FY2019 Project for Ministry of the Environment Japan

FY2019
City-to-City Collaboration Programme for Low-Carbon Society

City-to-City Collaboration between DKI-Jakarta and Kawasaki City for Promotion of Green Innovation

Report

March 2020

Nippon Koei Co., Ltd.
Kawasaki City

FY2019 City-to-City Collaboration Programme for Low-Carbon Society

City-to-City Collaboration between DKI-Jakarta and Kawasaki City for Promotion of Green Innovation

Report

Table of Contents

Page

List of Tables

List of Figures

List of Attachments

Abbreviations

Abbreviation	Description
BAPPEDA	Regional Development Planning Agency
BAU	Business-as-usual
BOD	Biochemical Oxygen Demand
BPPT	Agency for the Assessment and Application of Technology
CAPEX	Capital expenditure
CO	Carbon Monoxide
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
COP	Conference of the Parties
DKI-JKT	Special Capital Region of Jakarta
EMS	Energy Management System
EPC	Engineering, Procurement, Construction
EV	Electric Vehicle
FY	Fiscal Year
GBCI	Green Building Council Indonesia
GHG	Greenhouse Gases
IDR	Indonesian Rupia
INDC	Intended Nationally Determined Contributions
JCM	Joint Crediting Mechanism
M&A	Mergers & Acquisitions
MOEJ	Ministry of the Environment Japan
MOU	Memorandum of Understanding
MRT	Mass Rapid Transit
MRV	Measurement, Reporting and Verification
MW	Mega Watt
NGO	Non-Governmental Organization
NOx	Nitrogen Oxides
PDAM	Regional water company
PDD	Project Design Document
PLN	State Electric Power Company
PV	Photovoltaics
RAD-GRK	Regional Action Plan for Reducing Greenhouse Gas Emissions
RAN-GRK	National Action Plan for Reducing Greenhouse Gas Emissions
RO	Reverse Osmosis
RPJMD	Mid-term Regional Development Plan
RUEN	Grand National Energy Plan

RUPTL	Electricity Supply Business Plan
SDGs	Sustainable Development Goals
SDIP	Sustainable Development Implementation Plan
SNS	Social Networking Service

CHAPTER 1 BACKGROUND AND OBJECTIVE

1.1 BACKGROUND OF THE STUDY

In December 2015, all countries participated in United Nations Framework Convention on Climate Change (UNFCCC)'s 21st Conference of the Parties (COP21) which was held in Paris, France. In COP21, Paris Agreement was adopted as a legal framework of fair and practical countermeasures to climate change after 2020. Paris Agreement aims at keeping global warming below 2 degrees Celsius above pre-industrial level, and it requires efforts to keep it below 1.5 degrees Celsius by promoting activities for decarbonization. Furthermore, at the COP24 held in Katowice, Poland in December 2018, the Paris Agreement Work Programme was adopted for the full implementation of the Paris Agreement for 2020 onwards.

In addition, it was decided that activities by non-state actors (including cities) and efforts by all non-governmental entities (cities and other local governments, etc.) are acknowledged and encouraged to be scaled up in COP21. Cities are the places to support social and economic growth since a lot of people live there. Although the total of urban areas is only 2% of all land in the world, approximately half of world population live in urban areas and the percentage is predicted to increase to 70% by 2050. Also, it is estimated that more than 70% of global CO2 emissions are emitted from cities as of 2006; hence, cities have important roles for mitigation of climate change. Thus, implementation of countermeasures to climate change and greenhouse gas (GHG) emission reduction in cities are important for achievement of the goal of Paris Agreement.

In the Republic of Indonesia (hereinafter called "Indonesia"), the Government of Indonesia established National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK), and each regional government enacted Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK) in 2013. In addition, Grand National Energy Plan 2015-2050 (RUEN) formulated in January 2017, particularly considers promoting energy saving and utilization of natural gas in Indonesia as priority countermeasures.

RAN-GRK, issued as President Decree No. 61 in September 2011, is set to reduce GHG emission by 26% in 2020 from the BAU (Business-as-usual) level with its own efforts and reaching 41% reduction if the country secures international support. In RAN-GRK, sector-wise goal (Forestry and Peat, Agriculture, Industry, Energy and Transportation, Waste), responsible ministries, and major mitigation measures are described and summarized in the table below.

Table 1.1 Sector-wise Goal in RAN-GRK

Sector	Emission Reduction Target (Giga ton CO_2e)		Major Mitigation Activities
	26%	41%	
Forestry and Peat	0.672 (87.6%)	1.039 (87.4%)	Forest fire management, watershed management, forest/land recovery, industrial plantation, community forestry, illegal harvesting control, forestry degradation

Sector	Emission Reduction Target (Giga ton CO_2e)		Major Mitigation Activities
	26%	41%	
			prevention, community capacity development, etc.
Agriculture	0.008 (1.0%)	0.011 (0.9%)	Low carbon emission paddy introduction, high-efficient irrigation, organic fertilizers, etc.
Industry	0.001 (0.1%)	0.005 (0.4%)	Usage of energy efficient technology, renewable energy
Energy and Transportation	0.038 (5.0%)	0.056 (4.7%)	Introduction of bio-fuel, high-efficient engine, improved transportation system, improved public transportation system, energy efficient technology, renewable energy, etc.
Waste	0.048 (6.3%)	0.078 (6.6%)	Appropriate usage of final disposal sites, 3R activities, drainage control in urban areas, etc.
Total	0.767	1.189	

Source: Compiled by Nippon Koei based on various secondary data

The Intended Nationally Determined Contributions (INDC), which was submitted to UNFCCC in 2015 as Indonesia's target of countermeasures to climate change, mentions that the country will reduce GHG emission by 29% in 2030 from the BAU level with its own efforts and reaching 41% reduction if the country secures international support. Also, it describes that at least 23% of power generation in Indonesia will be generated from renewable energy by 2025.

1.2 CITIES OF THE STUDY

The Spatial Capital Region of Jakarta (Daerah Khusus Ibukota Jakarta : DKI-JKT) is the capital city of Indonesia with a population of approximately 9.60 million which makes it the largest city in the country. DKI-JKT is also the center of the country's government, economics, culture, industries, and with surrounding cities forming the Jakarta metropolitan area. The Jakarta metropolitan area has been developed with remarkable economic growth through both domestic and foreign investments since the latter half of the 20th century. During the Asian monetary crisis in 1997, investment to the area temporary stagnated, but currently the situation has recovered and its development is further expanding. On the other hand, DKI-JKT is now facing serious environmental issues caused by increasing energy demand, serious traffic jams, tons of solid waste, air pollution, and water pollution with rapid economic development.

Kawasaki City, in Kanagawa prefecture. is located next to Tokyo. Kawasaki City serves as one of the hub cities for the Keihin Industrial zone, and the city has experience and expertise in pollution control at citizen level, company level and government level. Many companies in the city use superior environmental technologies. To utilize such experience, expertise, and technologies for developing sustainable cities, Kawasaki City promotes "Green Innovation". Also, the city organized "Kawasaki Green Innovation Cluster" in 2015 which is a platform of industry-academia-government-citizen collaboration for contributing to environmental improvement and industrial development.

Kawasaki City has been conducting "City-to-City Collaboration Programme for Low-Carbon Society" with other cities since 2015 by utilizing its knowledge and experience. DKI-JKT expressed an interest in these activities, so City-to-City Collaboration between Kawasaki City and DKI-JKT was proposed and has started since September 2017.

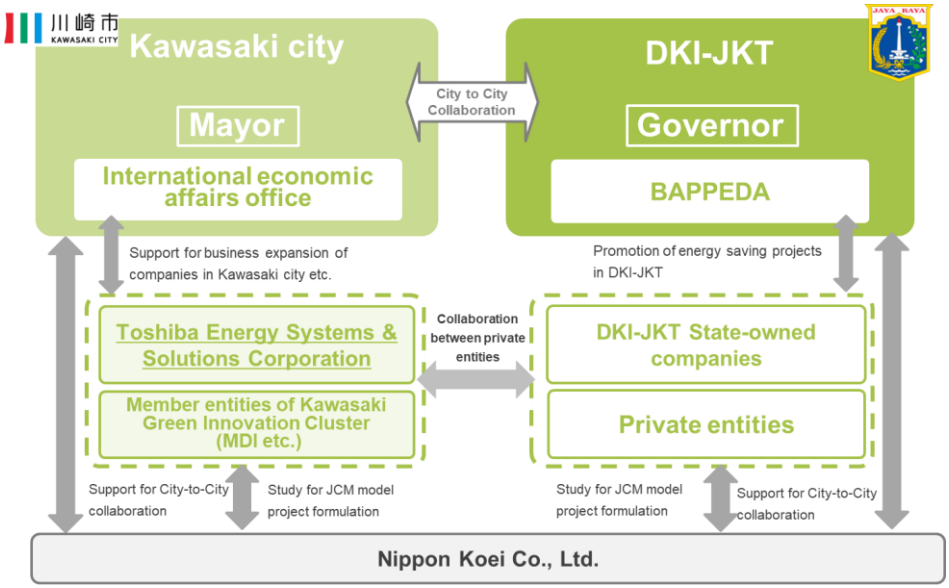
1.3 OBJECTIVE OF THE STUDY

"City-to-City Collaboration Programme for Low-Carbon Society between Kawasaki City and DKI-JKT" (hereinafter called "the Study") aims to implement investigations for developing a low carbon society in foreign cities by Japanese cities that have valuable knowledge and experience. Japanese cities also collaborate with Japanese research institutes, private companies, and universities in order to conduct the surveys in an effective and efficient manner. In the Study, Kawasaki City and DKI-JKT conducted a survey and discussion for realization a low carbon society.

1.4 IMPREMENTATION STRUCTURE

The International Economic Affairs Office of Kawasaki City and the Regional Development Planning Agency (BAPPEDA) of DKI-JKT mainly implemented the Study. In addition, the Environmental Agency, the Energy Agency and the Transportation Agency of DKI-JKT joined discussions of the Study to find potentials of GHG emission reduction in DKI-JKT.

Under the city-to-city collaboration between Kawasaki City and DKI-JKT, private companies such as Toshiba Energy Systems & Solutions Corporation conducted a feasibility study to formulate JCM (Joint Crediting Mechanism) model project in DKI-JKT. Nippon Koei Co., Ltd. supported all activities of the City-to-City Collaboration, and feasibility studies for JCM Model Project formulation.



Source: Prepared by Nippon Koei

Figure 1.1 Implementation Structure of the Study

1.5 STUDY SCHEDULE

The Study schedule is as follows.

Survey Items		2019			2020	
		Oct	Nov	Dec	Jan	Feb
<Energy Saving>						
(1): JCM Model Project Formulation on Energy Saving in Industry Sector						
1)	Consideration of specification of introduced technology					
2)	Formulation of project plan & project evaluation					
3)	Coordination for International Consortium					
4)	Formulation of monitoring plan					
(2): Promotion of energy saving by the city-to-city collaboration						
<Clean Energy>						
(1): JCM Model Project Formulation on Installation of Clean Energy in Remote Islands						
1)	Data collection of the target islands					
2)	Coordination of institutional design and horizontal development					
3)	Formulation of project plan & project evaluation					
(2): Promotion of clean energy by the city-to-city collaboration						
<Capacity Building>						
City-to-City Collaboration for achieving SDGs						
1)	Sharing experience/ knowledge regarding SDGs by Kawasaki City					
2)	Consideration of future collaboration in terms of SDGs					
<Workshop>						
1)	the Workshop in DKI-JKT				★	
2)	the JCM City-to-City Collaboration seminar in Japan				☆	
<Others>						
1)	Field survey		★	★	★	★
2)	Monthly report to Ministry of the Environment, Japan (MOEJ)		☆	☆	☆	☆
3)	Progress meeting with MOEJ			☆		☆
4)	Domestic meetings with Kawasaki City and related companies	☆	☆	☆	☆	☆
5)	Final report					☆
★ : Schedule in DKI-JKT ☆ : Schedule in Japan						

Source: Prepared by Nippon Koei

Figure 1.2 Study Schedule in FY2019

CHAPTER 2 CITY-TO-CITY COLLABORATION FOR LOW-CARBON SOCIETY

2.1 OBJECTIVE OF THE CITY TO CITY COLLABORATION

Kawasaki City and DKI-JKT have started the City-to-City Collaboration Programme for Low-Carbon Society in September 2017, and its goal is "Realization of Sustainable Green Innovation". Both cities agreed in "Letter of Intent for City-to-City Collaboration for Zero Carbon Society" (hereinafter called "LoI") signed in March 2019. The LoI mentions that utilizing JCM for realization of zero carbon society, and promotion of favorable cooperation to achieve Sustainable Development Goals (SDGs). This LoI will be valid for three years from the date of signing.

The achievement of the past city-to-city collaboration is as follows.

