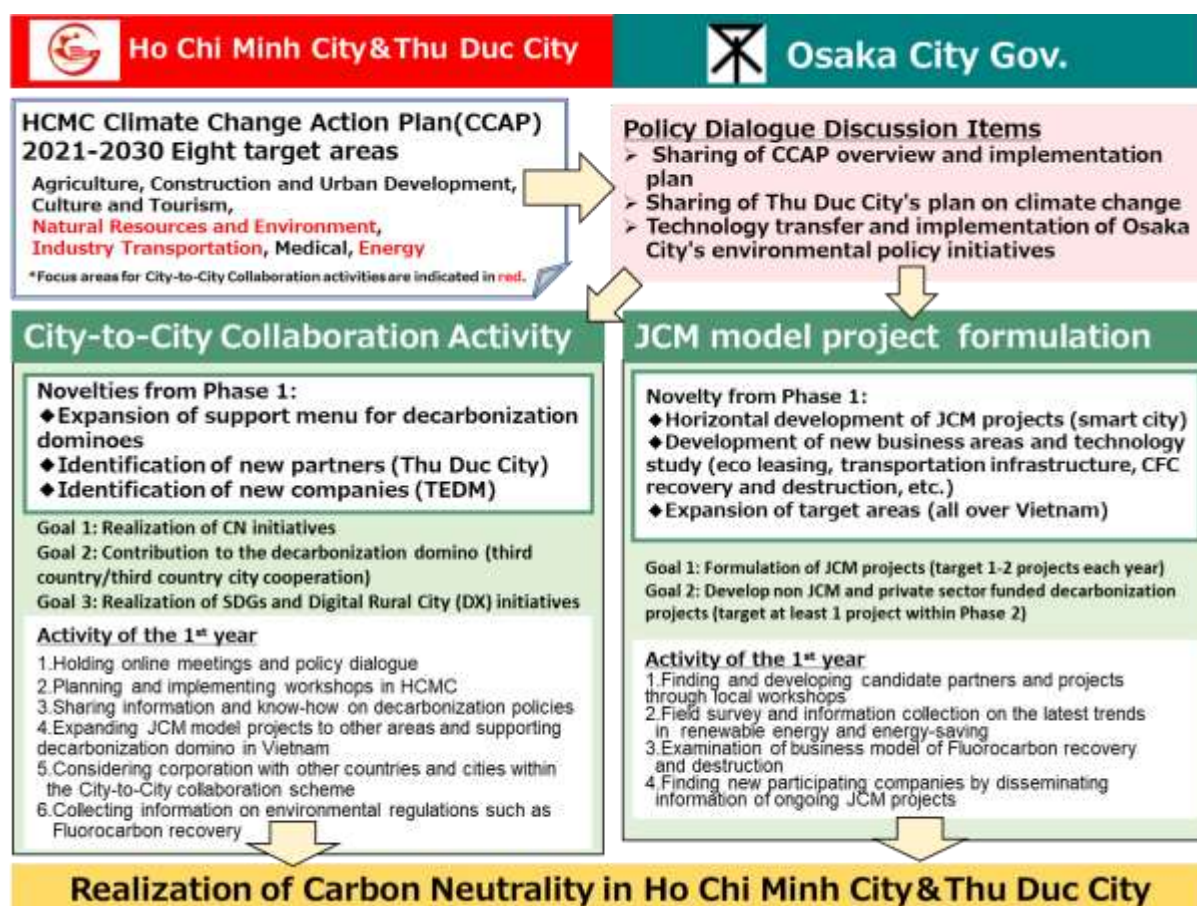
#	Month/Year	Overview
1	December 2009	Conclusion of MOU on technology exchange with Saigon Water Corporation (SAWACO)
2	April 2011	Started JCM City-to-City Collaboration Project (Ongoing)
3	October 2013	Conclusion of MOU on Formulation of Law-carbon City in HCMC
4	November 2015	Update of MOU on technology exchange with SAWACO
5	September 2016	Update of MOU on Formulation of Law-carbon City in HCMC
6	September 2016	HCMC Climate Change Action Plan 2017-2020 and Prospects until 2030
7	June 2018	Start to support on introducing a “hybrid rainfall forecasting system” for South Regional Hydro Meteorological Center (SRHMC) by Meteorological Engineering Center
8	December 2018	Update of MOU on technology exchange with SAWACO
9	September 2019- January 2020	Support for implementation of HCMC’s CCAP through JCM model project formulation
10	November 2019	“Mayor-level Policy Dialogue for Low-carbon Society between Osaka City and HCMC” in Osaka City
11	November 2019	“Introduction of high-efficiency air conditioner (Variable Refrigeration Flow, VRF) and air-cooled chiller to hotels and office buildings” was adopted as JCM model project
12	July 2020	“Introduction of High Efficiency Boiler System to Food Factory” was adopted as JCM model project
13	July 2020	“Introduction of High Efficiency Air-conditioning System to Hotel in Ho Chi Minh City” was adopted as JCM model project
14	January 2020	“Project Collaboration Agreement toward Improving Accuracy of Rainfall Prediction for Ho Chi Minh City” was concluded between Osaka City and SRHMC
15	March 2021	Updated “MOU on formulation of law-/zero-carbon city in HCMC”
16	September 2021	“Introduction of High Efficiency LED Lighting with Dimming and Tunable Function to Office Building in Ho Chi Minh City” was adopted as JCM model project

#	Month/Year	Overview
17	September 2021	“Introduction of High Efficiency Chiller and High Efficiency LED Lighting with Dimming Function to Shopping Center” was adopted as JCM model project
18	September 2021	“Introduction of 9.8 MW Rooftop Solar Power System in Industrial Park” was adopted as JCM model project
19	July 2022	“Introduction of 0.4MW Rooftop Solar Power System to Aluminum Wheel Manufacturing Factory” was adopted as JCM Eco lease project
20	August 2022	Online Policy Dialogue for zero-carbon society between HCMC and Osaka City
21	October 2022	Working-level City-to-City collaboration meeting in HCMC (Face-to-face)

Source: Prepared by Nippon Koei

3.2 Implementation Policy of City-to-City Collaboration

The implementation policy of this project consists of “City-to-City Collaboration activity” and “JCM model projects formulation” through policy dialogue based on HCMC’s CCAP. The following figure describes the content that has continued from Phase 1 of the past three years and the new goals and activities in the first year of Phase 2.



Source: Prepared by Nippon Koei

Figure 3-1 Implementation policy of City-to-City Collaboration

3.3 Results of City-to-City Collaboration in FY2022

3.3.1 Overview of City-to-City Collaboration Activities in FY2022

Results of the City-to-City Collaboration activities conducted during the Project are presented in the following table. Meeting materials can be found in Attachment-1, 2 and 3.

Table 3-2 Overview of City-to-City Collaboration activities in FY2022

Content	Schedule	Description
Meeting with Osaka City (online)	23 June 2022	<ul style="list-style-type: none"> • Confirmed with Osaka City the activities and schedule for this year's City-to-City Collaboration Project. • It was decided to coordinate an online policy dialogue in mid-August, followed by face-to-face discussions in conjunction with a technical workshop around November. • The state of Maharashtra in India was mentioned as a candidate for the third-country collaboration.
Meeting for JCM model project formulation (online)	8 June - 14 July 2022 8 July 2022	<ul style="list-style-type: none"> • Conducted face-to-face discussions with Yuasa Trading regarding new JCM project candidates for this fiscal year and information gathering on CFC recovery and destruction. • Conducted online discussions with Japanese contractors and exchanged opinions on the formation of JCM projects in local industrial parks. • Conducted online discussions with TDEM and exchanged information on new JCM projects and CFC recovery and destruction.
Meeting with Osaka Chamber of Commerce and Industry (OCCI) (hybrid)	30 June 2022	<ul style="list-style-type: none"> • Discussed with the OCCI both in person and online, and exchanged opinions on the possibility of cooperation in this year's city-to-city collaboration activities. • Discussed business matching opportunities with Osaka-related companies at a technical workshop to be held in November, as well as possible collaboration with the Japanese Chamber of Commerce and Industry in Ho Chi Minh City (JCCH).
Project formation activities utilizing local mercenaries	June 2022 – February 2023	<ul style="list-style-type: none"> • Utilizing local mercenaries, we compiled information on local municipalities and existing systems, and conducted a survey on the current status of CFC recovery and destruction, transportation infrastructure, etc.
1 st field survey	20 – 31 July 2022	<ul style="list-style-type: none"> • Information gathering and interviews with local officials were conducted in Ho Chi Minh City, Tu Duc City, and surrounding areas.
Meeting with Osaka City regarding policy dialogue and technical workshop (online)	4 August 2022	<ul style="list-style-type: none"> • Conducted online discussions with Osaka City to confirm the agenda, presentation materials, and logistics for the policy dialogue (8/18) agreed with DONRE during the 1st field survey. • Considering the timing of the Osaka City Council meeting, a potential date for the technical workshop was set for the end of October, and discussions were held on the proposed venue and agenda.
Policy Dialogue between Ho Chi Minh	18 August 2022	<ul style="list-style-type: none"> • Osaka City - Ho Chi Minh City hosted a policy dialogue. Discussions were held on the initiatives and