Table 2.1 Achievement of the City-to-City Collaboration

#	Year	Item	Outline
1	Sep. 2017	FY2017 City-to-City Collaboration programme	The city-to-city collaboration has started between Kawasaki City and DKI-JKT. "Green Building", "Green Industry", "Renewable Energy", "Waste Management", and "Urban transportation" was confirmed as the priority sectors of DKI-JKT.
2	Feb. 2018	Business matching for private companies between Japanese and DKI-JKT	DKI-JKT and Kawasaki city held the business matching in Jakarta area to look for candidate JCM Model Projects.
3	Apr. 2018	FY2018 City-to-City Collaboration programme	Feasibility Study for JCM project formulation focusing on "Green Building" and "Green Industry" was conducted.
4	Oct. 2018	Workshop for DKI-JKT officers	Kawasaki city officer shared their knowledge/experiences with DKI-JKT officers on waste management and promotion of renewable energy.
5	Oct. 2018	Site visit in Kawasaki city	2 delegates from DKI-JKT visited the facilities in Kawasaki city on waste treatment, recycling, and mega-solar system.
6	March 2019	LoI on Technical Cooperation for Zero Carbon Development between DKI-Jakarta and Kawasaki city	On 22 Mar. 2019, Secretary of DKI-Jakarta and Mayor of Kawasaki city has concluded the LoI to realize Zero Carbon society in DKI-Jakarta. The LoI also mentions the promoting activities regarding SDGs.

Source: Prepared by Nippon Koei

The objectives of the Study in FY2019 were as follows.

1) Project formulation aimed to apply for the JCM Model Project and promotion of energy serving technologies.

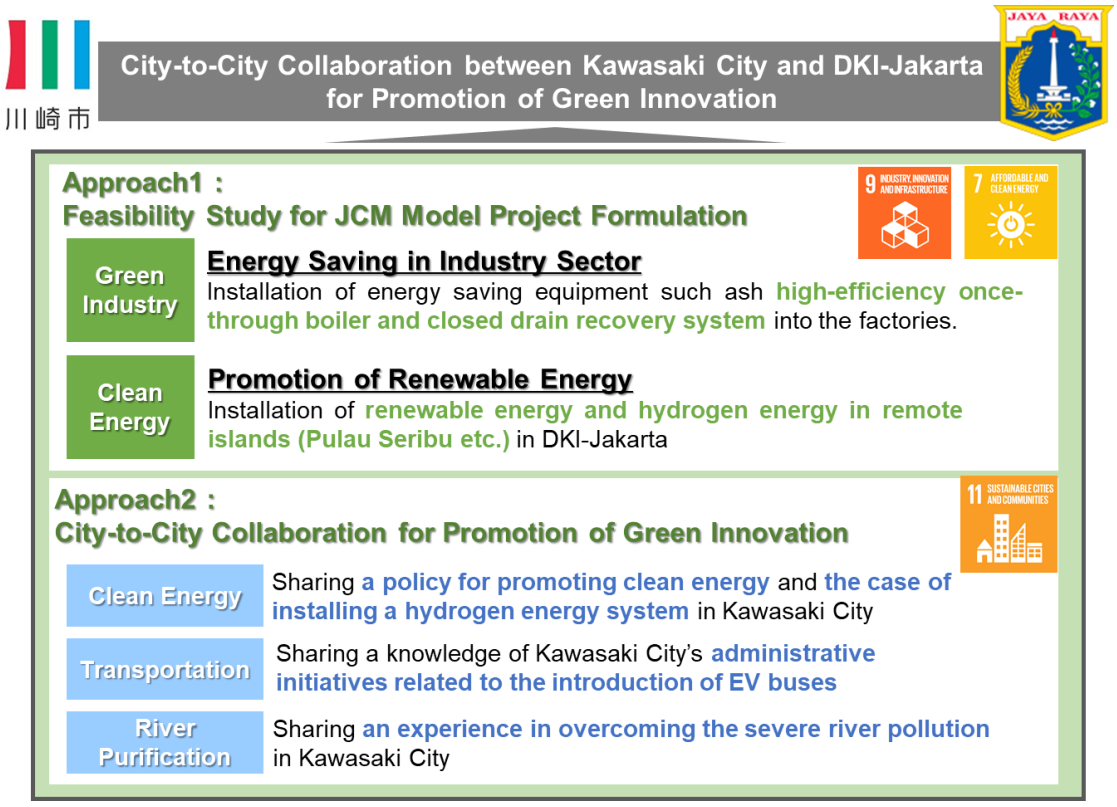
2) Promotion of green innovation activities in DKI-JKT by making use of experience of Kawasaki City.

The project aims to materialize a low carbon society in DKI-JKT through JCM Model Project formulation by utilizing energy saving technologies of the companies in Kawasaki City.

Kawasaki City is an industrial city located in Keihin industrial area which has supported the economic growth in Japan. The city has a history of overcoming industrial pollution such as air pollution and water pollution that occurred by rapid industrialization and urbanization in 1960s to 1970s by superior technology in private companies and efforts of government and citizen. Currently, urban development is rapid in DKI-JKT and they have several environmental problems such as air pollution, water pollution and waste management problem. Therefore, the experience in Kawasaki City can help to solve the problems in DKI-JKT.

2.2 CITY-TO-CITY COLLABORATION IMPLEMENTATION POLICY

The implementation policy for City-to-City Collaboration between Kawasaki City and DKI-JKI is presented in the figure below.



Source: Prepared by Nippon Koei

Figure 2.1 Image of Implementation Policy in FY2019

The discussion with both cities has focused on: 1) Feasibility study for JCM Model Project formulation to contribute to low carbon society, and 2) Promotion of green innovation actions by City-to-City Collaboration for which Kawasaki City can assist to solve the problems DKI-JKT has been facing.

The following items were identified as priority sectors in DKI-JKT based on the discussion in FY2019. The current situations are described below by priority sector.

Table 2.2 Priority Sectors in DKI-JKT

Priority Sector	Status
(a) Energy Saving in Industry Sector	Introduction of energy saving technologies and renewable energy into facilities are advanced under the Green Industry Policy supposed by Ministry of Industry in Indonesia. Many factories have high consciousness of using air conditioning well to make labor environment comfortable, and also to manage and maintain product's quality. In addition, factories which have freezers or cold storage facilities have high consciousness to save their energy consumption because a burden of energy is bigger than factories which don't have these facilities. DKI-JKT is a tropical climate and the average temperature is almost 27 degrees Celsius. Therefore, energy consumption and energy burden by air conditioning is very big, especially in large factories
(b) Clean Energy	West Java, where DKI-JKT is located, already have a stable electricity grid system maintained by a state-run electric power company, the national PLN（Perusahaan Listrik Negara）. Therefore, power cut seldom happens and stable power supply is available in Jakarta area. However, island areas along the Pacific Ocean, and a part of DKI-JKT do not have full connection to the existing grid systems. DKI-JKT related facilities in such island areas require to use their own power generators. From the facility operation and maintenance point of views, introduction of renewable energy system is getting one of key interests by DKI-JKT. Indonesian Electricity Supply Business Plan (RUPTL) specifies that total power generation capacity rate of renewable energy will be increased from 12.52% as of 2017 to 23% by 2020. Also, the Mid-term Reginal Development Plan (RPJMD, 2018-2022) of DKI-JKT aims to promote renewable energy system, and especially DKI-JKT strongly desires to install renewable energy into their remote islands. In addition, since Indonesia has established Feed in Tariff (FIT) system, DKI-JKT can benefit from FIT by in introducing renewable energy projects
(c) Green Building	Due to recent drastic economic development, rapid urbanization, similarly to major cities in Japan, is going on in Jakarta. Especially the central Jakarta is crowded with high-story office buildings and apartments, and high energy consumption by such buildings are becoming one of serious problems for the city. In consideration of the situation, DKI-JKT formulated the Green Building Policy to facilitate the construction of energy efficiency buildings in collaboration with the Green Building Council Indonesia (GBCI), a NGO, already promoting Green Building in Indonesia. However, since Green Building is not well recognized by majority of building owners, its construction and extension are not in well progress.

Priority Sector	Status
(d) Urban Transportation	DKI-JKT is one of the worst traffic congested cities in Asia. Not only private vehicles but also increasing number of bike taxi such as Grab, Uber, GOJEK, etc. are major causes of heavy traffic congestion in the city. To tackle the problem, DKI-JKT is introducing vehicle license number-wise traffic restriction[1] in the major traffic congestion areas of the city. Furthermore, to ease the chronic traffic congestion in the city, DKI-JKT is introducing other measures such as operation of Trans-Jakarta, installing EV buses (100 EV buses plan to be installed in 2020), and construction of MRT. However, the traffic congestion still big problem in DKI-JKT.
(e) River Purification	The inadequate waste management and illegal dumping have caused extremely serious water pollution in the rivers. In addition, almost all of the private companies in DKI-JKT don't have their own water purification system (such as septic tank) for their wastewater, and these untreated wastewaters have flowed in the rivers. According to the Environmental Agency, they monitor only BOD and COD in 13 rivers of DKI-JKT for monitoring river water's quality. River purification is one of the priority issues in DKI-JKT, and appropriate waste management and consideration of solutions to tackle this issue are highly needed.
(f) Waste Management	In DKI-JKT, daily average of 7,000 ton of waste is produced due to the rapid urbanization. To handle the situation, the waste management of Jakarta is administered by the Environmental Agency of DKI-JKT. In Jakarta, waste separation/ collection, intermediate treatment and final disposal are already introduced in the waste management, but their qualities have not yet systematized. Currently, the final disposal site for Jakarta metropolitan area has only one final disposal site located away from the urban areas, Bekasi.

Source: Prepared by Nippon Koei

From the above priority sectors, the following activities were conducted: 1) Feasibility study for JCM Model Project formulation or 2) Promotion of green innovation by City-to-City Collaboration in FY2019.

[1] At the designated areas of central Jakarta, vehicles allowed to enter the areas are determined based even-number days and odd-number days. For example, for even number dates, only vehicles having even numbers at the last-digit of their license plates are allowed to enter the designated areas.

Table 2.3 Main Activities in FY2019

Policy	Sector	Summary
1) Feasibility study for JCM Model Project formulation	Energy Saving in Industry Sector	Feasibility study on promoting high-efficiency energy saving equipment such as once-through boilers at the factories was conducted in Jakarta area for JCM Model Project formulation.
	Clean Energy	Feasibility study on installing hydrogen energy supply system into the remote islands was conducted for JCM Model Project formulation.
2) Promotion of Green Innovation by the City-to-City Collaboration	Clean Energy	Kawasaki City's policy and action plan for promoting renewable energy inclusive of hydrogen energy supply system were shared with DKI-JKT officers.
	Urban Transportation	The case of installed EV buses in Kawasaki City and their administrative activities were introduced to DKI-JKT officers.
	River Purification	Knowledge and experience of Kawasaki City which solved river pollution of Tama River were shared with DKI-JKT officers.

Source: Prepared by Nippon Koei

The results of feasibility study for JCM Model Project formulation related to Energy Saving and Clean Energy are described in Chapter 3.

2.3 STUDY RESULTS FOR CITY-TO-CITY COLLABORATION

2.3.1 Overview of the City-to-City Collaboration

Results of the City-to-City Collaboration activities conducted during the Study are presented in the following table.

Table 2.4 Overview of the City-to-City Collaboration

Content	Schedule	Description
The 1st Field Survey (Jakarta)	4 – 8 November, 2019	Based on contents of the project proposal, the purpose, activities and schedule of the Study were explained to DKI-JKT. During the meeting, DKI-JKT proposed a consideration of the collaboration regarding to installation of EV buses because Transportation Agency of DKI-JKT has an urgent plan to install 100 EV buses within 2020. In addition, Environment Agency requested Kawasaki City to cooperate in river purification and solid waste management. Based on the discussion, it was confirmed that a workshop for sharing knowledge from Kawasaki City would be held in January 2020 in DKI-JKT.
The 2nd Field Survey (Jakarta)	17 – 22 November, 2019	Collecting information for JCM Model Project formulation with private companies in DKI-JKT, and site visit to the fruit and vegetable markets which managed by DKI-JKT were conducted.
1st Progress	24 December,	Based on contents of the project proposal, concrete

Content	Schedule	Description
Reporting to MOEJ (Tokyo)	2019	purpose, activities and schedule of this project were explained to Ministry of the Environment Japan (MOEJ).
The 3rd Field Survey (Jakarta)	6 – 11 January, 2020	The workshop for DKI-JKT officers was conducted with cooperation of Kawasaki City. And the meeting with SDGs secretariat was set to discuss and consider possible collaboration between Kawasaki City and DKI-JKT in terms of SDGs. In addition, the JCM seminar for private companies was held for JCM Model Project formulation,
Workshop for DKI-JKT officers (Jakarta)	9 January, 2020	According to the request from DKI-JKT, Kawasaki City officers shared their policy and knowledge about "Clean Energy", "Urban Transportation" and "River Purification". DKI-JKT officers also gave a presentation on their policy and current issues about the above three sectors.
JCM Seminar and Inspection in Kawasaki City by DKI-JKT officer (Shinagawa/ Kawasaki)	14 – 18 January, 2020	To attend the JCM City-to-City Collaboration seminar organized by MOEJ at Shinagawa, a delegate from DKI-JKT officer was invited to Japan. During the seminar, Kawasaki City officer gave a presentation to introduce the Study. In addition, DKI-JKT officer participated in a panel discussion, and exchanged opinions with the delegates from other cities regarding to the City-to-City Collaboration. Also, the delegate from DKI-JKT visited several facilities related to waste treatment and renewable energy in Kawasaki City.
The 4th Field Survey (Jakarta)	2 – 7 February, 2020	The meetings with several private companies to formulate JCM Model Project were conducted. Also, the discussion with DKI-JKT (BAPPEDA and SDGs secretariat) was done. for consideration future plan.
Wrap up meeting (Jakarta)	6 February, 2020	Reporting the result of the Study FY2019 and discussion of future plan for FY2020 were conducted. As for the future plan in FY2020, it was confirmed that feasibility study for JCM project formulation on "Clean Energy" and "Energy Saving in Industry Sector" will be continuously implemented. Furthermore, collaboration activities in terms of SDGs will be considered under the city-to-city collaboration.
Final Reporting to MOEJ (Tokyo)	28 February, 2020	Outcome of activities in FY2019 and draft plan for FY2020 are explained to MOEJ.