Content	Schedule	Description
City and Osaka City (online)		<ul style="list-style-type: none"> issues of both cities in the fields of renewable energy, energy conservation, waste disposal, and transportation. Nippon Koei explained the achievements of City-to-City Collaboration Project and future activity goals (renewable energy, energy saving, transportation infrastructure, CFC destruction, etc.). Deputy Director General of DONRE, Ho Chi Minh City, expressed his expectations for Osaka City's cooperation and support, and expressed his willingness to further discussions.
Tour and gather information on LED lighting facilities	19 August 2022	<ul style="list-style-type: none"> Visited the "Osaka Showroom" of ENDO Lighting, one of the participating companies in this project, to see the latest LED system (Synca) and gather technical information.
Meeting with OCCI (online)	8 September 2022	<ul style="list-style-type: none"> Online meeting was held with the OCCI, and an agreement was reached to hold a JCM seminar in November for companies in Osaka and the Kansai region.
Kick-off online meeting to Ministry of the Environment, Japan (MOEJ)	21 September 2022	<ul style="list-style-type: none"> Online kick-off meeting was held at the MOEJ, Osaka City, and Nippon Koei, where an overview of this year's activities and progress was provided, as well as a report on the 1st field survey. The MOEJ commented that they expected to consider the formation of projects in the public sector, e.g., in the field of transportation.
Meeting regarding Technical workshop and 2 nd field survey preparation (online)	11 October 2022 12 October 2022	<ul style="list-style-type: none"> Online discussions were held with the Osaka City to prepare for the 2nd field survey schedule and the technical workshop. Exchanged information with participating companies (TEDM) on project formation and vehicle disposal and CFC recovery in Viet Nam.
2 nd field survey	16 – 22 October 2022	<ul style="list-style-type: none"> Interviews were held with the Consulate-General of Japan in Ho Chi Minh City, JICA, JETRO, JCCH, and other related organizations to exchange information on the City-to-City Collaboration Project and Osaka City's overseas development.
Technical Workshop (hybrid)	21 October 2022	<ul style="list-style-type: none"> Hybrid type technical workshop was held in Ho Chi Minh City to introduce the City-to-City Collaboration Project and JCM scheme, energy-saving and renewable energy technologies, and JCM case studies. Approximately 75 people participated.
JCM seminars in cooperation with the OCCI	21 November 2022	<ul style="list-style-type: none"> Online JCM seminar was held under the auspices of the OCCI, with which we have been collaborating since this fiscal year, to provide an overview of the JCM scheme and introduce case studies of JCM project. Approximately 100 participants, mainly from Kansai companies, attended the seminar. As an administrative support for this seminar, Nippon Koei introduced the JCM scheme and the city-to-city collaboration activities.
3 rd field survey	16 – 17 February 2023	<ul style="list-style-type: none"> Meetings were held with HCMC DONRE, VCCI and other related organizations to exchange information on the progress of the City-to-City Collaboration Project in this year and plans for FY2023.
Online final report meeting to MOEJ	20 February 2022	<ul style="list-style-type: none"> Online final report meetings were held at the MOEJ, Osaka City, and Nippon Koei to report on the activities

Content	Schedule	Description
		of this year's project and to explain plans for the next fiscal year and beyond.
The Third Zero Carbon City International Forum (Online)	1 March 2023	Introduction material of the activities and results of the City-to-City Collaboration Project was prepared and available on the website during the Forum.

Source: Prepared by Nippon Koei

3.3.2 Activities related to Institutional Support

The following six activities are related to institutional support under the City-to-City Collaboration in this fiscal year.

(1) Online Policy Dialogue

The Ho Chi Minh City-Osaka City Policy Dialogue was held on August 18, 2022 to support the implementation of the "Ho Chi Minh City Climate Action Plan (CCAP)" based on the Ho Chi Minh City-Osaka City "Memorandum of Understanding for the Formation of a Low/Zero Carbon City". In addition to the Department of Natural Resources and Environment (DONRE), the Department of Industry and Trade (DOIT), Department of Construction (DOC), Department of Transportation (DOT), Department of Tourism (DOT), and the Ho Chi Minh City Export Processing and Industrial Zones Authority (HEPZA) participated from Ho Chi Minh City, and DONRE from Thu Duc City.

In this policy dialogue, Osaka City introduced the "Osaka City Action Plan of Global Warming Countermeasures (Area Measures)" and shared knowledge on decarbonization. HCMC DONRE introduced the CCAP, explaining its policies, overall goals, and main missions. After that, JCM Model Projects and the City-to-City Collaboration Project were introduced, and the achievements of JCM Model Projects in Viet Nam were explained by Nippon Koei.

In the latter half of the policy dialogue, both cities exchanged opinions. Prior to the Policy Dialogue, Osaka City had provided comments to CCAP on "Priority Program 8: Introduction of shared rental cycles", "Priority Program 9: Waste management using advanced technology", and "Priority Program 10: Introduction of rooftop solar power generation in Thu Duc City". The HCMC DONRE commented on Osaka City's review. Regarding Priority Program 8: Introduction of Public Bicycles, HCMC DONRE introduced the development of public cycles services and the demonstration project of electric buses as an initiative to reduce CO2 emissions in the transportation sector. The city plans to formulate an electric bus development plan with the German Agency for International Cooperation (GIZ). Regarding Priority Program 9: waste treatment using advanced technology, it was announced that HCMC plans to increase the percentage of waste treated by incineration, recycling, and other new technologies from the current 30% to 80% by 2025, through a shift from landfill technology to incineration technology. Regarding Priority Program 10: Solar rooftop solar power in Thu Duc City, HCMC would promote further development of solar power generation in order to utilize the solar energy potential of Ho Chi Minh City.

During the above discussion, HCMC DONRE expressed its expectations for Osaka City to further cooperate with their experience, knowledge, and network in its future initiatives. In addition, they expressed their willingness to hold policy dialogue on a regular basis in the future, aiming to formulate concrete projects through the sharing of Osaka City's knowledge. This policy dialogue was the first to be held since the two cities signed a memorandum of understanding in 2013. HCMC DONRE expressed its willingness to further cooperate with Osaka City in the future, indicating that a relationship of trust has been built through the activities of City-to-City Collaboration Project to date. It is expected that continued policy dialogue in the next fiscal year will lead to further support for implementation through improvement of the CCAP content, and to the concrete implementation of current initiatives.

The program content of the policy dialogue is as follows.

Table 3-3 Agenda of Policy Dialogue

#	Local time	Agenda	Presentation organization
1	14:00-14:10	Opening Remarks	Osaka City, Environment Bureau, Deputy Director HCMC DONRE, Deputy Director
2	14:10-14:15	Online Photo Session	—
3	14:15-14:30	Osaka City Presentation -Osaka City's Efforts towards a Decarbonized Society-	Osaka City, Environment Bureau
4	14:30-14:45	DONRE Presentation -Current situation on climate change actions in HCMC and prospects of activities based on CCAP 2021-2030-	HCMC DONRE, Environment Bureau
5	14:45-15:00	Nippon Koei Presentation -Achievements of the City-to-City Collaboration Project (2019-2021) and further activities (2022-2024) for climate change measures in HCMC-	Nippon Koei
6	15:00-15:20	Discussion on further collaboration	Osaka City, Environment Bureau, Deputy Director HCMC DONRE, Deputy Director
7	15:20-15:25	Closing Remarks	Osaka City, Environment Bureau, Deputy Director HCMC DONRE, Deputy Director

Source: Prepared by Nippon Koei



Meeting venue in HCMC



Meeting venue in Osaka City



Presentation from HCMC

Presentation from Osaka City

Source: Prepared by Nippon Koei

Figure 3-2 Photos of Online Policy Dialogue between HCMC and Osaka City

(2) Support on Implementation of HCMC's CCAP 2021-2030

In accordance with MOU, Osaka City agreed to share experience and lesson learned regarding climate change action and support implementation of HCMC's CCAP 2021-2025 through formulation of JCM model projects.

According to the updated MOU, more specific low/zero-carbon activities and projects were described as follows,

- Proceeding with development of human resources, an organization and a system in order to manage the progress toward the steady implementation of the CCAP
- Sharing professional skills and knowledge in order to smoothly implement measures, research and assessment of greenhouse gas emissions toward the achievement of goals listed in the CCAP for 2020-2030
- Realizing a low/zero-carbon society by generating new projects including the installation of solar power generation system in public facilities, the promotion of smart MICE and the creation of large scale low/zero-carbon projects such as JCM
- Improving other environmental issues such as water treatment, waste management and public relations for climate change through sharing information and knowledge.

Based on the presentation materials of HCMC at the policy dialogue, the latest city targets and activity goals were confirmed regarding CCAP as below.

Table 3-4 Target and activity goals regarding CCAP

#	Targets	Activity goals
1	HCMC	Reduce emissions by 10% by 2030 and transition to a low-carbon economy through sustainable development (30% reduction in emissions with international support). Integrate priority actions for adaptation and mitigation into sectoral and urban planning, actively implement Viet Nam's commitments with the international community to address climate change, international cooperation, and attract support and private investment.
2	Industry	To manage GHG emissions from industrial manufacturing plants in Ho Chi Minh City. Convert industrial production to clean new technologies to reduce greenhouse gas (GHG) emissions. Promote and educate companies on climate change response.
3	Transportation	Promote the application of environmentally friendly technologies and encourage the use of renewable energy sources and clean energy in transportation. Promote and educate organizations and individuals about climate change response in transportation.

#	Targets	Activity goals
4	Energy	Ensure energy security and improve power sector facilities. Incorporate elements to address climate change and contribute to environmental protection in the development and implementation of programs for the economical and efficient use of energy in the city.
5	Solid waste	Minimize solid waste at source. -Limit landfills to conserve land resources. Applying greenhouse gas (GHG) gas emission reduction to reclamation (recycling) technologies in wastewater and waste collection and treatment.
6	GHG emissions reductions	Greenhouse gas (GHG) emission inventory preparation for 2016 and 2018. Development of a climate change implementation plan for the Paris Agreement. -Research and propose solutions to manage greenhouse gas (GHG) emissions from industrial manufacturing plants and buildings in Ho Chi Minh City. Capacity building for companies promulgated by the Prime Minister (listed as high emitters).

Source: Presentation material of DONRE, HCMC

(3) Technical Workshop in HCMC (Hybrid)

The workshop was held on October 21, 2022, in a hybrid format of local venue and online. In the first part, Ho Chi Minh City, Vietnamese private companies, and the Vietnamese Chamber of Commerce and Industry (VCCI) were invited to introduce the wide range of decarbonization technologies possessed by the four companies participating in the City-to-City Collaboration Project. Specifically, the representatives from each company explained to the Vietnamese participants about Osaka Gas' fuel conversion to natural gas, Yuasa Trading's one-stop solution business for achieving carbon neutrality, ENDO Lighting Viet Nam's high-efficiency LED lighting, and Sumitomo Mitsui Trust Panasonic Finance (SMTDFC)'s JCM eco-lease project. After the first part of the workshop, individual discussions were held among the participants, providing an opportunity for business matching for future project formation. In addition, the progress of the Ho Chi Minh City Climate Change Action Plan (CCAP) 2021-2030 was shared as an initiative of Ho Chi Minh City. In the second part of the workshop, an overview of this City-to-City Collaboration Project and case studies of JCM Model Projects were presented to online participants from Japan, with the aim of identifying new participants.