Source: Prepared by Nippon Koei

2.3.2 Workshop for DKI-JKT

The workshop for the capacity building of DKI-JKT officers was held on 9 January 2020 according to DKI-JKT's request. The main themes of this workshop were "Clean Energy", "Urban Transportation" and "River Purification", and Kawasaki City officers introduced their policy and experience on these themes for DKI-JKT. Also, the Energy Agency and the Environmental Agency introduced DKI-JKT's policy and their current issues on the themes.

The outline and agenda of the workshop are as follows.

<Outline of the workshop>

Date: 9 January 2020 (Thursday), 10:00-15:00
Venue: BAPPEDA Meeting room
Attendees: DKI-JKT officers: BAPPEDA, the Energy Agency, the Environmental Agency, the Transportation Agency, State-own Companies etc. (Total approx. 50 people)
Kawasaki City: 2 persons, Nippon Koei Co., Ltd.: 2 persons, PT. Indokoei International: 1 person

Table 2.5 Agenda of the Workshop for DKI-JKT Officers

#	Time	Program	Speaker
1	10:00-10:10	Opening Remarks (1)	DKI-JKT
2	10:10-10:20	Opening Remarks (2)	Kawasaki City
3	10:20-10:40	Policy on renewable energy in DKI-JKT	DKI-JKT Energy Agency
4	10:40-11:00	Introduction of Kawasaki city as SDGs future city, Strategy on renewable energy in Kawasaki City, inclusive of hydrogen energy and EV bus	Kawasaki City
5	11:00-12:00	Q&A, Discussion for potential collaboration	---
6	12:00-13:00	Lunch time	---
7	13:00-13:20	Current situation and policy on river purification in DKI-JKT	DKI-JKT Environmental Agency
8	13:20-13:40	Experience and policy on river purification in Kawasaki City	Kawasaki City
9	13:40-14:40	Q&A, Discussion for potential collaboration	---
10	14:40-15:00	Closing Remarks	Kawasaki City

Source: Prepared by Nippon Koei

Many questions and comments were asked by DKI-JKT officers. Several technical questions regarding to hydrogen energy and EV bus were answered by Toshiba Energy Systems & Solutions Cooperation and Toshiba Infrastructure Systems & Solutions Cooperation after the workshop, and share their answers with DKI-JKT officers.

The questions/ comments which were received at the workshop and its answers are as follows.

Table 2.6 Questions/ Comments from DKI-JKT and its Answers

#	Questions/ Comments	Answers
Hydrogen Energy		
1	How much efficient energy from hydrogen than solar PV, and how about CAPEX of hydrogen energy system? (Mr. Deftrianov, BAPPEDA)	It all depends on the installed conditions, but the cost will be 1/5 and 1/3 for the usage area compared to PV + storage battery system. (Toshiba Energy Systems & Solutions Corporation)
2	Even if hydrogen energy system is costly, what kind of benefits (tangible and	Kawasaki's viewpoint: (1) social responsibility to promote cleaner energy, (2) developing of new

#	Questions/ Comments	Answers
	intangible) do we get from application of the system? (Mr. Deftrianov, BAPPEDA)	industrial field and technology, and supporting the related companies, (3) stimulating of new investment into the city. (Kawasaki city) In remote islands, local production and local consumption of energy will be possibly available, and also independent power supply can be provided without any transportation to deliver fuel oil from the outside, and there is advantage of not emitting CO2. (Toshiba Energy Systems & Solutions Corporation)
3	How much water is required for hydrogen energy (fuel cell) system? It is important to consider the water requirement because if it will be applied in Kepulauan Seribu / Thousand island. The amounts of water supply by reverse osmosis now is only enough for the island population. (Mr. Saelani, Energy Agency)	Regarding water supply for hydrogen production, it is possible to produce a fresh water by using auxiliary generator with H2One system, so there is no problem on this matter. (Toshiba Energy Systems & Solutions Corporation)
4	If we think about installing the hydrogen energy system in Sebira island, how much surface area of PV panel will be required to meet the demand of 0.4 MW in this island? Limitation of land area on the island should be considered. (Mr. Saelani, Energy Agency)	In our calculation, 400kW Solar PV can cover the island's demand, and the required site area is about 4,800m2, which can be accommodated by PLN's planned 6,000m2 site. (Toshiba Energy Systems & Solutions Corporation)
5	Using plastic as raw source for producing ammonia is one of an action of recycling in Japan. In Indonesia, we can study on petrochemical industries (e.g. how many hydrogens can be produced). I believe that these technologies can become cheaper in the future if fuel cell technologies can be mass product. (Mr. Dicky)	If we would be able to build up “sustainable” or economically sounds hydrogen supply system at first phase, I totally agree with you saying fuel cell technologies become mass product. (Kawasaki city)
Solar power system/ other renewable energy		
6	How Kawasaki city can encourage private companies to use and develop renewable energy such Solar PV and Fuel Cell?	Various approaches such as policy discussion, providing land and space for installation of solar PV, and collaborative research project are conducted by the city in order to encourage local private companies. (Kawasaki city)
7	Based on our experience in AEON rooftop PV about 500 kW requires about 200 m2, and another example in Jakabaring Palembang, about 2 MW needs 1.5 hectares of PV surfaces. (Mr. Dicky)	—
8	If any power generation would be applied to Thousand islands, please also consider the supply of the energy source. (Mr. Edward, Energy Agency)	PV will be considered as the base renewable energy, but if there is any reason that the site cannot be secured, other renewable energy such as wind power may be the second option. (Toshiba Energy Systems & Solutions Corporation)
9	How about the electricity price from solar PV compared with other sources of electricity in Kawasaki? Is it cheaper? (Mr. Edward, Energy Agency)	Solar PV is not main electricity supply source in Kawasaki yet. So the electricity from solar PV is still more costly than conventional one. (Kawasaki city)
10	How much capacity of solar PV is	Nagasawa water purification plant in Kawasaki has

#	Questions/ Comments	Answers
	installed in the water treatment plant in Kawasaki City at your presentation? And how much the capacity is the water treatment plant? (from PDAM staff)	installed 1.2 MW of solar PV with back-up battery system. The electricity provided from solar PV can cover 20% of electricity consumed by the plant. (Kawasaki city)
EV bus		
11	How does Kawasaki city mitigate the disaster related to the EV bus operation including its facilities? Jakarta is prone to suffer the disaster. (Hendra, Transportation Agency)	There are few numbers of EV bus under operation in Kawasaki so far. The city has studied and classified hazardous area by heavy rain, so most of city related facilities tend to be constructed in the safer land. (Kawasaki city)
12	What are the challenges for adopting EV bus in Kawasaki City, from the point of passengers, operator, and bus manufacturer viewpoint? (Mrs. Susi, Environmental Agency)	-Passenger's view: maintain ride fee at current level. -Operator's view: recharging time, additional maintenance cost, technological reliability. -Bus manufacturer's view: satisfying the government policy for zero-carbon or transportation system in the future. (Kawasaki city)
13	About battery supply, we concern to the battery lifetime for EV bus because it is about 1 year. (Mrs. Susi, Environmental Agency)	It depends upon battery. Toshiba thinks requirement for battery life for EV bus is 10 years. And Toshiba thinks "SCiB battery" (a secondary battery produced by Toshiba) can achieve this with water cooling if in hot countries. (Toshiba Energy Systems & Solutions Corporation)
14	If Jakarta Government wants to encourage to adopt EV bus, we can start from DKI Jakarta operational vehicle first, at least the operational motorbike. The government initiates it by giving example. (Mr. Edward, Energy Agency)	SCiB has some examples to have been used for motorbike, such as e-trike in Philippines. However, Toshiba thinks SCiB battery is suitable for heavy duty, repetitive fast charging application. Toshiba prefers to work on such places where the battery shows its strength, such as BRT whose daily travel distance is very long. (Toshiba Energy Systems & Solutions Corporation)
Environmental Management		
15	Opportunities to have cooperation with Kawasaki City are in Grand Design of Pollution Control; Application of Online Monitoring for River Water Quality; and Communal Wastewater Treatment. (Environmental Agency)	In addition, we can work on capacity building for that matter. (Kawasaki city)
16	Actually, DKI-JKT has the regulation to convict any illegal waste dumping to river or lake or water bodies, but the problem is the weak law enforcement (Mr. Yus, Environmental Agency)	It is needed to acquire practical knowledge and knowhow at implementation level. (Kawasaki city)
17	We would like to know how to educate or how to socialize the citizen in Kawasaki City to encourage them to have willingness to connect to sewerage or to upgrade their septic tank? (Environmental Agency)	In addition to educate citizen to know how important wastewater treatment is, there is a law enforcement for wastewater treatment in Japan. In terms of installing septic tank, Japanese government enacted "septic tank law in 1985. Under the law every household have to install septic tank or connect sewage pipe. Otherwise, they can't allow to discharge sewage water to outside. (Kawasaki city)

Source: Prepared by Nippon Koei

During the workshop, DKI-JKT officers showed interest in not only administration aspect but also technical ones. So, it will be considered in FY2020 to invite technical experts from private companies when a workshop is held.

Photos of the workshop are shown below.

Workshop in DKI-JKT

Group Photo after the workshop

2.3.3 JCM Seminar in Tokyo and Inspection in Kawasaki City

The following delegate from DKI-JKT was invited to Japan from 14 to 18 January 2020 in order to attend the JCM Seminar organized by MOEJ on 16 - 17 January 2020.

Mr. YUNIAR TRIYOKO : STAFF of the Transportation Agency, DKI-JKT

During the stay in Japan, DKI-JKT delegate visited several facilities in Kawasaki City regarding renewable energy system, waste management system, and recycle system.

The schedule of the inspection on 15 January is as follows.

Table 2.7 Schedule of Inspection (15 January 2020)

Time	Activity
9:30	Departure the hotel
10:00-12:00	Kawasaki Eco Gurashi Mirai-kan
	Mega solar in Ukishima
	Charge station of EV buses for garbage collection
12:30-13:30	Lunch time
14:00-15:30	J Bio food recycle
16:00	Arrival the hotel

Source: Prepared by Nippon Koei

On 16 and 17 January, the JCM seminar was held with the following program.

Table 2.8 Program of the Seminar

#	16 Jan. (Thu)	17 Jan. (Fri)
AM	Closed seminar (1)	Closed seminar (2)
PM	Site visit (Gas museum of Tokyo Gas Co., Ltd.)	Open seminar

Source: Prepaed by Nippon Koei based on the material of Ministry of the Environment, Japan

At the closed seminar (1), Kawasaki City officer gave a presentation on the Study and its outocome. Also, the delegate of DKI-JKT joined a panel discussion at the closed seminar (2), and have a discussion with the delegates from other cities on the benefits of participation in the city-to-city collraboration program, the keys for promoting zero-carbon & sustainable city developmet, and the roles which cities should play for realizing zero-carbon society.

The following are photos of the inspection during Kawasaki City and the JCM Seminar.

Kawasaki Eco Gurashi Mirai-kan

J Bio food recycle

Presentation by Kawasaki City

Panel discussion which the delegate joined

2.3.4 Wrap-up Meeting with DKI-JKT

The wrap-up meeting was conducted with DKI-JKT on 6 February 2020. The main contents of this meeting were reporting of the result of the Study FY2019, and discussion of future plan for FY2020.

As for the future plan in FY2020, it was confirmed that feasibility study for JCM project formulation on "Clean Energy" and "Energy Saving in Industry Sector" will be continuously implemented. Furthermore, collaboration activities in terms of SDGs will be considered under the city-to-city collaboration.

In the meeting, DKI-JKT requested that it is better to do not only transferring of knowledge from Kawasaki City but also implementing some actual projects together between both cities. To meet the request, possible activities under the Study will be considered in FY2020.

2.3.5 Utilization of Sustainable Development Goals (SDGs)

During the Study in FY2018, Kawasaki City and DKI-JKT already agreed that SDGs can be utilized in the Study to implement City-to-City Collaboration with more beneficial and clear discussion. It is mentioned that Kawasaki City and DKI-JKT contribute to the achievement of SDGs through the Study in "Letter of Intent for City-to-City Collaboration on Zero Carbon Development" which was signed by both cities in February 2019. The actual activity for SDGs will be conducted in FY2019.

Kawasaki City made public announcement of "Action Policy for Sustainable Development Goals (SDGs) in Kawasaki City" in February 2019, and has started their activities for achieving SDGs. In addition, Kawasaki City has been selected as "SDGs Future City" in July 2019, which is selected by the Regional Revitalization Promotion Office of Cabinet Office/

Kawasaki City aims to be "the happiest city with full of joy for everyone" by 2030. To achieve this goal, the city is implementing several actions at three aspects, which are "economy", "environment", and "social".

Table 2.9 SDGs Actions in Kawasaki City

Item	SDGs	Issue	Action	
Economic	3,8,9,17	Adaptation to environmental changes of industrial economy	Strengthening of global competitiveness and creation of new industry	• Creating "Green Life welfare Innovation" • Strengthening of research infrastructure
			Promotion of strategic industry accumulation at waterfront area and development infrastructure	• Enforcement of international competitiveness in industrial complex • Development "king sky front" as an international strategy hub

Item	SDGs	Issue	Action	
Social	5,10,11,17	Dealing with impact of the falling birthrate, the aging population, and population decrease	Making the city comfortable to live, and providing opportunities to the citizens for great success	• Diffusing a vision of "Kawasaki Para Movement" and creating legacy • Promotion of wood utilization by collaboration with suburban cities • Formulation of regional comprehensive care system for all citizens
			Formulation of urban community by the citizens	• Solving local issues by establishing "Machino hiroba (open space for citizens)" • Utilizing "Social design center" for solving local issues by citizens
Environment	7,12,13,17	Effort for solving global issues regarding to environment and energy etc.	Realization of low-carbon and circulatory city	• Promotion of actions for GHG emission reduction by citizen, companies, and local government • Installing hydrogen energy into waterfront area
			International contributions by utilizing knowledge on environmental technologies and administration	• Solving environmental issues in developing countries by utilizing JCM

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

In addition to the above actions, Kawasaki City made "Kawasaki City's Strategy on Hydrogen Energy (set in March 2015)" for one of the actions to achieve SDGs. This strategy aims to realize "Future-oriented environmental/ industrial city" by installing hydrogen energy and utilization this energy.

In DKI-JKT, SDGs action is currently being prepared based on the Mid-term Regional Development Plan (RPJMD). RPJMD is a development plan for 5 years in DKI-JKT established with consideration of the Mid-term National Development Plan in Indonesia.

The target period of current DKI-JKT's RPJMD is from 2018 to 2022, and there are five missions in RPJMD as the table below. Especially, Mission 4 mentions a sustainable development from the point of view of environmental aspect.

Table 2.10 Mission of Development Policy in DKI-JKT

Mission	Contents
Mission 1	Making Jakarta a safe, healthy, smart, cultured city, by strengthening tribe's values and providing space for creativity.
Mission 2	Making Jakarta a city that promotes public welfare through the creation of employment, stability and affordability of basic needs, increased social justice, accelerated infrastructure development, ease of investment and business, and improved spatial management.
Mission 3	Making Jakarta a place for the state apparatus to work, serve, serve, and solve various problems of the city and citizens, effectively, meritocratically and with integrity.
Mission 4	Making Jakarta a sustainable city, with development and living arrangements that strengthen environmental and social carrying capacity.
Mission 5	Making Jakarta the dynamic capital as a node of Indonesia's advancement characterized by justice, nationality and diversity

Source: Prepared by Nippon Koei based on the material provided by DKI-JKT SDGs secretariat

DKI-JKT plans to utilize SDGs as a tool for realizing the goal of RPJMD. Then, DKI-JKT, mainly BAPPDA, has formulated "SDGs Regional Action Plan (2018 – 2022)"

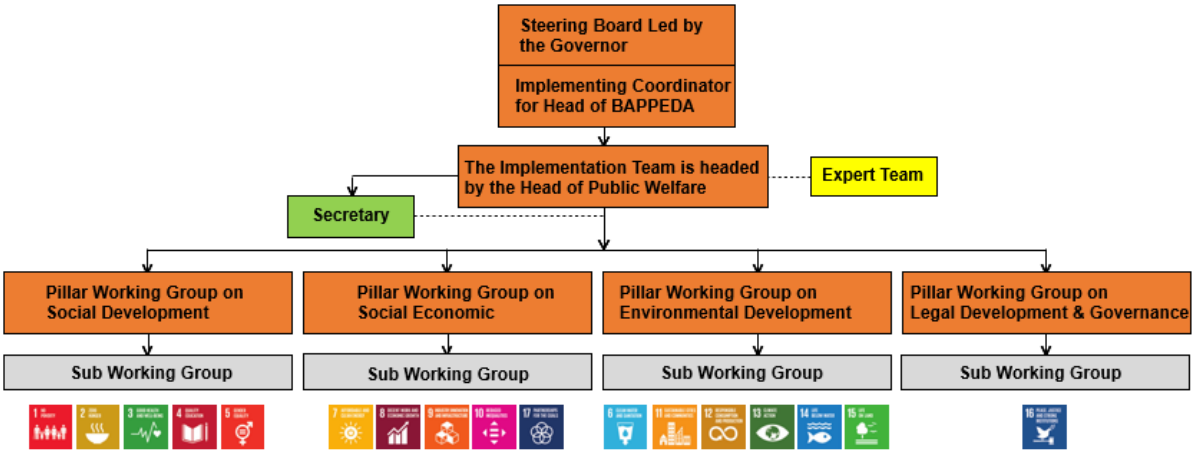
Furthermore, DKI-JKT has set up "SDGs Implementation Team" for implementing SDGs Regional Action Plan. During the period of the action plan (2018 – 2022), Public Welfare Department of DKI-JKT has been assigned as the main department in charge of the Implementation Team.

Also, four Pillar Working Groups ("Environment", "Social", "Economy", and "Law and administration") are located under the Implementation Team. Each pillar is assigned to the related SDGs goals[2]. The goals which can contribute to "realization of low-carbon society" are under the pillars of "Environment" and "Economy" (SDGs goal 7. 9, 11, and 13).

In addition, SDGs secretariat is established under the Implementation Team in DKI-JKT. SDGs secretariat do manage the four Pillar Working Groups, confirm a progress of action plan, and give some advices to each working group to achieve SDGs.

The implementation structure for SDGs Regional Action Plan is shown below. SDGs secretariat is "Secretary" in the figure.

[2] Environment: Goal 6, 11–15, Social: Goal 1-5, Economic: Goal 7-10, 17, Law and administration: Goal 16



Siurce: DKI-JKT SDGs secretariat

Figure 2.2 Implementation Structure for Achieving SDGs

SDGs Regional Action Plan includes goals and indicators regarding to the Regional Development Goals. 253 indicators out of 319 indicators which are determined as national level indicators are selected as DKI-JKT's own indicator in SDGs Regional Action Plan because these 253 indicators meet an area characteristic and an authority that DKI-JKT has.

To achieve these indicators, 5,822 action plans are set in DKI-JKT. The way of monitoring each action plan is as follows.

(1) Confirming the status of the achievement to the action plan's indicators

(2) Confirming current progress on the Governmental activities

(3) Confirming current progress on Non-Governmental Organization (NGO)'s activities

About item (3) above, SDGs secretariat tries to collect information from NGOs by using SNS or sending questionnaires; however, they have a hard time with collecting information and cannot understand their current progress. One of the reasons is that there is no incentive for NGOs when they inform their status of the achievement.

Accordingly, SDGs secretariat requested to share the knowledge or experiences from Kawasaki City about how to encourage NGOs or citizens to participate actively in SDGs actions.

CHAPTER 3 FORMURATION OF JCM MODEL PROJECT

3.1 FEASIBILITY STUDY ON ENERGY SAVING IN INDUSTRY SECTOR

3.1.1 Overview of the Feasibility Study

DKI-JKT is the capital city of Indonesia, and one of the biggest industrial bases in Southeast Area. The Jakarta metropolitan area has been developed under remarkable economic growth by both domestic and foreign investments since the latter half of the 20th century, and many Japanese companies are located in this area. On the other hand, the supply capacity of power generation facilities in Indonesia is not enough due to recent rapid economic growth. To meet the current increased power demand, more power generation is needed. In addition, introduction of energy saving technologies and renewable energy into facilities are advanced under the Green Industry Policy supported by Ministry of Industry in Indonesia.

"Energy Saving in Industry Sector" is one of the priority sectors in DKI-JKT, and a feasibility study for JCM Model Project formulation on this sector was conducted in FY2018. Based on the result of this feasibility study, it was clear that there was big potential for energy saving in factories in Jakarta area. So, the feasibility study on energy saving in industry sector has been continued in FY2019.

The feasibility study was implemented according to the following study items to formulate JCM Model Project at the candidate factories.

Table 3.1 Study Items on Energy Saving in Industry Sector

#	Study Items	Description
1	Consideration of specification of introduced technology	The existing facilities were checked in a factory, and introduced technology have been considered. The introduced technology was already proposed to the factory.
2	Formulation of project plan & project evaluation	Project cost, efficiency of energy saving, CO2 emission reduction were estimated.
3	Coordination for International Consortium	International consortium and implementation structure were considered.
4	Formulation of monitoring plan	Monitoring Plan for JCM Model Project was considered.
5	Support for promotion of energy saving by the city-to-city collaboration	The workshop for DKI-JKT officers was held to share Kawasaki City's policy and activities for promoting energy saving.

Source: Prepared by Nippon Koei

3.1.2 Selection of Candidate Factory

To select candidate factories of JCM Model Project, collecting information on the target companies, discussion with each company, and JCM seminar for private companies were implemented in this feasibility study.

The target companies and their possibility of JCM Model Project formulation are as follows.

Table 3.2 Basic Information of the Target Project Participant

#	Company	Possibility of JCM Model Project Formulation
1	Real estate developer	<Low> They don't have a plan for installing energy saving equipment at this moment.
2	Indonesian conglomerate company	<Low> They don't have a plan for installing energy saving equipment at this moment.
3	Printing and packaging company	<Low> They have just replaced old chillers with new one at their factory.
4	Glass manufacturer	<Low> They don't have a plan for installing energy saving equipment at this moment.
5	Consumer products manufacturer	<Low> They don't have a plan for on installing energy saving equipment at this moment.
6	**Instant seasoning manufacturer**	**<High> They are interested in JCM for installing boilers into their factory, and effect of energy saving is very high.**

Source: Provided by Nippon Koei

From the above, the instant seasoning manufacturer (hereinafter called "Company S") was selected as a candidate company for applying to the JCM Model Project in FY2020. The detail consideration of project formulation is described below (Section 3.1.4).

In addition, the meetings with several Japanese manufacturers were conducted to look for suppliers of JCM Model Project as follows.

Table 3.3 Basic Information of the Target Suppliers

#	Company	Possibility of JCM Model Project Formulation
1	Air-conditioning manufacturer	<Middle> they are interested in JCM, and specific project with their client companies will be considered.
2	**Air filter manufacturer**	**<High> They are interested in JCM, and they have started discussion for JCM project formulation with their air filter.**
3	**Boiler/ air-compressor manufacturer**	**<High> They are interested in JCM to expand their equipment (boiler and air compressor). This company already have several experiences on JCM Model Project.**

Source: Prepared by Nippon Koei

From the discussion with above manufacturers, air filter manufacturer (No.2) and boiler/ air-compressor manufacturer (No.3) are interested in becoming a supplier of JCM Model Project. So, further discussion with these manufactures will be continued in FY2020.

The companies of No.3~6 in table 3.2 and the companies of No.1~2 in table 3.2 were the attendees of the JCM seminar for private companies. This JCM seminar was held according to a request from PT. Rodamas Inti Teknica, which is an Indonesian conglomerate company. The seminar aimed to introduce the JCM scheme to the group companies of PT. Inti Teknika.

The outline and agenda of the JCM seminar are as follows.

<Outline of the seminar>

Date	: 10 January 2020 (Fri)/ 9:20-11:00
Venue	: PT. Rodamas Inti Teknika
Attendees	: PT. Rodamas Inti Teknika, Group companies (6 companies), Kawasaki City, Nippon Koei Co., Ltd. (Total approx. 20 people)

Table 3.4 Agenda of the JCM Seminar for Local Companies

#	Time	Activity	Speaker
1	9:00-9:10	Opening address	PT. RODAMAS INTI TEKNIKA
2	9:10-9:20	Explanation of JCM scheme	Nippon Koei
3	9:20-10:00	Q&A	----
4	10:00-10:15	Introduction of air-conditioning equipment	Air-conditioning manufacturer
5	10:15-10:30	Q&A	----
6	10:30-11:00	Exchanging of business cards	----

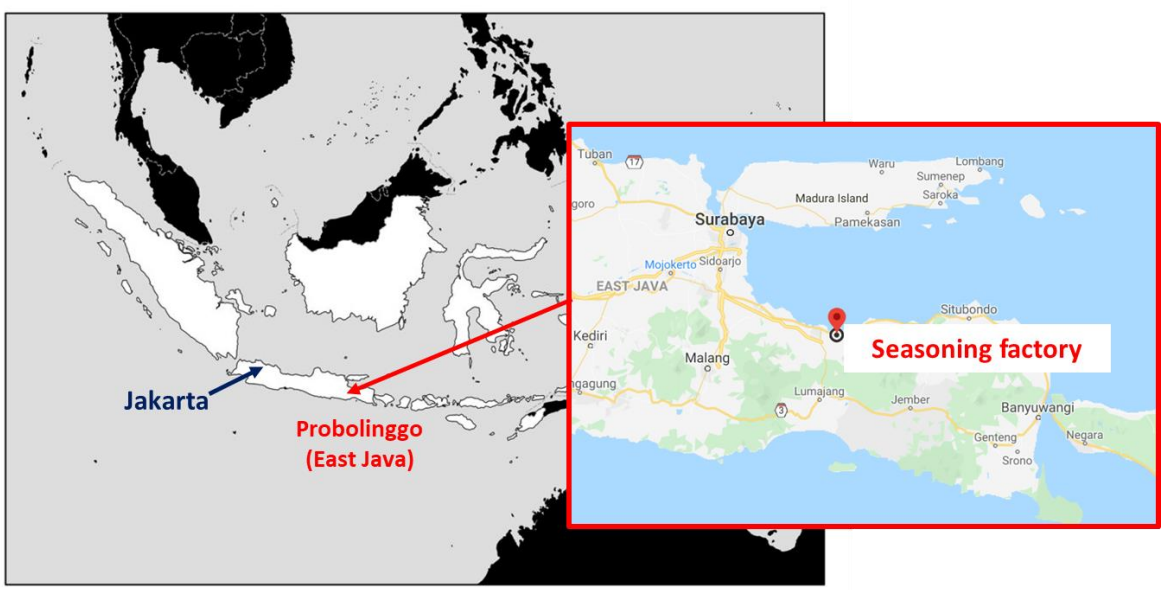
Source: Prepared by Nippon Koei

Explanation of JCM by Nippon Koei

Introduction of air-conditioning system as an example of energy saving equipment

3.1.3 Data Collection of Candidate Factory

Company S is a pioneer of seasoning company in Indonesia, founded in 1968. The head office is located in DKI-JKT, and there are two factories (Cikarang in West Java, and Probolinggo in East Java) in Indonesia. The candidate factory for JCM project formulation is at Probolinggo. An existing fire-tube boiler in the factory in Probolinggo will be replaced with once-through boilers for energy saving. The location of the factory in Probolinggo is shown below.