The workshop was attended by 77 participants in total for both the first and second parts, showing a high level of interest in the introduction of decarbonization technologies in Viet Nam. The workshop was reported by three local media companies, which helped to publicize the JCM Model Projects. In the future, we plan to invite more companies to participate in the workshop by strengthening cooperation with the VCCI and the Japanese Chamber of Commerce and Industry in Ho Chi Minh City (JCCH).

The contents of the program are as follows. (Also, see Attachment-2 for explanatory materials.)

Table 3-5 Part 1 Program of the Technical Workshop

#	Time (Viet Nam)	Agenda	Speakers
1	9:00-9:10	Opening Remarks	HCMC DONRE, Osaka City, Environment Bureau
2	9:20-9:30	Introduction of JCM model projects and the City-to-City Collaboration Project between HCMC and Osaka City	Nippon Koei
3	9:30-9:40	Steps toward implementing HCMC Climate Change Action Plan (CCAP) 2021-2030	HCMC DONRE
4	9:40-10:20	Achievements of JCM model projects and technologies/solutions for decarbonization	Japanese partner companies - Osaka Gas/ SOGEC - Yuasa Trading - ENDO Lighting Viet Nam - SMTPFC
5	10:20-10:30	Closing Remarks	Nippon Koei

Source: Prepared by Nippon Koei

Table 3-6 Part 2 Program of the Technical Workshop

#	Time (Viet Nam)	Agenda	Speakers
1	10:45-11:00	Opening Remarks and introduction of Osaka City's actions	Osaka City, Environment Bureau
2	11:00-11:15	Introduction of JCM scheme	Nippon Koei
3	11:15-11:25	Introduction of achievements of JCM model projects in Viet Nam	Japanese partner companies
4	11:25-11:35	Introduction of City-to-City Collaboration Projects between HCMC and Osaka City	Nippon Koei
5	11:35-11:40	Closing Remarks	Nippon Koei



Group photo



Workshop venue in HCMC



Opening remarks of DONRE, HCMC



Opening remarks of Osaka City



Presentation from DONRE, HCMC



Exhibition booth of the partner companies

Source: Prepared by Nippon Koei

Figure 3-3 Photos of Technical Workshop in HCMC

(4) Promotion of Third Country Collaboration

Osaka City and the India/Maharashtra State Pollution Control Board have signed a Memorandum of Understanding to cooperate on environmental conservation and energy sectors in 2020. Confirming the importance of actions to implement international environmental agreements including the Paris Agreement, Sustainable Development Goals (SDGs), and the Osaka Blue Ocean Vision, the two cities have been promoting cooperation for environmental conservation and rational energy use in the Maharashtra State.

(Source: Osaka City website, <https://www.city.osaka.lg.jp/kankyo/page/0000364999.html>).

It is desirable to disseminate the efforts and results of climate change mitigation measures in the City-to-City collaboration project with Ho Chi Minh City to third countries, in particular, the U.S., Australia, India, etc. It connects cities to cities to spread and develop the efforts (the dots become lines and the lines become surfaces) toward decarbonization on a global scale, ultimately.

This year, we have only provided information on City-to-City Collaboration Project in individual discussions with the Maharashtra State but in the following fiscal year and beyond, we plan to strengthen third-country collaboration by introducing decarbonization technologies that are more suitable for the city and companies in Kansai region that seek to develop business in India.

(5) Consideration of Digital Transformation (DX)

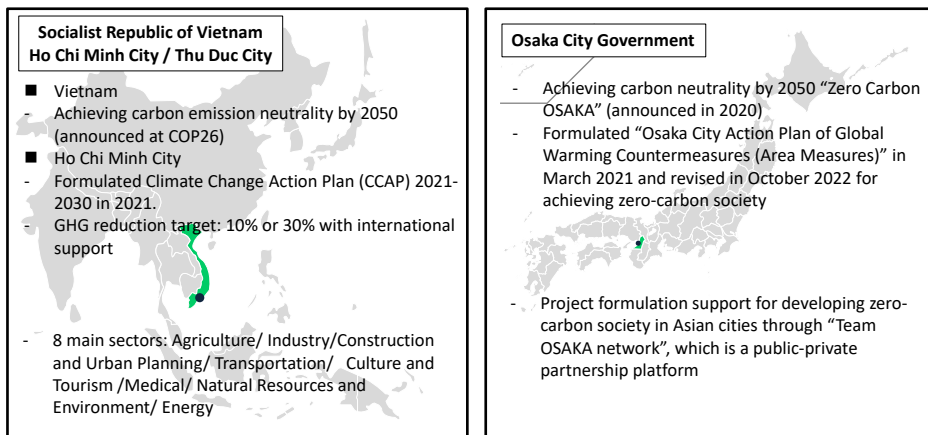
Although we have not considered the introduction of DX-specific technologies this year, we are studying technologies such as superior monitoring systems and energy management while forming the JCM model projects. From the next fiscal year onward, when forming projects for transportation infrastructure and logistics, etc., we plan to consider optimization and operational improvement through DX. In addition, for advanced technologies such as dimming and color-controlled LEDs, which have been introduced as part of the JCM model projects since the previous year, we plan to make proposals based on local needs in cooperation with participating companies.

(6) Zero Carbon City International Forum 2023 hosted by MOEJ

MOEJ together with the Office of the Special Presidential Envoy for Climate (SPEC), U.S. State Department organized the Forum as a part of the “Global Subnational Zero Carbon Initiative” launched by the in the Side Event at Japan Pavilion of the COP26. The achievements of this city-to-city collaboration project between Osaka City and HCMC were submitted as report materials (in Japanese and English) as below, and posted during the Forum.

City-to-City Collaboration Project between Ho Chi Minh City and Thu Duc City, Vietnam and Osaka City, Japan

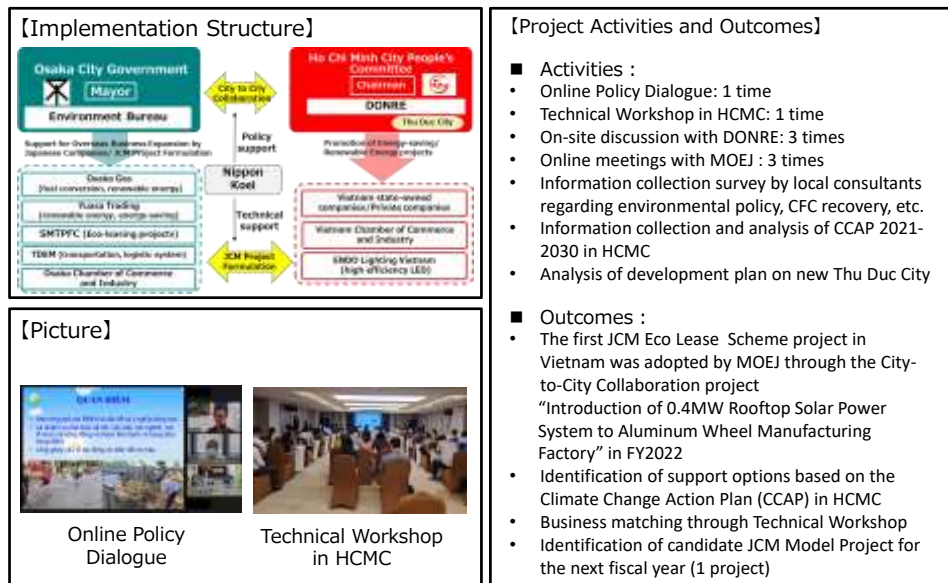
Osaka City Government and Ho Chi Minh City (HCMC) have been implementing the City-to-City Collaboration Project in the environmental field since 2011. In 2013, HCMC formulated an action plan for the formation of a low-carbon city, and Osaka City and HCMC signed MOU for comprehensive cooperation to realize steady urban development of HCMC. They have agreed to five-year extension of MOU in March 2021. **Through continuous discussions between two cities and JCM model projects formation by companies, seven JCM model projects were selected so far, contributing to the decarbonization of HCMC and Thu Duc City (a new city established in HCMC in January 2021) and expansion of decarbonization technologies to surrounding areas.**



Source: Prepared by Osaka City and Nippon Koei

Figure 3-4 Materials of introducing the Project (1/2)

City-to-City Collaboration Project between Ho Chi Minh City and Thu Duc City, Vietnam and Osaka City, Japan



Source: Prepared by Osaka City and Nippon Koei

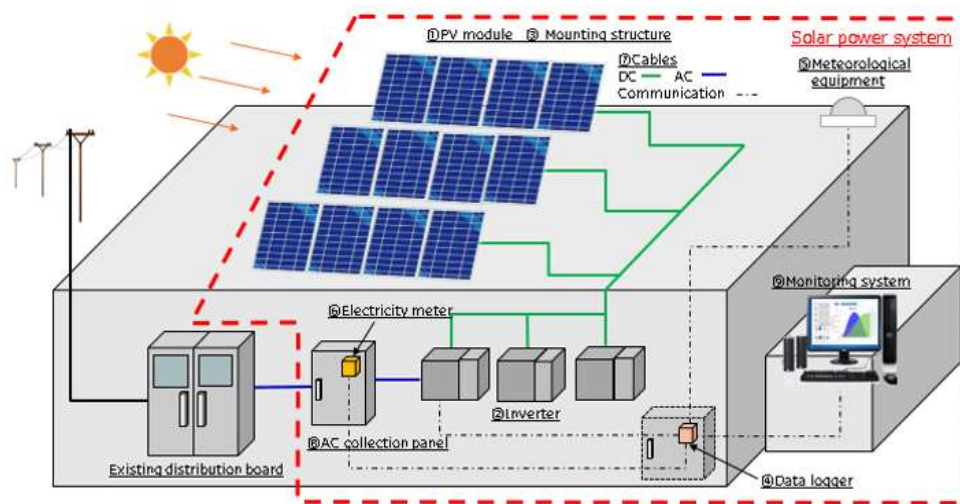
Figure 3-5 Materials of introducing the Project (2/2)

CHAPTER 4 JCM MODEL PROJECTS FORMULATION STUDY

4.1 Achievement of JCM Model Project Formulation through City-to-City Collaboration in FY2022 (JCM Eco Leasing Project)

SMTDFC, a participant in the City-to-City Collaboration Project, was selected by the Ministry of the Environment this fiscal year as the representative participant for the "Introduction of 0.4MW Rooftop Solar Power System to Aluminium Wheel Manufacturing Factory (JCM Eco Leasing Project)".

This project was developed through this City-to-City Collaboration Project in which a local company was identified as a partner participant, and the project was implemented in the suburbs of Hanoi, where SMTDFC has a local base. The project involves the installation of a 0.4 MW rooftop solar power generation system at an aluminium wheel manufacturing plant to cover part of the plant's electricity needs, which is expected to reduce CO2 emissions by 156 tons per year.



Source: GEC web site (https://gec.jp/jcm/projects/22pro_vnm_04/)

Figure 4-1 Image of the system in the JCM Eco Lease Project in FY2022

In the next fiscal year, the City-to-City Project will support as needed in the implementation of the above Eco Leasing project and continue to consider the formulation of projects for rooftop solar power generation projects in Ho Chi Minh City and Thu Duc City. In addition, support for proposal of Eco Leasing Projects for energy-saving equipment will be provided in the City-to-City Project FY2023 by collecting information and examining application procedures.

4.2 JCM Model Project Formulation for Introduction of High-efficiency Equipment (Once-through Gas Boiler)

4.2.1 Outline of the Study

Since last fiscal year, in cooperation with Osaka Gas, a JCM model project formation study on the introduction of a high efficiency gas once-through boiler in HCMC have been conducted. Osaka Gas Singapore Pte. Ltd., an Osaka Gas 100% owned subsidiary company, established a joint venture company SOGEC in 2019 with Sojitz Corporation and Sojitz Viet Nam. SOGEC operates a natural gas supply business in Viet Nam.

The equipment to be installed will be a high-efficiency once-through gas boiler from MIURA Co.,Ltd. ("Miura"), a boiler manufacturer in Japan.

Since the JCM Model Projects already has a track record in Viet Nam, we have been able to collect information on local needs and local companies for the most part. Therefore, this year, we focused on collecting and finding information on local companies that are considering the introduction or renewal of once-through gas boilers in industrial parks and factories.

4.2.2 Specification of Installed Technologies

In this study, the introduction of a high-efficiency gas once-through boiler manufactured by Miura is being considered as a roll out JCM project. High-efficiency once-through boilers push boiler water to one direction of the water tubes and convert it to steam without circulation. It keeps a small amount of water, which leads to easy start-up. Also, as its size is small, it can be said that the boiler is space-saving. Besides, the once-through boiler is a technology has been developed and introduced mainly in Japan, which has features such as low noise and low NOx emission.

The following table shows the advantages of once-through boiler over other boilers.

Table 4-1 Advanced performance of once-through gas boiler

Advantage	Overview
Once-through boiler with high mobility, load following, and advanced control	Different from water tube boiler, once-through boiler produces steam in a pile. By this, starting and response to load variation is fast. High-level control for stable steam production amount and temperature control is conducted.
Space saving	Only 60% of space is necessary compared with other boilers.
High efficiency in low load operation	It controls in response to load variation. High efficiency operation is possible in broad range of load.
Recovery of exhaust combustion gas by economizer	High-efficiency is enabled by an economizer that recovers remaining heat in exhaust gas and pre-heating the water pressurized by feed-in pump.
Low NOx, low CO emissions	Emission of NOx and CO is low, which was enabled by lowering combustion temperature and arrangement of nozzle location.

Source: Prepared by Nippon Koei



Source: MIURA

Figure 4-2 Image of high-efficiency once-through gas boiler

4.2.3 Results of the Study

To formulate JCM model projects to introduce high-efficiency once-through gas boiler, interview survey to companies in HCMC, which had discussion from the past fiscal year, was continued. In addition, the field survey, which was suspended due to the COVID-19 pandemic, was resumed this year, and through the technical workshop, we were able to confirm the level of interest by introducing the technology and case studies widely to Ho Chi Minh City officials and local and Japanese companies. Furthermore, through discussions with the Vietnam Chamber of Commerce and Industry (VCCI), we have compiled information on industrial sectors that are highly interested in this technology.

As for the gas dissemination in southern Viet Nam, a pipeline has been constructed from Ba Ria-Vung Tau Province, where there are oil fields, to the south of Ho Chi Minh City. The gas is mainly used in industrial parks and power plants, but the proportion of coal and fuel oil use is still high. The study confirmed that there is a need for gas once-through boilers in factories, which are the end-users of gas, in addition to the development of gas supply.

4.2.4 Project Plan and Evaluation

Since there is a rough idea of the project plan and business feasibility evaluation based on the past JCM Model Projects, GHG emission reduction and cost effectiveness were estimated in the same way as a horizontal expansion of the project. The GHG emission reduction was approximately 600 CO₂ tons/year per once-through gas boiler based on past results. Although cost-effectiveness is affected by fluctuations in the cost of electricity and fuel in Viet Nam, it was confirmed that the fuel conversion from heavy oil to natural gas will result in a reduction

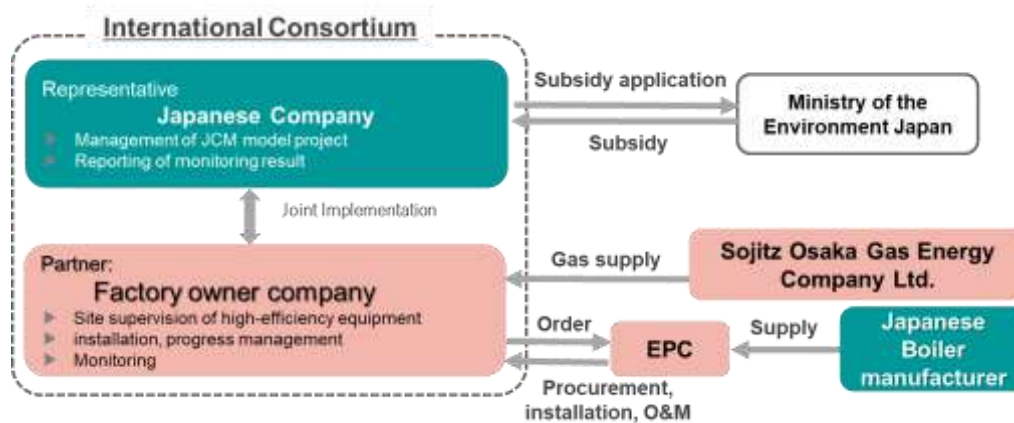
of approximately 1,000 yen/tCO₂, which fully meets the requirements of the JCM equipment subsidy project.

4.2.5 Coordination for International Consortium

The international consortium for JCM model project is assumed as follows. It is ideal that factory's parent company is a representative company in terms of smooth management of the JCM model project and confirmation and reporting of the monitoring results.

If a partner company is a Vietnamese company, it would be necessary to request a company, who has rich experiences of implementation of JCM model project, to be the representative company.

Then, a Japanese boiler manufacturer would supply a high efficiency gas once-through boiler to the local EPC and install boilers in the Factory. Sojitz Osaka Gas Energy Company Ltd. (SOGEC) would supply natural gas for once-through boilers.



Source: Prepared by Nippon Koei

Figure 4-3 International consortium and implementation structure of JCM model project for introduction of once-through gas boiler

4.2.6 MRV Planning

The measurement data required for estimation of GHG emission reduction is the fuel consumption of introduced high efficiency gas once-through boiler. The data required for MRV will be measured and recorded mainly by the equipment manager of the Partner company, with the support of the Japanese subsidiary of boiler manufacturer in Viet Nam. The results will be reported to the Representative company. And it is expected that monitoring will be carried out under the above structure.

4.3 JCM Model Project Formulation for Installation of Energy-saving Equipment (LED Lighting with Dimming Function)

4.3.1 Outline of the Study

Study for JCM model project formulation for installation of dimmable and highly efficient LED lightings to buildings, commercial facilities, factories, etc. in HCMC and Thu Duc City was carried out. Studied technology is dimmable and highly efficient LED lighting sold by Endo Lighting Viet Nam who is Vietnamese subsidiary of lighting equipment manufacturer, Endo Lighting Corporation based in Osaka City.

Having collected information in Viet Nam during the previous fiscal year, this year, surveying specific facilities and interviews with companies that are candidates for partner participants in the JCM Model Project in preparation for their applications were conducted.

Study contents are as follows.

Table 4-2 Study contents for installation of high efficiency LED Lighting with dimming function

#	Study contents	Outline
1	Consideration of specification of installed technologies	Study of existing equipment and consideration of installed technologies were implemented.
2	Project plan and evaluation	Project cost, energy-saving effect, payback period and CO2 emission reduction were considered.
3	Consideration of international consortium and implementation structure	International consortium and implementation structure were considered for application for JCM model projects.

Source: Prepared by Nippon Koei

4.3.2 Information Collection of LED Lighting in Viet Nam

In accordance with collected data, overall lighting market in Viet Nam drastically increased from VND 5,275 billion in 2015 to VND 9,066 billion in 2020 and share of LED lighting sharply rose from 37.7% in 2015 to 60.4% in 2020. Market scale of “Commercial and service facility” including candidate building of the study is VND 3,626 billion in 2020 and 65% of total is occupied by LED lighting.

4.3.3 Specification of Installed Technologies

Tunable LEDZ, dimmable and highly efficient LED lighting of Endo Lighting has one of the most efficient LED lighting firms in Japan. Table 4-3 shows the comparison among LED lightings sold in Viet Nam by three manufacturers. Efficiency of Tunable LEDZ is 160 lm/W which is much better than around 110 lm/W of products of a local manufacturer, Company C and of European manufacturer, Company D.