Source: Prepared by Nippon Koei using https://www.abysse.co.jp/world/map/country/asia/indonesia.html and Google Map

Figure 3.1 Location of the Candidate Factory

The overview of an existing boiler in the Probolinggo factory Company S is as follows.

Table 3.5 Existing Boiler in Probolinggo Factory

#	Item	Description
1	Boiler type	Fire tube boiler
2	Manufacturer	Euroasiatic Machinery
3	The number of existing boilers	1 unit
4	Capacity	50 t/h

Source: Prepared by Nippon Koei

Company S plans to replace one (1) existing fire tube boiler with fifteen (15) once-through boilers. The overview of introduced technologies for Company S is as follows.

Table 3.6 Plan for Installing Boilers into Probolinggo Factory

#	Item	Description
1	Boiler type	Once-through boiler
2	Estimated manufacturer	MIURA Co., Ltd.
3	The number of installed boilers	15 unit
4	Capacity	2 t/h/unit (Total 30t/h)
5	Fuel type	Natural gas and diesel (dual fuel)
6	Schedule for replacement	Replacement in April to June, 2021

Source: Prepared by Nippon Koei

3.1.4 Technology to be Installed (High-efficiency Once-through Boiler)

The high-efficiency once-through boiler inputs all feed-in water from one side, and steam is produced without circulation. The once-through boiler has advantages of (i) fast starting, (ii) small space, (iii) small noise, and (iv) low emission of NOx and CO. The characteristics are as summarized in the following table.

Table 3.7 Advanced Performance of Once-through Boilers

Advantage	Description
High performance in starting, response to load variation, 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.
Small space	Only 60% of space is necessary compared with other boilers.
High efficiency is kept at low load range	It controls in response to load variation. High efficiency operation is possible in broad range of load.
Recovery of exhaust 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 air pollutant emission	Emission of NOx and CO is low, which was enabled by lowering combustion temperature and arrangement of nozzle location.

Source: Prepared by Nippon Koei

The specification of the high-efficiency once-through boiler which plan to be installed is as shown in the table below.

Table 3.8 Specification of High-efficiency Once-through Boiler

#	Item		Unit	Value
1	Working pressure range		MPa	0.49 – 0.88
2	Equivalent output		Kg/h	2,000
3	Actual output		Kg/h	1,680
4	Heat output		kW	1,248
5	Boiler efficiency		%	95
6	Water content		L	138
7	Fuel consumption	Natural gas	m3N/hr	117
		Japanese A type fuel oil	L/hr	129.4

Source: Prepared by Nippon Koei based on the brochure of MIURA "GC2000-GS"

Appearance of High-efficiency Once-through Boiler is as shown in the figure below.

Source: Prepared by Nippon Koei based on the brochure of MIURA "GC2000-GS"

Figure 3.2 Appearance of High-efficiency Once-through Boiler

3.1.5 Confirmation of Project Plan and Estimated CO2 Emission Reduction

The JCM methodology in Indonesia ID_AM015" Energy Saving by Introduction of High Efficiency Once-through Boiler" has been approved in July 2018. CO2 emission reduction amount is estimated with this methodology.

Table 3.9 CO2 Emission Reduction by Once-through Boilers

#	Item	Value	Unit	Source
A	Dual fuel once through boiler	15	unit	Seasoning company
B	Working hours of each boiler	8,232	h/year	Seasoning company
C	Fuel consumption of project boiler (natural gas)	117	Nm3/h/unit	Seasoning company
D	Fuel consumption of project boiler (diesel)	129	Liter/h/unit	Seasoning company
E	Average load of boiler can	30%	---	(assumption)
F	Fuel consumption per year (natural gas)	4,334,148	Nm3/year	[A]×[B]×[C]×[E]
G	Fuel consumption per year (diesel)	4,778,676	Liter/year	[A]×[B]×[D]×[E]
H	Efficiency of project boiler	95%	---	PT. MIURA Indonesia
I	Efficiency of reference boiler	89%	---	ID_AM015
J	Calorific value (natural gas)	0.0406	GJ/Nm3	Standard13A
K	Calorific value (diesel)	41.4	GJ/t	IPCC
N	Emission factor（natural gas）	0.0543	tCO2/GJ	IPCC
M	Emission factor（diesel）	0.0726	tCO2/GJ	IPCC
N	Project emission	21,045	tCO2/year	ID_AM015
O	Reference emission	22,464	tCO2/year	ID_AM015 *Conversion factor (diesel oil): 0.80 g/cm3
P	**CO2 emission reduction per year**	**1,418**	**tCO2/year**	ID_AM015
Q	project period	8	year	Japanese regal durable year
R	CO2 emission reduction	11,344	tCO2	[P]×[Q]
S	Subsidy（%）	30%	---	Max. 30%
T	**Cost effectiveness**	**2,729**	**JPY/tCO2**	Subsidy amount / [R]

Source: Prepared by Nippon Koei

From the above, the CO2 emission reduction will be 1,418 tCO2/year. If the subsidy rate is 30%, the cost performance for JCM Model Project is 2,729 JPY/tCO2, which is considerably high.

3.1.6 Confirmation about Environmental License and SDIP

In Indonesia, Sustainable Development Implementation Plan (SDIP) needs to be submitted and approved together with Project Design Document (PDD) at the time of JCM project registration. SDIP items were confirmed at the candidate factory according to JCM form.

The confirmation of SDIP items is as shown in the table below.

Table 3.10 Confirmation about Environmental License and SDIP

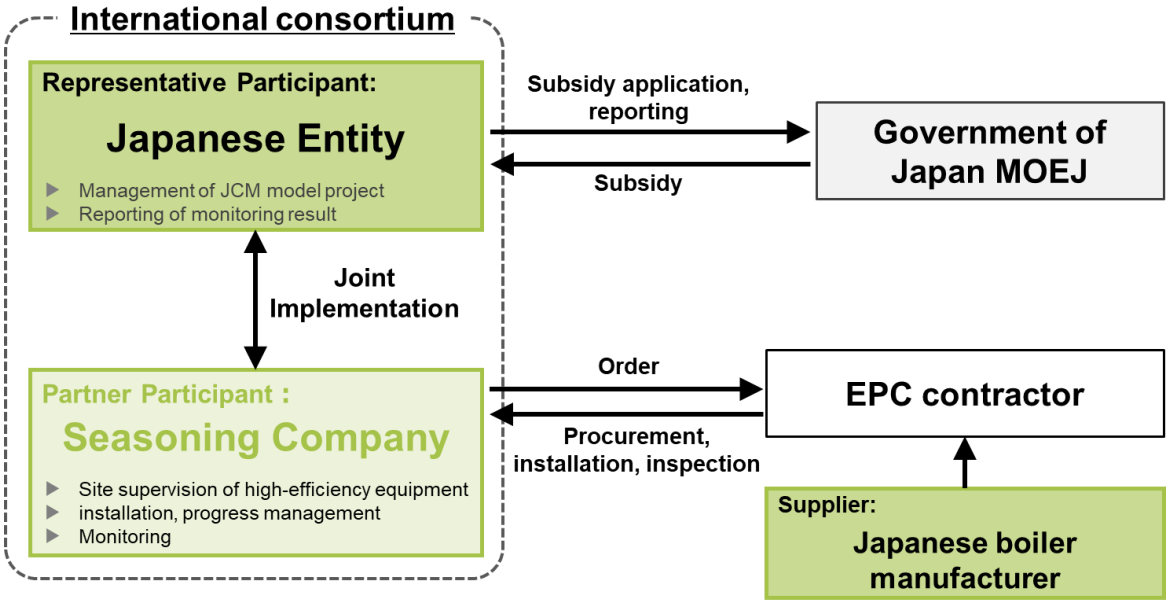
Items	#	Questions	Y/N	If answer is Yes, please describe the action plans.
EIA	1	Does the proposed project require official/legal process of EIA?	No	
Pollution Control (No need to answer if EIA is required)	2	Does the proposed project emit air pollutants?	No	
	3	Does the proposed project discharge water pollutants or substances which influence BOD, COD or ph, etc.?	No	
	.4	Does the proposed project generate waste?	No	
	5	Does the proposed project increase noise and/or vibration from the current level?	No	
	6	Does the proposed project cause ground subsidence?	No	
	7	Does the proposed project cause odor?	No	
Safety and health	8	Does the proposed project create dangerous condition for local communities as well as individuals involved in the project, during either its construction or its operation?	No	
Natural Environment and biodiversity	9	Is the proposed project site located in protected areas designated by national laws or international treaties and conventions?	No	
	10	Does the proposed project change land use of the community and protected habitats for endangered species designated by national laws or international treaties and conventions?	No	
	11	Does the proposed project bring foreign species?	No	
	12	Does the proposed project include construction activities considered to affect natural environment and biodiversity (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	No	
	13	Does the proposed project use surface water, ground water and/or deep ground water?	No	
Economy	14	Does the proposed project have negative impact on local workforce capacity?	No	
	15	Does the proposed project have negative impact on local community's welfare?	No	
Social Environment and Community Participation	16	Does the proposed project cause any resettlement or other types of conflict?	No	
	17	Does the proposed project fail to involve activities to respond to, and follow up, comments and complaints that have been received from local communities, particularly from the public consultation?	No	
	18	Do the project participants violate any laws and/or ordinances associated with the working conditions of local communities which the project participants should observe in the project?	No	
Technology	19	Does the proposed project fail to involve activities to build capacity of human resources through technology transfer and technical assistance?	No	
	20	Does the proposed project fail to describe information of technology specification that consists of manual book and ways to overcome the problems that may occur when being operated on the site, at least in English and in Bahasa Indonesia as applicable?	No	

Source: Prepared by Nippon Koei based on JCM Sustainable Development Implementation Plan Form

3.1.7 Coordination for International Consortium

International Consortium for applying to JCM Model Project is proposed as shown in the figure below. A company, which provides consulting service or M&A service in Asia, is expected to be the Representative Participant of International Consortium. And Japanese boiler

manufacturer will provide their once-through boilers to a local EPC contractor for installing them into the seasoning company.



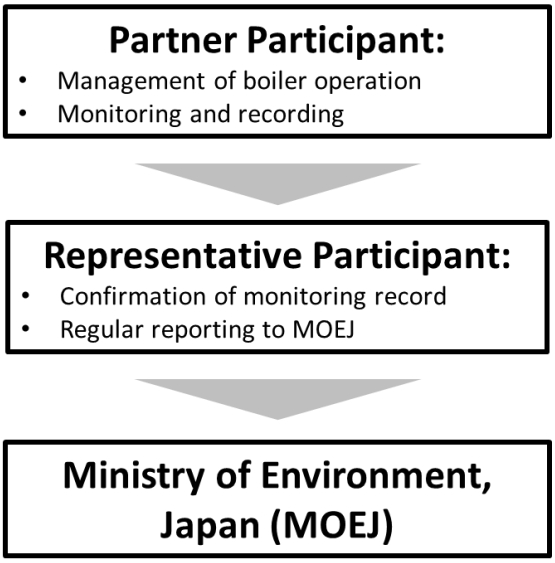
Source: Prepared by Nippon Koei

Figure 3.3 International Consortium for the Proposed Project

3.1.8 Monitoring Plan

Monitoring is assumed to be implemented as part of daily operation by operation manager in the factory.

Implementation structure of monitoring is proposed as shown in the figure below. Monitoring report will be submitted to MOEJ by a Representative Participant.



Source: Prepared by Nippon Koei

Figure 3.4 Monitoring Structure

3.1.9 Issues for JCM Model Project Application

One of the reasons why it was challenging to formulate JCM Model Projects in DKI-JKT is regarding a financial statement. In Indonesia, it is normally difficult to obtain audited an financial statement from Indonesian companies. However, the financial statement is one of necessary document to apply for JCM Model Project. So, it is needed to continue explaining the necessity submissions and getting their understanding about it is required.

3.2 INSTALLATION OF CLEAN ENERGY IN REMOTE ISLANDS

3.2.1 Overview of the Feasibility Study

Indonesia is an island country which has more islands than any other nation in the world. Hence, supplying stable energy and utilizing clean energy are most important issues for these islands. Indonesian Electricity Supply Business Plan (RUPTL) specifies that total power generation capacity rate of renewable energy will be increased from 12.52% as of 2017 to 23% by 2020.