In addition, by combining with wireless control system, Smart LEDZ, dimming (function to tune brightness of lightings) and toning (function to change color of lightings to meet preference of users and purpose) can be controlled automatically, which realizes further energy saving.



Source : Endo Lighting

Figure 4-4 Dimmable LED lighting “Tunable LEDZ” of Company A

Table 4-3 Comparison of LED lighting

Supplier (Base country)	Tunable LEDZ	C (Vietnamese)	D(Dutch)
Length (mm)	1,200	1,210	1,195
Color temperature (K)	5,000	3,000	4,000
Luminous (lm)	6,025	7,600	3,370
Power consumption (W)	37.8	72	30
Efficiency (lm/W)	159.4	105.5	112.3

Source: Prepared by Nippon Koei based on information of the three manufacturers

Tunable LEDZ is dimmable by scheduling operation and manual operation, which lead to large amount of energy saving. Tunable LEDZ can be controlled one by one with different dimming rate even if they are installed in the same space, and this enables keeping the same brightness in the space without difference of dark and bright positions. This leads to improvement of value of the office because this point is important for office workers from the perspective of indoor working environment.

4.3.4 Project Plan and Evaluation

To apply for JCM model project in FY2021, GHG emission reduction, subsidy amount, cost-effectiveness and payback period were calculated. The result of the trial calculation is shown in Table 4-4 and Table 4-5. Since JCM methodology of interior LED lighting has not been developed in Viet Nam, calculation was carried out based on approved methodology in

Indonesia “AM_ID005: Installation of LED Lighting for Grocery Store”. However, this methodology cannot take dimming effects into account, thus formula below was utilized to calculate annual electricity consumption and GHG reduction.

$$\begin{aligned} & (\text{PRJ annual GHG reduction}) = (\text{PRJ annual electricity consumption}) \times (\text{Emission factor}) \\ & (\text{REF annual GHG reduction}) \\ & = (\text{REF annual electricity consumption}) \times (\text{Emission factor}) \times (\text{PRJ efficiency}) \times (\text{REF efficiency}) \\ \\ & (\text{PRJ annual electricity consumption}) = (\text{Operation hour}) \times (\text{No. of LED}) \times (\text{Lighting input}) \times (\text{Dimming rate}) \\ & (\text{REF annual electricity consumption}) = (\text{Operation hour}) \times (\text{No. of LED}) \times (\text{Lighting input}) \\ & \text{PRJ: Project} \quad \text{REF: Reference} \end{aligned}$$

Table 4-4 Trial calculation of GHG reduction and cost-effectiveness

#	Item	Figure	Unit	Remarks
a)	Operation hour	3,120	h/year	=13h/day x 240day (Condition)
b)	Number of lightings	2,800	-	Condition
c)	Input	37.8	W	Figure from catalogue
d)	Lighting rate	60	%	Study by Company B
e)	PJT annual electricity consumption	198	MWh	=a) x b) x c) x d)
f)	REF annual electricity consumption	330	MWh	=a) x b) x c)
g)	Luminous flux	6,025	lm	Figure from catalogue
h)	PJT efficiency	159.4	lm/w	= g) / c)
i)	REF efficiency	110.0	lm/w	AM_ID005
j)	Emission Factor	0.8041	tCO2/MWh	GEC guideline for FY2022 JCM model project
k)	PJT GHG emission	180.9	tCO2/year	= d) x h) (AM_ID005)
l)	REF GHG emission	436.9	tCO2/year	= f) x h) / i) x j) (AM_ID005)
m)	Annual GHG reduction	256	tCO2/year	= j) - i)
n)	Project period	12	year	legal lifetime
o)	Total GHG reduction	3,072	tCO2	= k) x l)
p)	Subsidy amount	XXXXXX	JPY	Subsidy rate XX%
q)	Cost-effectiveness	3,999	JPY/tCO2	= n) / m)

Source: Prepared by Nippon Koei

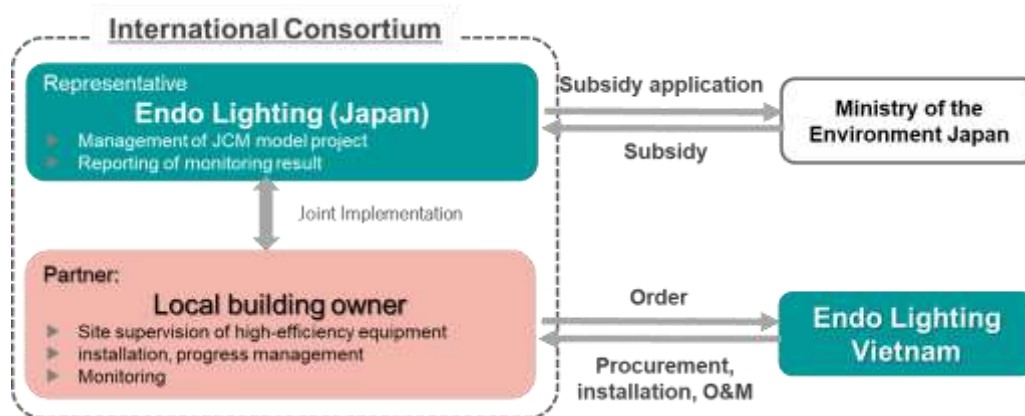
As a result of the trial calculation above, it was found that project for installation of dimmable and highly efficient LED lighting of Endo Lighting has a high potential to be applied for JCM model project.

4.3.5 Consideration of International Consortium and Implementation Structure

Two of the international consortiums and implementation structures below can be assumed for application for JCM model projects.

One is Endo Lighting Corporation (Japan) as a representative company, manages this project comprehensively and implement checking and reporting of monitoring results while local building owner, as a partner company, order the LED lighting to Endo Lighting Viet Nam and owns them. Endo Lighting Viet Nam is in charge of procurement, installation and operation and maintenance.

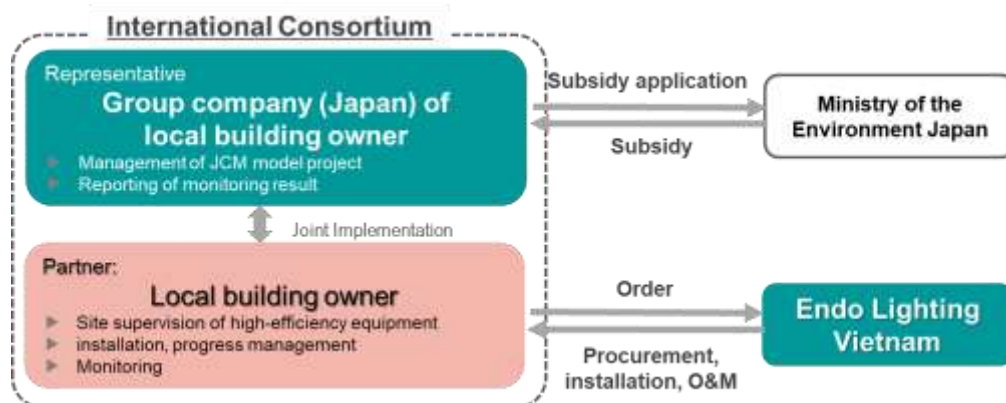
Note: Since the products will be purchased from ENDO Lighting, the representative participant, profit exclusion will be applied to the subsidy amount based on the rules of the JCM Model Project (Figure 4-5).



Source: Prepared by Nippon Koei

Figure 4-5 International consortium and implementation structure of JCM model project for introduction of dimmable and highly efficient LED lighting (1)

The other one is Local building owner and their group company based in Japan to form an international consortium and buy LED lightings from Endo Lighting Viet Nam. Endo Lighting Viet Nam is in charge of procurement, installation and operation and maintenance (Figure 4-6).



Source: Prepared by Nippon Koei

Figure 4-6 International consortium and implementation structure of JCM model project for introduction of dimmable and highly efficient LED lighting (2)

4.3.6 MRV Planning

The methodology for dimmable LED is currently under development in the JCM Model Project adopted in previous years. The measurement data (monitoring data) required for the calculation of GHG emission reductions will be LED-derived electricity consumption, and dimming rates will be normally operated based on planned values. The implementation structure of MRV assumes the flow of measurement and record management by the partner participant, and reporting to the Japanese company of the representative participant.

4.4 JCM Model Project Formulation of Renewable Energy (Solar Power Generation)

4.4.1 Outline of the Study

As a result of previous study in FY2021, it was found that there is high potential for the introduction of rooftop PV system in Ho Chi Minh City and Tu Duc City. On the other hand, according to information from Ho Chi Minh City, the introduction of rooftop solar power in public facilities is not possible at this time due to restrictions in the current system (for details, see “2.2.2 (2) Difficulties in Introducing Rooftop Solar Power Generation in Public Facilities in Ho Chi Minh City”). Therefore, this year, the following items targeting solar power generation for private companies' own consumption, such as in factories, were studied. (Table 4-5).

Table 4-5 Study contents for JCM model project for Solar power generation

#	Study contents	Outline
1	Promotion of understanding of JCM subsidy scheme	To promote the understanding of HCMC, outline of JCM scheme and example of JCM for public facility in other country were introduced.
2	Information collection of candidate facilities for JCM	The outline of buildings and large-scale facilities in HCMC were collected.
3	Project evaluation	In case of 1MW PV solar generation, project cost, amount of power generation, the payback period of the investment, and the amount of GHG emission reduction were examined.

Source: Prepared by Nippon Koei

4.4.2 Specification of Installed Technologies

Although technologies to be installed are decided depending on the purpose and scale, the following equipment (PV panel, inverter and monitoring system) is assumed to be introduced (Table 4-6).

Table 4-6 Specification of target equipment

#	Equipment	Outline
1	PV panel	The PV panel is made by Japanese manufacturer and the specification needs to be suitable for target facility such as shape and weight and to have better power generation efficiency (more than 20%) and durability.
2	Inverter	The specifications of inverter will be decided according to the compatibility with the solar panel.
3	Monitoring system	The system needs to measure the amount of generated power for the calculation of GHG emission reduction and to control remotely for getting monitoring data. Optimal specifications for PV panels and other equipment are required.

Source: Prepared by Nippon Koei

4.4.3 Results of the Study

This year, the field survey was resumed, and the interest in introducing solar power equipment was confirmed by introducing the technology and case studies widely to Ho Chi Minh City officials and local and Japanese companies through the technical workshop. In addition, information on companies and facilities with high energy consumption in the city was organized, and information sharing on the JCM scheme and case studies was conducted through online meetings and e-mails. It was planned to continue discussing the technology and implementation system with companies interested in this technology for application in the following fiscal year and beyond.

4.4.4 Project Plan and Evaluation

With the aim of JCM application later than this fiscal year, project feasibility was evaluated. JCM methodology "VN_AM007_ver 01.0 (Installation of Solar PV System)" was applied for the evaluation. Annual power generation, GHG emission reduction and cost-efficiency was estimated by assuming 1MW of PV system.

Note that, from this year's JCM Model Project subsidy program application guidelines, there are conditions for solar power generation projects in terms of panel efficiency (20% or more) and cost-effectiveness (2,500 yen or less), and the subsidy rate in Viet Nam is capped at 30%, so the business potential of the project must be reconfirmed at the time of application.

Below are the results of the trial calculation for the installation of 1MW-scale solar panels (Table 4-7). It is possible to secure a scale equivalent to 10 to 30 MW by installing multiple rooftop solar panels on the roofs of the companies occupying the industrial park (tenant factories). In addition, since surplus power can be flexibly distributed within the industrial park as private consumption without connection to the grid, efficient and economical use of renewable energy power can be expected without considering power loss. In particular, Ho Chi Minh City, Thu Duc City, and the surrounding provinces have a large number of industrial parks, so the potential is extremely high.

Table 4-7 Trial calculation of project for installation of PV solar system

Items	Figure	Unit	Remarks
Project cost (rough calculation)	XXXXXX	JPY million	Including PV panels, inverters and EMS etc.
Annual power generation by renewable energy	1,444	MWh/year	Estimated by a calculation model
Annual GHG emission reduction	991	tCO ₂ /year	EF (Renewable energy): 0.533 (tCO ₂ /MWh)
Cost efficiency	Around 2,500	JPY/tCO ₂	Condition of JCM model project application in FY2022

Source: Prepared by Nippon Koei

4.4.5 Consideration of International Consortium and Implementation Structure

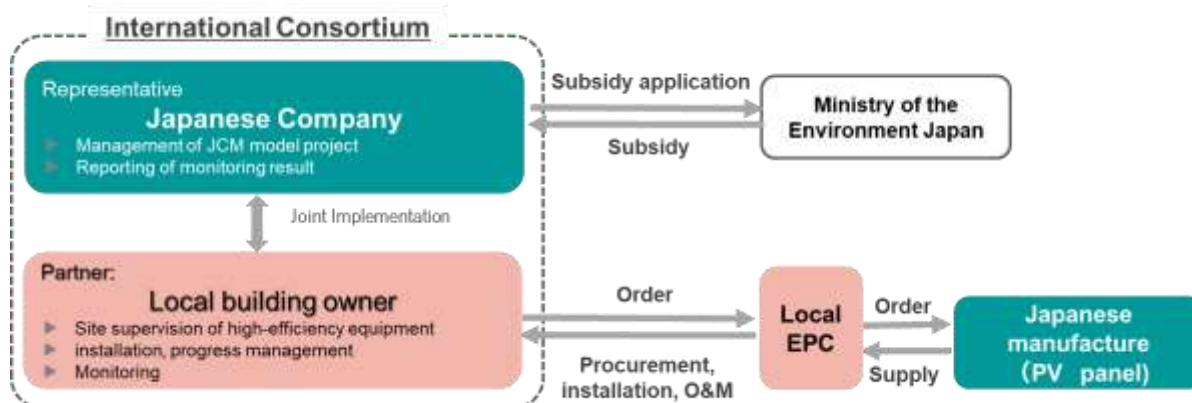
In single facilities, due to limited roof space, the power generation capacity per project is mostly in the range of 0.5 to 1 MW. Since Viet Nam no longer has a feed-in tariff (FIT) system, and Ho Chi Minh City and Tu Duc City has the difficulties in introducing PV system with the assumption of selling electricity under the current system, the implementation structure of the JCM Model Projects were examined based on the assumption of self-consumption.

In particular, based on the results of previous studies, in order to secure maximum GHG emission reductions as a JCM Model Projects in the case of a single project for commercial facilities and factories, it was considered including renewal and energy saving of existing facilities with electricity consumption. Since multiple patterns are possible, a total of four implementation structures were considered for the JCM Model Projects and the Eco leasing projects as shown below (Table 4-8, Figure 4-7-Figure 4-10).

Table 4-8 Expected International consortium (four cases)

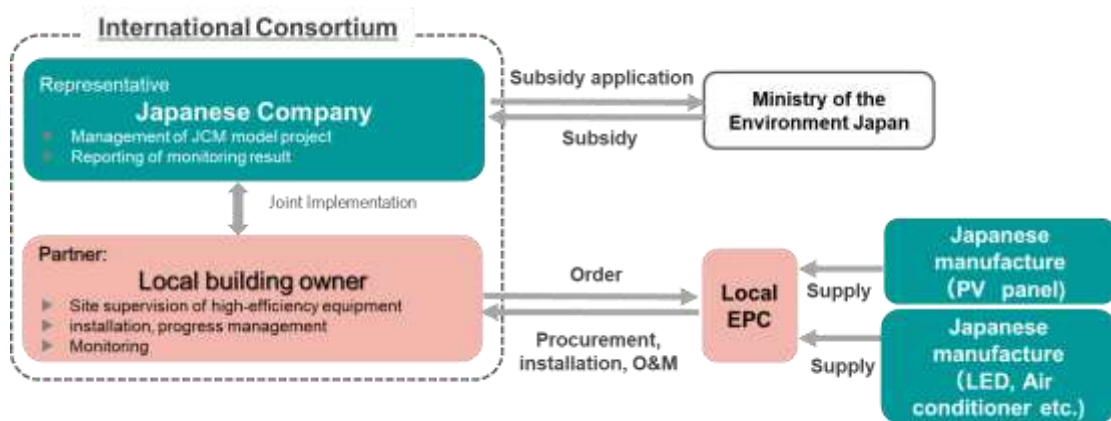
#	Introducing equipment	Scheme
1	Solar power generation system in single facility	JCM model project
2	Solar power generation system & energy saving equipment in single facility	JCM model project
3	Solar power generation system & energy saving equipment in single facility using leasing service	JCM Eco leasing project
4	Solar power generation system in multiple facilities (tenant factories)	JCM model project

Source : Prepared by Nippon Koei



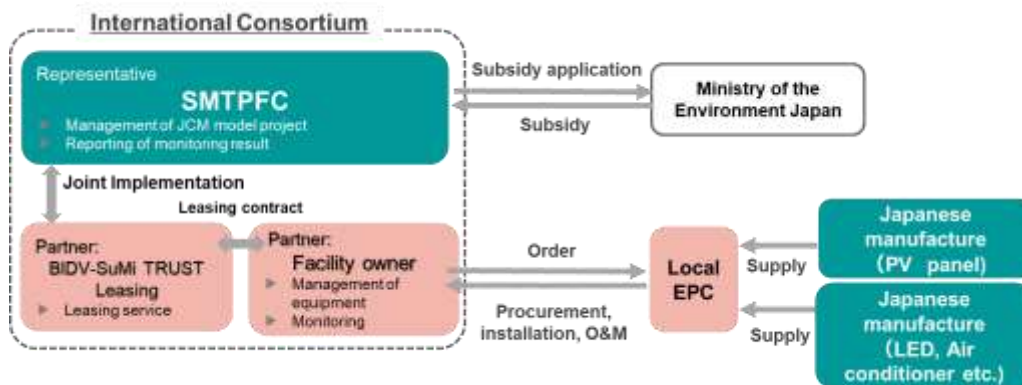
Source: Prepared by Nippon Koei

Figure 4-7 International consortium and implementation structure of JCM model project in public sector (1/4)



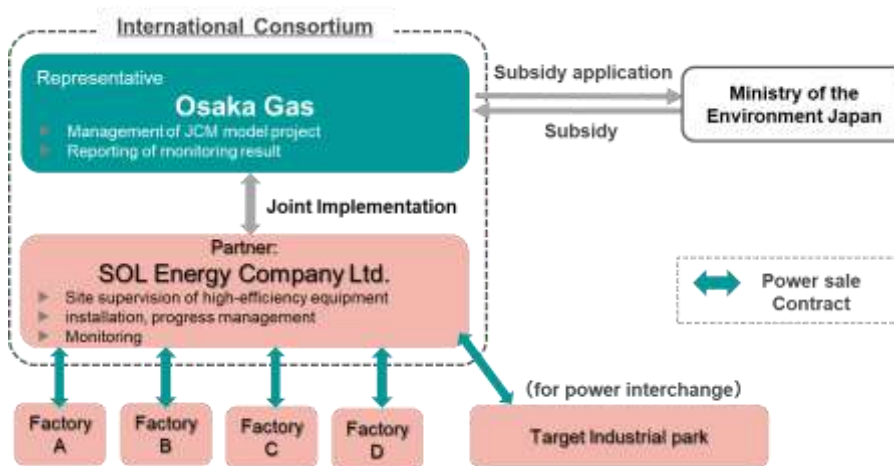
Source: Prepared by Nippon Koei

Figure 4-8 International consortium and implementation structure of JCM model project in public sector (2/4)



Source: Prepared by Nippon Koei

Figure 4-9 International consortium and implementation structure of JCM model project in public sector (3/4)



Source: Prepared by Nippon Koei

Figure 4-10 International consortium and implementation structure of JCM model project in public sector (4/4)

4.4.6 MRV Planning

MRV (Measurement, Reporting and Verification) will be conducted based on the approved methodology (VN_AM007Ver01.0/ Installation of Solar PV System), and the measurement data (monitoring data) required to calculate GHG emission reductions will be the amount of electricity generated, ignoring the generation loss due to electricity sharing. The MRV implementation structure is assumed to be a process in which partner participants (multiple cases are assumed) manage measurements and records, and reports to the Japanese company that is the representative participant.