DKI-JKT plans to install renewable energy system into the remote islands and some areas which need dispersed power source, and the city has strongly requested the cooperation about this issue under the City-to-City Collaboration. Especially, several islands of the Pulau Seribu under the control of DKI-JKT are not connected to the PLN's grid, and the electricity in the islands is supplied by diesel power generation system. Thus, they have serious problems such as stable electricity supply and environmental burden. The Pulau Seribu means "thousand islands" in Indonesian language, and it is a name of the northern part of DKI-JKT which have approximately 110 islands. This area is a sightseeing spot as beach resort; however, 11 islands out of 110 islands are residential areas.

In FY2019, Toshiba Energy Systems & Solutions (hereinafter called "Toshiba ESS"), which is a company located in Kawasaki City, implemented the feasibility study on installing renewable energy and hydrogen energy into the Pulau Seribu for JCM Model Project formulation.

Toshiba ESS has concluded a memorandum of understanding (MOU) in August 2018 with Agency for the Assessment and Application of Technology (Badan Pengkajian dan Penerapan Teknologi: BPPT), an Indonesian government organization, on the implementation of H2One™, an autonomous off-grid hydrogen energy system based on renewable energy and the use of hydrogen as a fuel for power generation in Indonesia. In addition, Toshiba ESS has also concluded MOU with PLN in October 2019. Under these MOU, Toshiba ESS has been studying the installation site, the optimum system specifications in Indonesia, and the operation system, including maintenance, and aim to install the first system by 2022.

Furthermore, Toshiba ESS have implemented "Study for project development on installing a hydrogen-based autonomous energy supply system into remote islands in Indonesia and Philippine" as Ministry of Economy, Trade and Industry's "FY2018 Study on business opportunity of High-quality Energy Infrastructure to Overseas".

In FY2019, data collection on the target areas and discussion with relevant government/ organizations on institutional design for installing the technology were mainly conducted. Then, a project schedule, specification of installed technology, project cost, GHG emission reduction for JCM Model Project formulation will be considered in FY2020.

The feasibility study was implemented according to the following study items to formulate JCM Model Project at the candidate factories.

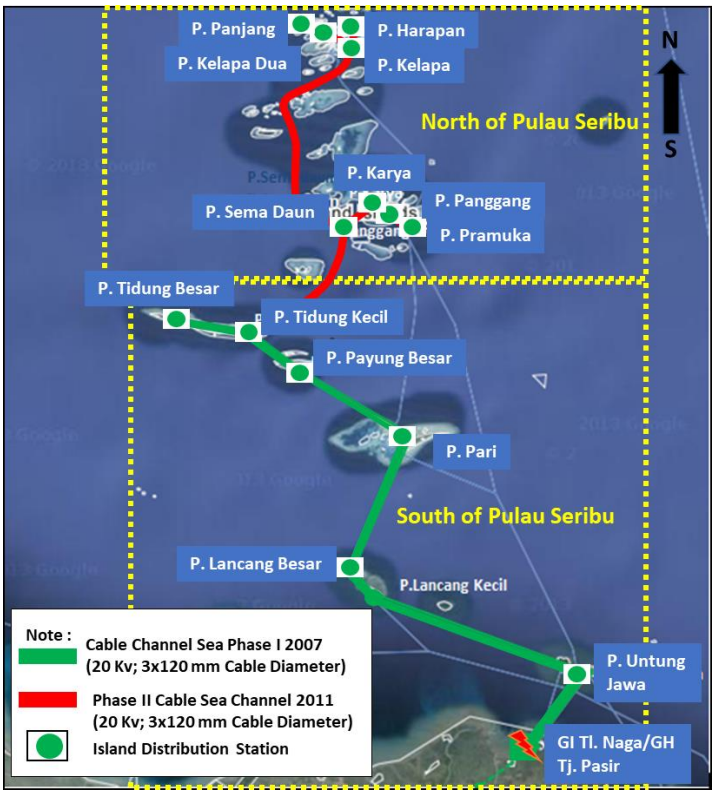
Table 3.11 Study Items on Installation of Clean Energy

#	Study Items	Description
1	Data collection of the target islands	For selecting a candidate project site for installing hydrogen energy supply system, data collection by DKI-JKT Energy Agency was conducted.
2	Coordination of institutional design for installing the proposed equipment and horizontal development	Institutional design for installing the technology was considered, and currently there is nothing to consider.
3	Formulation of project plan & project evaluation	For JCM Model Project formulation in FY2021 or later, outline of project schedule was considered. Also, necessary study items in FY2020 were confirmed.
4	Support for installing clean energy by the city-to-city collaboration	During the workshop for DKI-JKT officers which is held in January 2020, Kawasaki City officers introduced their policy and actions for promoting hydrogen energy supply system. The details are described in Chapter 2.

Source: Prepared by Nippon Koei

3.2.2 Information on the Target Islands

To select the candidate project site in the Pulau Seribu, discussion and information collection with DKI-JKT Energy Agency were implemented. Several islands in the Pulau Seribu already have undersea cables which connect to PLN's electricity grid. The green line in the following figure is the cable constructed in 2007, the red line is in 2011. On the other hand, there is no undersea cable at the northern area of Pulau Seribu, and they use a diesel generation to supply electricity to the residents.



Source: DKI-JKT Energy Agency of DKI-JKT (Revised by Nippon Koei)

Figure 3.5 Current Situation of Undersea Cable in Pulau Seribu

The Energy Agency nominated 6 islands as potential islands for installing hydrogen energy supply system, which are Sebira、Harapan、Pramuka、TidungBesar、LanchangBesar、Untung Jawa. The basic information of these 6 islands is as follows.

Table 3.12 Basic Information of the Potential Islands

#	Islands	Longitude	Latitude	Area	Population	Household	Power provider	Type
		Numbers	Numbers	km^2	Numbers	Numbers		
1	**Sebira**	-5.2044164, 106.4592013		0.0882	592	138	DKI-JKT	diesel
2	Harapan	-5.6537415, 106.577994		0.0670	1969	611	PLN	grid
3	Pramuka	-5.7456078, 106.6094047		0.1600	2140	595	PLN	grid
4	Tidung Besar	-5.799601, 106.4974736		0.5013	5570	1237	PLN	grid
5	Lancang Besar	-5.9331953, 106.5875793		0.1513	2122	597	PLN	grid
6	Untung Jawa	-5.9785081, 106.7026707		0.4000	2422	629	PLN	grid

Source: Prepared by Nippon Koei based on the materials provided by DKI-JKT Energy Agency

From the above, the Sebira island, which are not connected to the PLN's grid and the electricity in the island is supplied by diesel power generation system, were selected as a candidate site for the project.

Source: DKI-JKT Energy Agency with minor revision by Nippon Koei

Figure 3.6 Location of the Sebira Island

Further imformation on the Sebira island were collected to consider detail prject plan as follows.

Table 3.13 Information of the Sebira Island

#	Item	Data
Electricity		
1	Peak demand	65 kW
2	Hourly electricity demand	55 kW
3	Generation type	diesel
4	Capacity of the installed	2 unit: 125 kVa 1 unit: 250 kVa
5	Electricity consumption	481,800 kWh/year
6	Electricity cost (BPP)	445 – 1,352 IDR/kWh
7	Power generation cost	3,130 IDR/kWh
Water		
8	Water quality	Not drinkable
9	Available volume of water	2,400 liter/day (Average)
Transportation		
10	Port	Dock type
11	Transportation	Boat, medium ship
Others		
12	Main industry	Fishery
13	Network Availability	2G -4G (unstable)

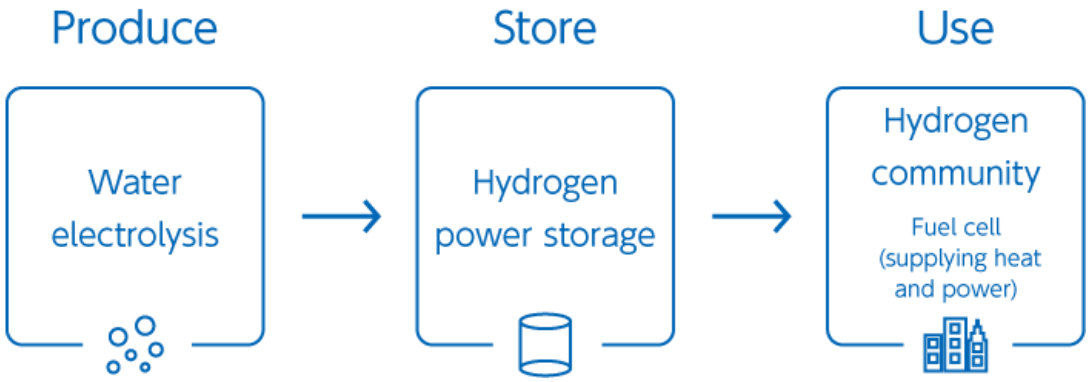
Source: Prepared by Nippon Koei based on the material provided by DKI-JKT Energy Agency

3.2.3 Technology to be Installed (Hydrogen Energy Supply System)

In the feasibility study, "H2One™ Off-grid solution (hereinafter called "H2One")", which is one of the applications of hydrogen-based autonomous energy supply system developed by Toshiba ESS, is considered as a technology to be installed into the remote island.

To supply electricity stability and inexpensively in remote islands, H2One consists of: (i) renewable energy power generation system (e.g. solar power system, wind power), (ii) storage battery unit (for short-term fluctuations), (iii) hydrogen production unit and hydrogen storage tank (for long-term fluctuations), (iv) pure hydrogen fuel cell unit (for contrary weather and night time), (v) electrical control panel.

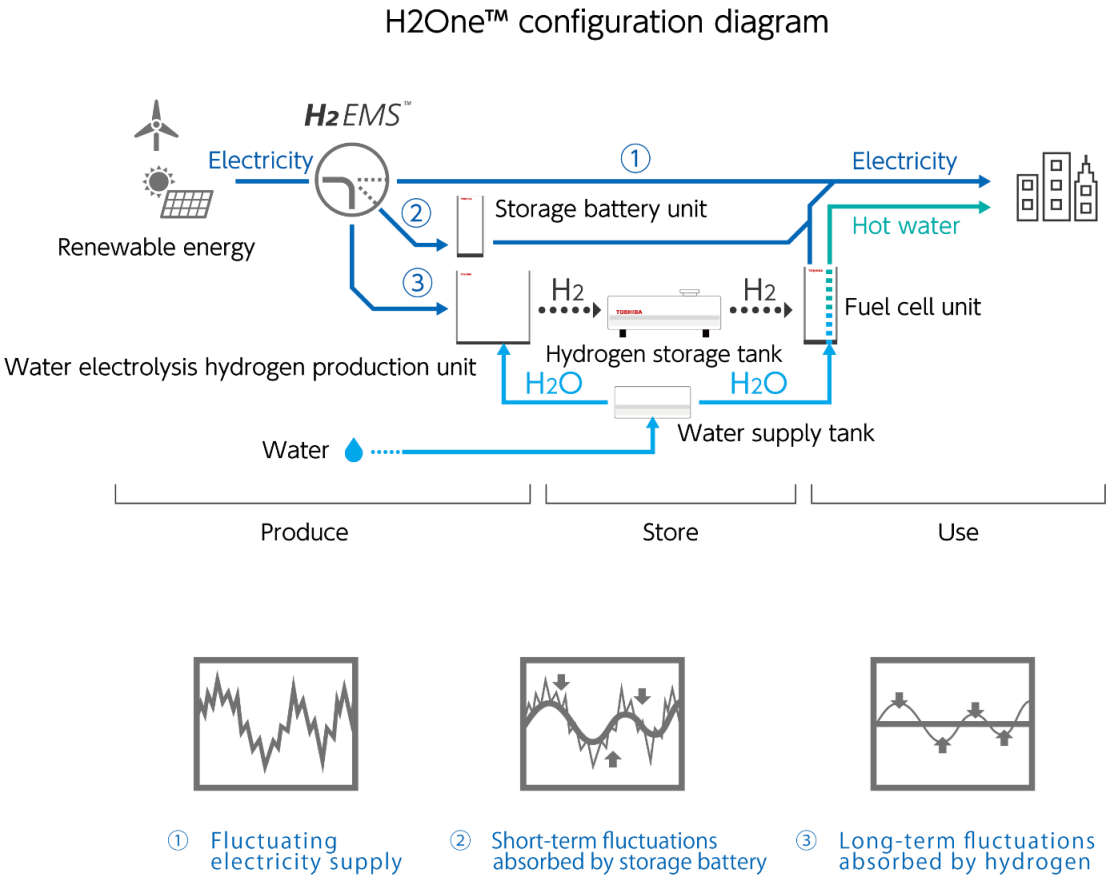
H2One provides a one-stop solution to three hydrogen processes. Specifically, H2One uses renewable energy to "produce" hydrogen, which can be "stored" for later "use" with Fuel Cell technology. "H2One" helps maintain a stable energy supply both in normal times and at times of emergency.



Source: Website of Toshiba Energy Systems & Solutions Corpration

Figure 3.7 One-stop Solution Provided by H2One

The image of H2One system inclusive of above (i)～(v) are as follows.



Source: Website of Toshiba Energy Systems & Solutions Corpration

Figure 3.8 H2One Configuration Diagram

The outline of each systems are as follows.

Table 3.14 Outline of Each Systems in H2One

#	System	Outline
(i)	Renewable energy power generation system	This system consists of PV panel, a junction box, connecting cable, and power conditioner for PV generation.
(ii)	Storage battery unit	This unit consists of a battery to store the electricity generated by a renewable energy power generation system and its power conditioner, and transformer unit. These systems are operated by hydrogen energy management system (EMS) to control charging or discharging. This shortage battery unit is installed H2One for in case of short-term fluctuations.
(iii)	Hydrogen production unit and hydrogen storage tank	Hydrogen production unit can produce hydrogen by using surplus electricity of renewable energy power generation system, and it can be stored in a hydrogen storage unit. This system is installed for in case of long-term fluctuations. The safety valve and the gas leak detector and other safety machine are installed for safe use of hydrogen.
(iv)	Pure hydrogen fuel cell unit	This unit generates electricity and supplies heat by using hydrogen in the storage tank. This unit consists of fuel cell, inverter, depressurization machinery, heat exchanger, and radiator. This fuel cell unit is installed H2One for the case of supplying electricity during bad weather or night time.
(v)	Electrical control panel	Interface board for a diesel generator in the island and renewable energy power generation system, distribution board, and other electrical machinery are included in this panel.

Source: Prepared by Nippon Koei based on the report of "Study for project development on installing a hydrogen-based autonomous energy supply system into remote islands in Indonesia and Philippine"

The above items (i)～(v) units are controlled by Hydrogen EMS, and it can control the amount of hydrogen production corresponding to the amount of electricity generated by renewable energy power generation system. In addition, this EMS can also control the operation of hydrogen fuel cells corresponding to electricity demand in order to keep appropriate operation of H2One.

The features of H2One are shown in the following table.

Table 3.15 Feature of H2One

Feature	Outline
Stable energy	Renewable energy such as solar power is affected to climate conditions, and usually its power generation is very fluctuant. However, H2EMS™, hydrogen generation, hydrogen production, and rechargeable battery are applied to H2One, and they can realize stable energy supply through a whole year.
Clean energy	H2One can provide stable delivery of CO2-free electricity by utilizing renewable energy such as solar power and hydrogen energy.
Local production for local consumption	Energy generated by H2One can realize 100% "local production for local consumption", so it can save shipping cost of fuel for remote islands.

Source: Prepared by Nippon Koei based on the materials provided by Toshiba Energy Systems & Solutions Corperation

3.2.4 Consideration of Project Outline

In the feasibility study in FY2019, the scale of installed H2One was estimated by using peak value of electricity demand in the Sebira island. The estimated H2One model is 2 types, one is 50% of the supply rate to electricity demand of the Sebira island and another is 100%, and evaluated the possibility on installing each H2One models into the island.

It was identified that securing fresh water to produce hydrogen is one of the biggest issues for installing H2One into the Sebira island. There are 138 families (total 592 people) in the Sebira island, and limited fresh water in the island is used in daily life such as for drinking water.

Necessary fresh water for producing hydrogen is 56 liter per day (16,753 liter per year) estimated by electricity peak demand in the Sebira island. The result of study confirmed that fresh water can be secured for hydrogen production in rainy season. On the other hand, it is difficult to secure enough fresh water in dry season. So, to tackle this problem, equipment for production of condensate water by utilizing renewable energy will be newly installed into H2One system to secure fresh water even in dry season.

According to information from the Energy Agency, PLN has a plan to install PV system of 400 kW in the Sebira island within 2020. The Energy Agency has proposed that it is more effective to work with PLN together for installing renewable energy (PV system) and H2One.

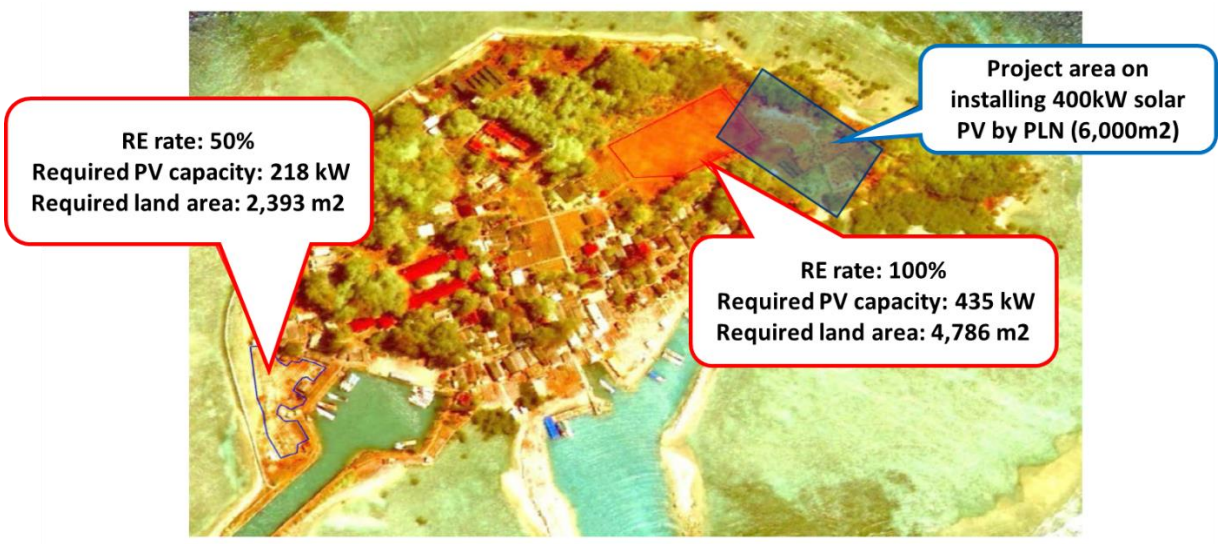
In addition, it is confirmed that PT Jakarta Propertindo (commonly called "Jakpro") which is DKI-JKT's state-own company will be assumedly in charge of operation & maintenance (O&M) after installation of the technologies in the Sebira island. From the above information, the discussion with PLN and Jakpro in addition to the Energy Agency will be implemented in FY2020 and later for JCM Model Project formulation.

Based on the data from the Energy Agency, required PV capacity and land area were estimated for both cases of 50% and 100% demand rate for electricity supply.

Table 3.16 Required PV Capacity and Land Area for H2One

#	Item	Demand rate: 50%	Demand rate: 100%
1	Required PV capacity	218 kW	435 kW
2	Required land area for H2One system	2,393 m^2	4,786 m^2

Source: Prepared by Nippon Koei based on the materials provided by Toshiba Energy Systems & Solutions



Source: Toshiba Energy Solutions & Systems Corperation

Figure 3.9 Image of Installing H2One into the Sebira Island

3.2.5 Plan for Feasibility Study in FY2020

Based on the result of feasibility study in FY2019, further detailed investigation in the Sebira island will be continued in FY2020. The study items for FY2020 are as follows.

1) The following data collection for consideration of H2One specification:
   - Annual electricity demand data (hourly data)
   - Geological condition of the Sebira island
   - Logistics from Japan to Indonesia, and the Sebira island
   - Current situation of the existing diesel power generation system in the Sebira island
2) Confirmation of H2One specification from the above information and PLN's plan of installing 400kW solar PV
3) Estimation of project cost, power generation cost, and amount of CO2 emission reduction by installing H2One
4) Consideration of project plan by discussion with Energy Agency, PLN, and Jakpro

3.3 OUTCOME OF FEASIBILITY STUDY FOR JCM PROJECT FORMULATION

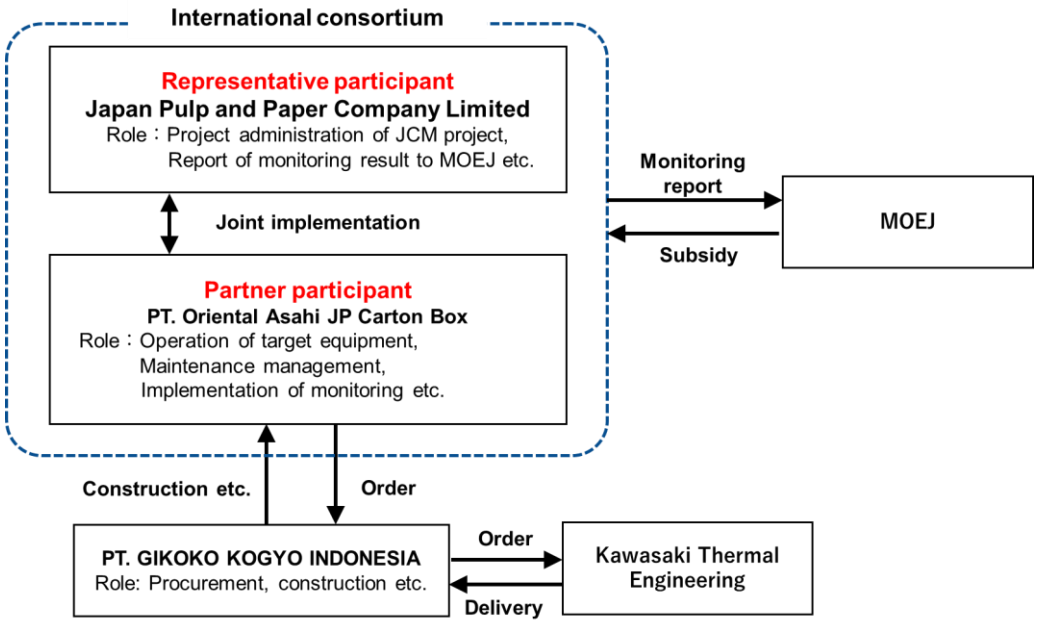
3.3.1 Outline of the Project

The feasibility study on "Energy Saving in Industry Sector" which is one of the priority sectors in DKI-JKT was conducted in FY2018 for installing high efficiency once-through boilers into the factory. Based on the result of this feasibility study, "Introduction of High Efficiency Boiler System to Carton Box Factory" was applied and selected as JCM Model Project at the end of November 2019.

This project aims to reduce fuel consumption and GHG emissions by introduction of high efficiency once-through boilers and closed drain recovery system into a new carton box factory constructed in MM2100 Industrial Town in Bekasi.

3.3.2 Implementation Structure

Japan Pulp and Paper Company Limited is the Representative Participant, and their local corporation (PT. PT Oriental Asahi JP Carton Box) is the Partner Participant of International Consortium for this JCM Model Project. Japan Pulp and Paper Company is a contact point with MOEJ. The company is mainly in charge of management of this project and reporting of the monitoring results. On the other hand, PT. PT Oriental Asahi JP Carton Box is in charge of installing equipment appropriately, operation and maintenance (O&M),and monitoring for MRV. The International Consortium the project is as follows.



Source: Prepared by Nippon Koei

Figure 3.10 Implementation Structure

3.3.3 Applied Technology

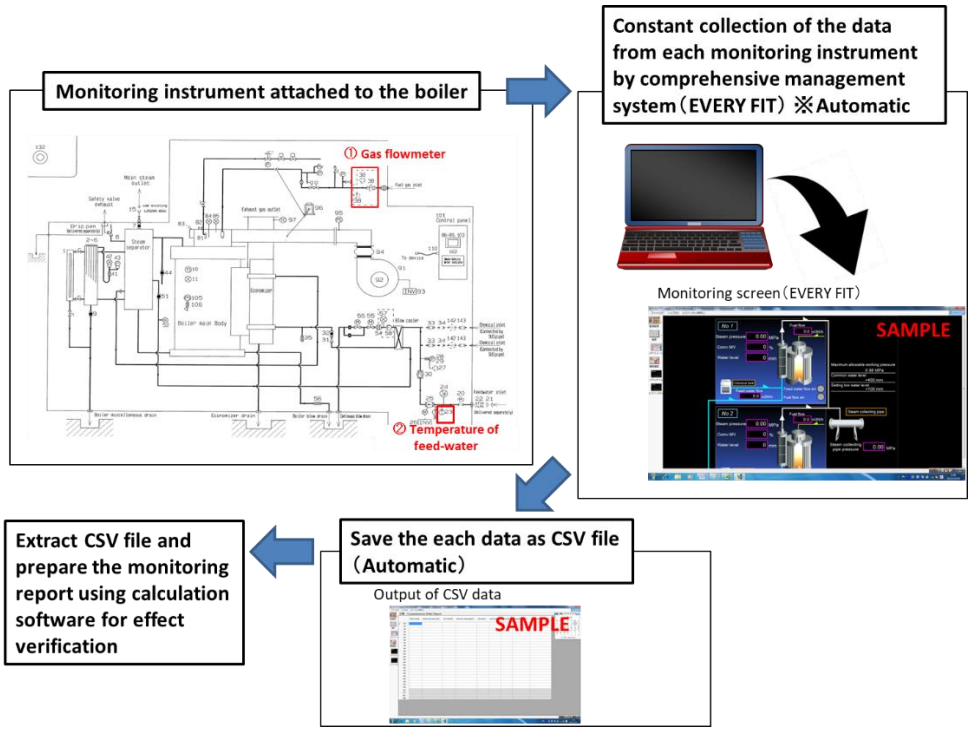
This project will install 3 high efficiency once-though boilers and closed drain recovery system into a new carton box factory (2 boilers are newly installed, and 1 boiler is relocated from an existing factory). The surplus steam from these boilers is utilized by the closed drain recovery system to reduce fuel consumption in the new factory and GHG emissions. In addition, the Reverse Osmosis (RO) membrane will be additionally installed to boilers, and heat exchange of blow water will be implemented. Both technologies aim for improving the efficiency of installed boilers. Specification of the applied boilers is as follows.