4.4.7 Future Plans for Dissemination of the Project

Among the multiple business cases examined in this study, the one with the most potential for future diffusion and expansion is the project shown in Figure 4-11, which involves the installation of rooftop PV system on multiple factories in an industrial park. It is a versatile business model because the scale can be adjusted with similar equipment specifications, and an environment is being created in which it is easy to explain the project to other industrial parks (management company and tenant factories) based on knowledge and actual data from the JCM Model Projects already underway.

As shown in the following image (Figure 4-11), the spread of PV system to Ho Chi Minh City, Tu Duc City, and surrounding areas is expected to contribute to decarbonization at the city and regional level. It was planned to continue to propose this business model through HEPZA in Ho Chi Minh City in the next fiscal year's City-to-City Collaboration Project, utilizing the JCM Model Projects.

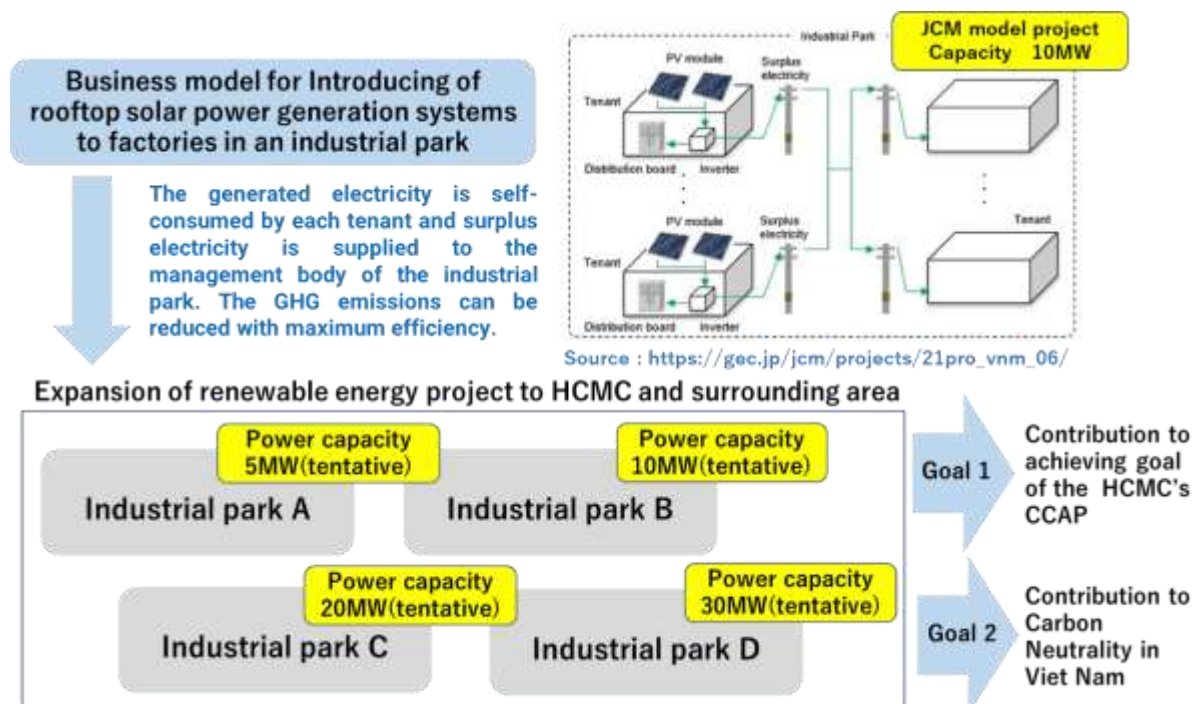


Figure 4-11 Image of dissemination of solar power generation system in industrial parks

4.5 JCM Model Project Formulation of Fluorocarbon Recovery and Destruction

4.5.1 Outline of the Study

In terms of laws and regulations, Viet Nam has ratified the Montreal Protocol, which aims to reduce the production and consumption of ozone-depleting substances, including fluorocarbons. In HCMC, demand for fluorocarbon recovery and destruction is expected to increase in the future as a new field to be supported.

This City-to-City collaboration project has been focusing on the project formulation using JCM scheme to reduce CO₂ emissions, but in this fiscal year, data collection of fluorocarbon recovery and destruction was also conducted to consider the possibility of support by cities and Japanese companies. The study items regarding fluorocarbon are as follows.

- a) Basic information collection related to fluorocarbon recovery and destruction in Viet Nam
- b) Information collection on current systems, related laws and regulations of fluorocarbon recovery
- c) Information collection on the current status of countermeasures and trends of fluorocarbon recovery

4.5.2 Result of the Study

a) Basic Information Collection

The Vietnamese government was one of the first countries to join the Montreal Protocol on Substances that Deplete the Ozone Layer and the Vienna Convention for the Protection of the Ozone Layer in 1994. In implementing the Montreal Protocol, Viet Nam has wholly excluded a number of ozone-depleting substances, such as chlorofluorocarbons (CFCs), Halon, and carbon tetrachloride (CTC), while controlling the import and export of Methyl Bromide and implementing a roadmap to eliminate hydro-chlorofluorocarbons (HCFCs).

b) Current Regulation and related Laws regarding Fluorocarbon Recovery

With the adopted roadmap, Viet Nam will end the consumption and use of hydrofluorocarbons (HFCs), mostly used in refrigeration, air conditioning, insulating foam, and aerosol production propellants, from 2024. According to the Department of Climate Change in Viet Nam, information on current regulations on the control of fluorocarbons will be shared and experience in the management of ozone depleting substances will be exchanged.

Currently, the National Assembly and the Vietnamese government have legal systems that set out an important legal framework to manage ozone-depleting substances and GHG. This includes regulations governing the production, import, export, consumption and disposal of controlled ozone-depleting substances and GHG; clarifying the responsibilities of state management agencies, organizations and individuals involved in the export, import and production of substances that deplete the ozone layer, substances causing the greenhouse effect.

Relevant legal documents on ozone layer protection, including:

- Law on Environmental Protection (*Article 92: Ozone layer protection*)
- Decree No. 06/2022/ND-CP dated January 07, 2022, Decree on mitigation of GHG emissions and protection of ozone layer.
- Decree No. 45/2022/ND-CP dated July 07, 2022, Decree on penalties for penalties for administrative environmental protection offenses. (*Article 45: Offences against regulations on GHG emissions mitigation, Article 46: Offences against regulations on ozone layer protection*)
- Circular No. 01/2022/TT-BTNMT dated July 07, 2022, providing guidelines for implementation of the Law on Environmental Protection regarding response to climate change

c) Current Status of Countermeasures and Trends of Fluorocarbon Recovery

Regarding supporting businesses to implement technology transformation without using ozone-depleting substances, as of September 2022, the Department of Climate Change has completed implementing subprojects for technology conversion in some fields: manufacturing refrigeration equipment, foam manufacturing, manufactures air conditioners. These companies typically collect used air conditioning units and recover the fluorocarbons for reuse or destruction.

In HCMC, currently, there are no specific regulations regarding the recovery of fluorocarbons from air conditioning systems. The market for these services is still in its early stages. No official information about companies performing fluorine recovery in HCMC exists. Overall, the demand for fluorocarbon recovery in HCMC is expected to increase as environmental awareness grows and regulations become more stringent.

4.5.3 Items for Future Consideration

As a result of the study, it was found that while the legal development at the national level is progressing, policies and initiatives at the city level are to be implemented. Fluorocarbon emissions due to new/renewal equipment are expected to be enormous in HCMC with as the largest city of Viet Nam with large amount of logistic and Thu Duc City which is being developed as a new city.

Therefore, considering fluorocarbon recovery and destruction as one of the countermeasures against global warming, in next fiscal year, it will collected information on related Japanese technologies, examples and financial support schemes for providing to HCMC and Thu Duc City.

4.6 JCM Model Project Formulation of Fluorocarbon Collection and Destruction

4.6.1 Outline of the Study

As goals of the CCAP in the transportation sector, Ho Chi Minh City aims to "promote the application of environmentally friendly technologies; encourage the use of renewable energy sources, and clean energy in transportation." In particular, "development of a shared bicycle system with other types of public transportation such as buses and subways, and construction of pedestrian and bicycle lanes" is a priority program, so a study of its plans and progress was conducted through the policy dialogue between Osaka City and Ho Chi Minh City.

4.6.2 Results of the Study

Ho Chi Minh City has approved the pilot projects of "Mobike", shared bicycle service at 43 locations in HCMC District 1 to reduce traffic congestion. During the field survey at HCMC, the establishment of the shared bicycle stations and the used of bicycles by tourists were confirmed.

According to HCMC DONRE, the following operational results of shared bicycle (500 bicycles at 43 stations) have been recorded (as of June 2022).

- New registration to bicycle reservation app: 184,283 accounts, average 1,086 accounts/day
- The number of usages: 246,502 times, average 1,315 times/day
- Total distance: 1,105,137 km, average 4.5 km/time
- Total usage time: 227,662 hours, average 55 minutes/time



Figure 4-12 Rental Cycle in HCMC

In accordance with the fuel supply infrastructure, clean and environmentally friendly fuels - alternative fuels such as CNG, LPG, and electric energy- are supplied to vehicles preferentially according to development trends in the world, and a bus investment plan is being developed.

Although HCMC has not yet developed its own plan, the HCMC People's Committee is implementing a pilot activity for public transport by electric buses on five routes. This project is being implemented under another country's donor project to the Ministry of Transportation, and they were formulating a city-level transportation development plan. Through this survey, it was found that there is a growing interest in Osaka City's air pollution control and decarbonization transportation policies in order to develop an electric bus development plan (implementation date, number of buses, structure of car lanes, etc.).

4.6.3 Items for the Future Consideration

The ongoing "electric bus demonstration project" and "pilot introduction of electric bicycles" will play an important role in promoting decarbonization in the transportation sector. In the next fiscal year, these transportation infrastructure (electrification) projects will be examined to consider if JCM Model Projects can be utilized. Regarding the logistics, that information was shared to several member companies of Transportation Subcommittee of the Japanese Chamber of Commerce and Industry (OCCI) in Ho Chi Minh City through the technical workshop. Further investigation and study will be conducted in the next fiscal year, as the potential for fuel savings by efficient logistics has high potential.

CHAPTER 5 FUTURE PLAN

5.1 Achievements of the Project in FY2022 and Plan for Further Activities

In this fiscal year, the main achievements were to hold the online policy dialogue on August 2022 between two cities which had been postponed due to COVID-19, and to conduct face-to-face discussion under the City-to-City Collaboration at the practical level on October 2022. Through the discussion between two cities, sharing information of the latest policies and regulations of both cities and exchange opinions related to zero-carbon activity and applicable technology could be conducted. Regarding the formulation of JCM Model Projects, the Project achieved the target of this fiscal year, because one JCM project with support from the City-to-City collaboration project was adopted by MOEJ as the first Eco Leasing project in Viet Nam. The original activity plan described in Figure 3-1 and items that have been achieved and activities that will be carried over to FY2023 (2nd year) are shown in Table 5-1.

Table 5-1 Achievements of the project in FY2022 and Plan for further activity

#	Activities in FY2022 (the first year)	Achievements and further activity
<Activities through City-to-City Collaboration>		
1	Holding online meetings and policy dialogue	Online/offline meetings and policy dialogue were carried out. The offline policy dialogue in HCMC was planned in FY2023.
2	Planning and implementing workshops in HCMC	The workshop was carried out in FY2022. It is expected that preparation work clearly shared with DONRE and project team, and discussion among the cities and introduction of technology will be implemented separately in the workshop of FY2023.
3	Sharing information and know-how on zero-carbon policies	Sharing information and know-how on zero-carbon policies was conducted in FY2022.
4	Expanding JCM model projects to other areas and supporting decarbonization domino in Viet Nam	One JCM Eco leasing project was adopted by MOEJ in FY2022 with the support of the City-to-City collaboration project.
5	Considering corporation with other countries and cities within the City-to-City collaboration scheme	Plan to introduce activity of the City-to-City collaboration project in FY2023.
6	Collecting information on environmental regulations such as Fluorocarbon recovery	Necessary information on environmental regulations such as Fluorocarbon recovery was collected.
<JCM project formulation>		
1	Finding and developing candidate partners and projects through technical workshops	It was supported one project under planning as a candidate JCM project for FY2023.
2	Field survey and information collection on the latest trends in renewable energy and energy-saving	The constraints of introducing renewable energy into public facilities of HCMC were summarized. Although there are demand of energy saving in HCMC, there is a difficulty in approaching Vietnamese companies, it plans to strengthen the relationship with VCCI in FY2023.
3	Examination of business model of Fluorocarbon recovery and destruction	As the detailed information on waste collectors and the local market is necessary, continuous survey will be conducted in

		FY2023.
4	Finding new participating companies by disseminating information of ongoing JCM projects	At the workshop, on-going/adopted JCM projects and Eco leasing project were introduced by partner companies.

Source: Prepared by Nippon Koei

5.2 Action Plan of the Project in FY2023

Based on the results of the achievement of activities and demands of HCMC, in the next fiscal year, it is planned to continue this support by adding the following activities.

5.2.1 Support for Promotion of Zero-carbon Policies/technology through Environmental Education

In this fiscal year, new topics such as waste reduction and Waste to Energy (WtE) were raised at the discussion under the project. According to HCMC DONRE, they expect that the accumulation of public awareness and small-scale efforts at the household level will eventually lead to zero-carbon of HCMC rather than formulating large-scale project at the city level.

The following activity plan was considered in Table 5-2 as a part of activity in this project, because it is expected to be effective as a long-term climate change countermeasure in the households and private sector. Further discussions will be held next fiscal year to confirm priorities of HCMC and consider possible funding schemes.

Table 5-2 Achievements of the project in FY2022 and Plan for further activity

	Collaboration activity plan	Expected achievements
1	Advice for preparation of environment education materials of HCMC and public awareness based on the achievements and activities of Osaka City.	After confirmation of the current situation of environmental education in HCMC, public awareness will be promoted comprehensible by reflecting points for improvement and good practices in Osaka City.
2	Dissemination and promotion of zero-carbon policy	The information and knowledge of zero-carbon are widely publicized to the citizen through several kinds of media. As a result, effects such as energy saving and waste reduction at the household level are expected.
3	Strengthening of public awareness and activity to households, educational institutions, public institutions, and private companies	Through introduction of technology and example of activities in Japan, it is expected to increase interest in climate change countermeasures and lead to strengthening and improvement of actual efforts.

Source: Prepared by Nippon Koei

5.2.2 Support for Strengthening Networks of Private Companies

Through the discussion in this fiscal year, it was agreed that VCCI and the project team would have collaboration in earnest for supporting the business of private companies related to HCMC and Thu Duc City. The idea for the collaboration is shown in Table 5-3. and the benefit of collaboration with VCCI shown in Table 5-4.

Table 5-3 Idea for collaborative activity with VCCI

#	Collaboration activity	Expected achievement
1	Promotion of the technical workshop to Vietnamese company and follow-up to participating companies	<ul style="list-style-type: none"> • Create opportunities of business matching • Public awareness in private sector on zero-carbon/environment conservation • Promotion of introduction of zero-carbon/environment technology • Project formulation using JCM scheme
2	Strengthening functions as a consultation desk for Vietnamese companies	<ul style="list-style-type: none"> • Regarding zero-carbon/environment technology and JCM model project, the project team responds consultation from Vietnamese company through VCCI, and supports on project formulation and introduction of these technology, if necessary.

Source: Prepared by Nippon Koei

Table 5-4 Benefits of collaboration with VCCI

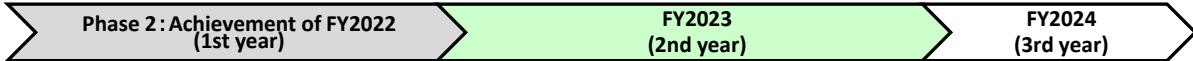
#	Target	Benefits of collaboration with VCCI
1	Japanese side (Osaka City, Japanese partner companies)	<ul style="list-style-type: none"> • Easier expansion of business in Viet Nam, with the opportunity to introduce Japanese zero-carbon/environment technology and services. • It can be expected to improve corporate value and acquire new customers by introducing equipment which contributes environmental/ zero carbon and investment. • Publicize the charm of Osaka City and unique technologies of partner companies to Vietnamese companies.
2	Vietnamese side (VCCI, HCMC, Thu Duc City, Vietnamese companies and Japanese companies in Viet Nam)	<ul style="list-style-type: none"> • Having knowledge makes it easier consider to introduce energy saving, renewable energy, fuel conversion and other advanced zero-carbon technology to own facility. • Increasing the opportunity of using the JCM by Vietnamese company. • It can be expected to improve corporate value and acquire new customers by introducing equipment which contributes environmental/ zero carbon and investment. • As a result, it leads to zero-carbon and environment conservation in the whole city.

Source: Prepared by Nippon Koei

5.2.3 Plan of Project Activity in FY2023

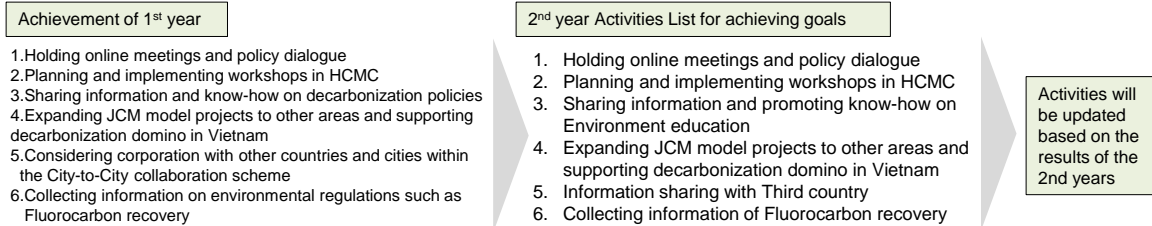
The implementation plan for project activity and goals in FY2023 was updated based on the summarized achievement of activities in FY2022 shown in Figure 5-1. The contents of support will be further specified through the discussion with Osaka City and partner companies of this project.

Implementation plan of City-to-City Collaboration Project between HCMC and Osaka City
Promotion of Carbon Neutrality based on Climate Change Policies in Ho Chi Minh City and Thu Duc City



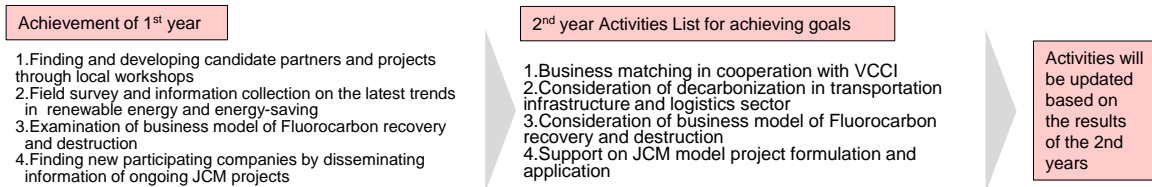
1) Support from Osaka City under City-to-City Collaboration

- Goal 1 ▶ Realization of Carbon Neutrality efforts in HCMC and Thu Duc City through policy dialogue
- Goal 2 ▶ Contribution to decarbonization dominoes (expand the effects to other countries and cities)
- Goal 3 ▶ Realization of efforts on SDGs and Digital Garden City Initiative (DX)



2) Support for formulation of decarbonization projects, such as JCM model projects

- Goal 1 ▶ Formulation of JCM (JCM Model Projects, JCM F-gas Project, etc. (1-2 projects/year)
- Goal 2 ▶ Development of decarbonization projects utilizing JICA, international schemes, and private funds (one or more projects in Phase 2)



Source: Prepared by Nippon Koei

Figure 5-1 Plan of project activities in FY2023