Table 3.17 Specification of Applied Boilers

#	Item	Specification
1	High efficiency once-through boiler (newly installation, 2 unit)	Type: IF-6000CMVE, Capacity: 5t/h, Efficiency: 93%
2	High efficiency once-through boiler (relocation from an existing factory, 1 unit)	Type: IF-6000CMVE, Capacity: 5t/h, Efficiency：93%

Source: Prepared by Nippon Koei

As for the monitoring, this project installs monitoring equipment called “EVERY FIT” for recording data of fuel consumptions by the boilers. The image of monitoring is shown in the following figure.



Source: Kawasaki Thermal Engineering Co., Ltd.

Figure 3.11 Monitoring System

3.3.4 GHG Emission Reduction

The GHG emission reduction and the cost effectiveness of this project are estimated in the following table. Reference emission is estimated by using values of the same type as installed boiler in this project. In addition to this, the amount of steams recovered by closed drain recovery system is also added to the amount of GHG emission reduction of the project, because these steams would be emitted into air and never utilized again if not installing closed drain recovery system.

According to the Japanese legal durable year, monitoring period is set as 12 years.

Table 3.18 GHG Emission Reduction and Cost Effectiveness

#	Items	Result
1	GHG emission reduction per year	975 [tCO2/year]
2	GHG emission reduction	11,699 [tCO2]
3	Cost effectiveness	4,000 [JPY/tCO2]

Source: Prepared by Nippon Koei

3.3.5 Schedule of the Project

Schedule of the project is as follows.

Table 3.19 Schedule of the Project

Year	Schedule
Dec. 2019	Start of the project
Jan. to Mar. 2020	Manufacturing new boilers
Mar. 2020	Shipment of new boilers
May 2020	Start of installing new boilers
Jun. 2020	Completion of installing new boilers and closed drain recovery system (2 units), starting test operation
Jan. 2021	Transferred existing boiler/ closed drain recovery system (1 unit)
Apr. 2021	Start of the monitoring

Source: Prepared by Nippon Koei

CHAPTER 4 FUTURE PLAN

In the Study FY2019, "Feasibility study for JCM Model Project formulation" and "Promotion of Green Innovation by City-to-City Collaboration" were conducted between Kawasaki City and DKI-JKT. According to the result in FY2019, the following sections describe future plan for FY2020.

4.1 APPLICATION OF JCM MODEL PROJECT

As described in Chapter 3, the feasibility study on "Energy Saving in Industry Sector" and "Installation of Clean Energy in Remote Islands" were conducted in the Study in FY2019.

As for "Energy Saving in Industry Sector", a proposal on "Installing once-through boilers into the seasoning company" plans to be applied for JCM Model Project in FY2020. International Consortium and implementation structure of this proposed project have been already determined, and specification of the installed boilers are almost confirmed as well. In addition, the estimated GHG emission reduction and cost performance are very high, and they meet JCM application's conditions.

Regarding to "Installation of Clean Energy in Remote Islands", it is clear that the Sebira Island can become a project site for installing H2One based on the result of feasibility study. Therefore, further feasibility study to consider project schedule and installed technology will be implemented in FY2020 to formulate JCM Model Project in FY2021 or later.

Furthermore, interest to join a feasibility study for JCM Model Project formulation in FY2020 is received from the air filter manufacturer and boiler/ air-compressor manufacturer, so the study will be conducted with these companies for applying to JCM Model Project as soon as possible.

4.2 PROPOSED STUDY FOR FY2020 CITY-TO-CITY COLLABORATION

Both Kawasaki City and DKI-JKT have already agreed to continue City-to-City Collaboration for low carbon society in FY2020. The cities will implement their activities according to "Letter of Intent for City-to-City Collaboration for Low-Carbon Society".

As the theme of continuous City-to-City Collaboration for low carbon society in FY2020, "Realization of Sustainable Green Innovation" is proposed. Green Innovation aims to realize both economic growth and low-carbon urban development by utilizing and promoting advanced environmental technologies. In the Study, Kawasaki City's experiences and good technologies of Kawasaki companies such as a member of Kawasaki Green Innovation Cluster will be utilized to solve DKI-JKT's environmental issues due to their strong economic growth.

Based on the discussion result between both cities, the Study in FY2020 will be conducted with 2 approach; "JCM Feasibility Study", and "Promotion of Green Innovation by the City-to-City Collaboration".

Based on the idea proposed by DKI-JKT and the result of the Study in FY2019, the following activities were agreed between both cities for FY2020.

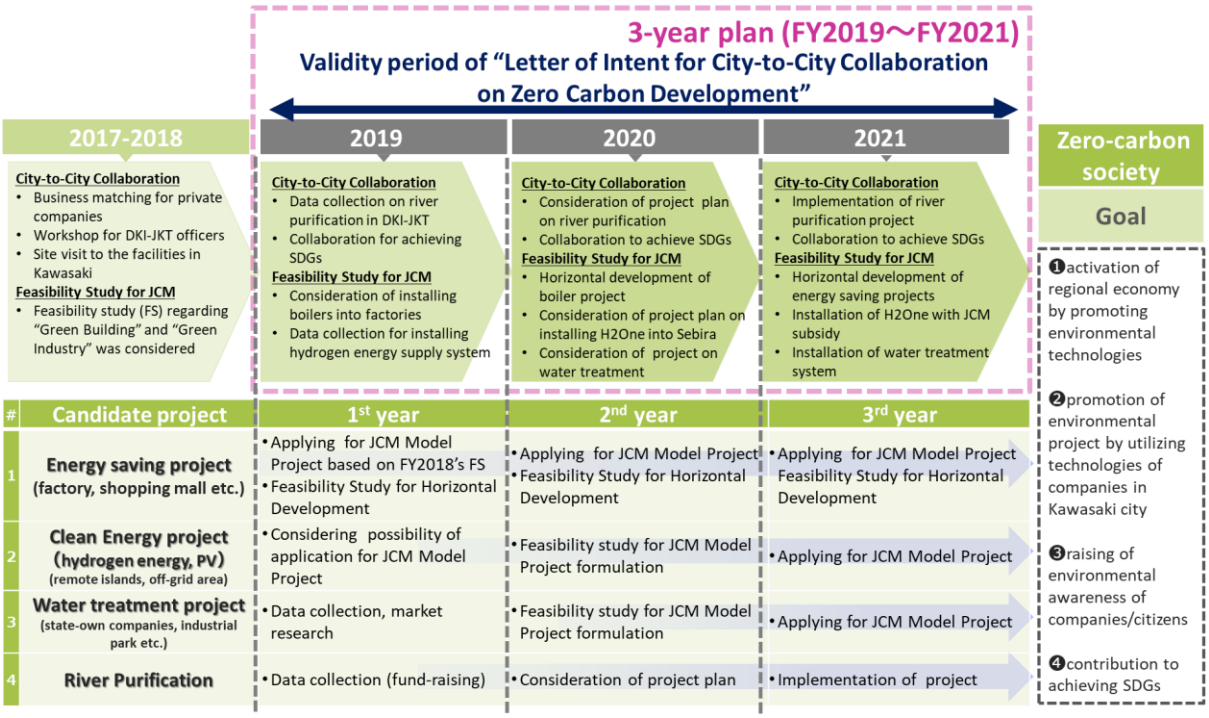
Table 4.1 Proposed Activities for FY2020

Policy	Sector	Outline
Approach 1: JCM Feasibility Study	**Clean Energy**	Based on the result of feasibility study in FY2019, **additional study for installing H2One into the remote islands** will be conducted.
	Energy Saving in Industry Sector	Promotion of energy saving solutions/ technologies (such as **once-through boiler, air-compressor, air filter**) at factories in DKI-JKT will be implemented for JCM Model Project formulation.
Approach 2: Promotion of Green Innovation by the City-to-City Collaboration	**Collaboration for SDGs**	Collaboration activities in terms of achieving SDGs will be considered between Kawasaki City and DKI-JKT (mainly SDGs secretariat of DKI-JKT).

Source: Prepared by Nippon Koei

4.3 3-YEAR PLAN OF CITY-TO-CITY COLLRABORAION

The original 3-year plan which was considered when the Study in FY2019 started is as follows. According to this original plan, each activity has been implemented. However, it was confirmed that several activities should be modified to meet the results of the Study in FY2019.



Source: Prepared by Nippon Koei

Figure 4.1 Original Three Year's Plan of the Study (as of Sep.2019)

In the above figure, "water treatment project" and "river purification" in the list of candidate project were especially modified for the Study in FY2020.

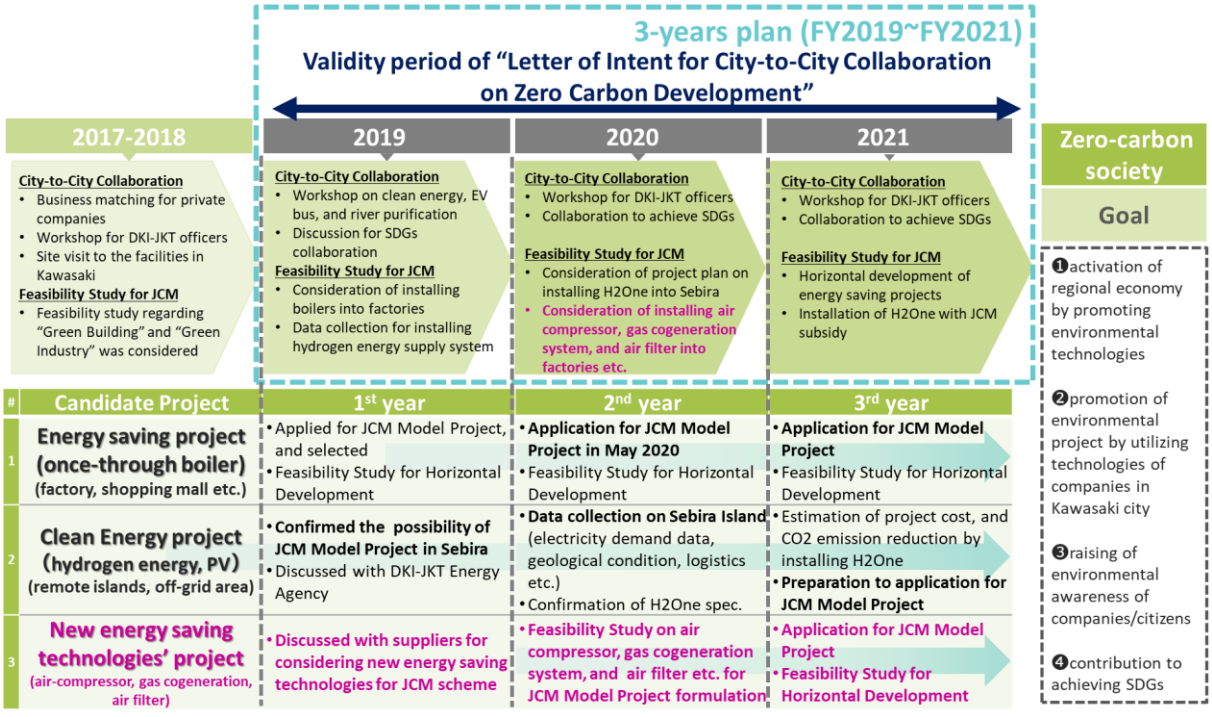
Regarding "water treatment project", collecting information from Japanese companies which has water treatment technologies was conducted. But there was no company which currently plans to expand their business in DKI-JKT, and there was also no candidate project to meet application condition of JCM Model Project about GHG emission reduction. Thus, it was confirmed that JCM Model Project formulation on installing water treatment technologies was deprioritized as activities in FY2020.

On the other hand, according to the results of discussions with DKI-JKT officers and local companies about "river purification", it was confirmed that activities on river purification will be conducted based on DKI-JKT's requests in FY2020. During the Study in FY2019, Kawasaki City officers gave a presentation on their own experience about river purification in the workshop based on the request from DKI-JKT officers. In FY2020, sharing knowledge and experience on river purification by Kawasaki City officers will be conducted as well if DKI-JKT requests.

The following revised 3-year plan of the City-to-City Collaboration between Kawasaki City and DKI-JKT takes advantage of the fact that these cities have developed good relations with each other since 2017, and further collaboration is expected to solve DKI-JKT's priority issues and archive SDGs.

Among the priority sectors of DKI-JKT, "Energy Saving in Industrial Sector" and "Clean Energy" have been confirmed as high potential sectors for JCM Model Project based on the result of feasibility study in FY2019. Thus, feasibility study will be continued to expand the technologies more in DKI-JKT and other cities in Indonesia in FY2020 and beyond. In addition, new environmental technologies such as air compressor, gas cogeneration system, and air filter which have not been considered under the feasibility study will be considered to identify a possibility of JCM Model Project.

Regarding to SDGs actions, the discussion with SDGs secretariat have been started to consider collaboration activities in FY2020. DKI-JKT expressed an interest in collaboration with Kawasaki City to achieve SDGs, so the actions related to SDGs especially which can contribute to zero carbon society will be implemented.



Remarks) The sentences in red are main revised items from the original plan
Source: Prepared by Nippon Koei

Figure 4.2 Revised Three Year's Plan of the Study (as of Feb.2020)