FY2020 Project for Ministry of the Environment Japan

FY2020
City-to-City Collaboration Programme for Zero-Carbon Society

Promotion of Green Innovation to Realize Zero Carbon City by the Collaboration between DKI-Jakarta and Kawasaki City

Report

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Nippon Koei Co., Ltd.
Kawasaki City

FY2020 City-to-City Collaboration Programme for Zero-Carbon Society

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Report

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List of Abbreviations

ASEAN	Association of Southeast Asian Nations
BAPPEDA	Badan Perencanaan Pembangunan Daerah
BaU	Business-as-usual
BEV	Battery Electric Vehicle
BOD	Biochemical Oxygen Demand
BPPT	Badan Pengkajian dan Penerapan Teknologi
BRT	Bus Rapid Transit
C40	The large Cities Climate Leadership Group
CFF	Cities Finance Facility
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
COP	Conference of the Parties
CTCN	Climate Technology Centre and Network
DKI-JKT	Special Capital Region of Jakarta
EMS	Energy Management System
EV	Electric Vehicle
FIT	Feed in Tariff
GBCI	Green Building Council Indonesia
GDP	Gross Domestic Product
GEC	Global Environment Centre Foundation
GHG	Greenhouse Gas
GIC	Kawasaki Green Innovation Cluster
HEPA	High Efficiency Particulate Air Filter
ICE	Internal Combustion Engine
IDR	Indonesian Rupia
IFC	International Finance Corporation
IGES	Institute for Global Environmental Strategies
IMF	International Monetary Fund
IoT	Internet of Things
IPP	Independent Power Producer
IT	Information Technology
JCM	Joint Crediting Mechanism
JICA	Japan International Cooperation Agency
LNG	Liquefied Natural Gas
LoI	Letter of Intent
LULUCF	Land use, land-use change, and forestry
MEMR	Ministry of Energy and Mineral Resource
MOE	Ministry of the Environment, Japan
MOU	Memorandum of Understanding
MRT	Mass Rapid Transit
NDC	Nationally Determined Contributions
NGO	Non-Governmental Organization
NIES	National Institute for Environmental Studies
PAC	Poly Aluminum Chloride
PCR	Polymerase Chain Reaction
PLN	Perusahaan Listrik Negara
PSBB	Pembatasan Sosial Berskala Besar
PV	Photovoltaics

RAD	Regional Action Plan
RAD-GRK	Regional Action Plan for Reducing Greenhouse Gas Emissions
RAN-GRK	National Action Plan for Reducing Greenhouse Gas Emissions
RE100	Renewable Energy 100
RPJMD	Mid-term Reginal Development Plan
RPJMN	Mid-term National Development Plan
RPJPD	Long-term Regional Development Plan
RPJPN	Long-term National Development Plan
RTRW	Rencana Tata Ruang Wilayah
RUPTL	Electricity Supply Business Plan
SDGs	Sustainable Development Goals
UNFCCC	United Nations Framework Convention on Climate Change
WEO	World Economic Outlook
ZEB	Net Zero Energy Building
ZEH	Net Zero Energy House
ZEV	Zero Emission Vehicle

CHAPTER 1 BACKGROUND AND OBJECTIVE

1.1 BACKGROUND OF THE PROGRAMME

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 FY2020, the Paris Agreement finally entered its implementation stage. As it is expected that not only central governments but non-governmental bodies including regional municipalities and cities accelerate their climate change policies, cities and municipalities are key players to consider and implement concrete regional climate actions and projects. 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. To realize zero carbon society, it is important to accelerate actions to develop sustainable and zero-carbon society and low-carbon society as a passing point especially in Asia, the area of prominent economic growth. International supports for activities for zero-carbon and low-carbon society have been enforced in cities, the place for activities to support socio-economic development.

1.2 OBJECTIVE OF THE PROGRAMME

The objective of "FY2020 City-to-City Collaboration Programme for Zero-Carbon Society" is to realize zero-carbon society in overseas cities through the intercity collaboration between overseas cities and Japanese cities which have experiences and know-how to develop low/zero-carbon city, and also implementation of a feasibility study for installing private companies' technologies in overseas cities contributing to low/zero-carbon society.

1.3 CITIES OF THE PROJECT

The cities participating in the project "Promotion of Green Innovation to Realize Zero Carbon City by the Collaboration between DKI-JKT and Kawasaki City" (hereafter "the Project) are the Special Capital Region of Jakarta (DKI-JKT) and Kawasaki City.

DKI-JKT is the capital city of the Republic of Indonesia (hereafter "Indonesia"). DKI-JKT is the city with a population of approximately 10.37 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 temporarily 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.

1.4 IMPLEMENTATION STRUCTURE OF THE PROJECT

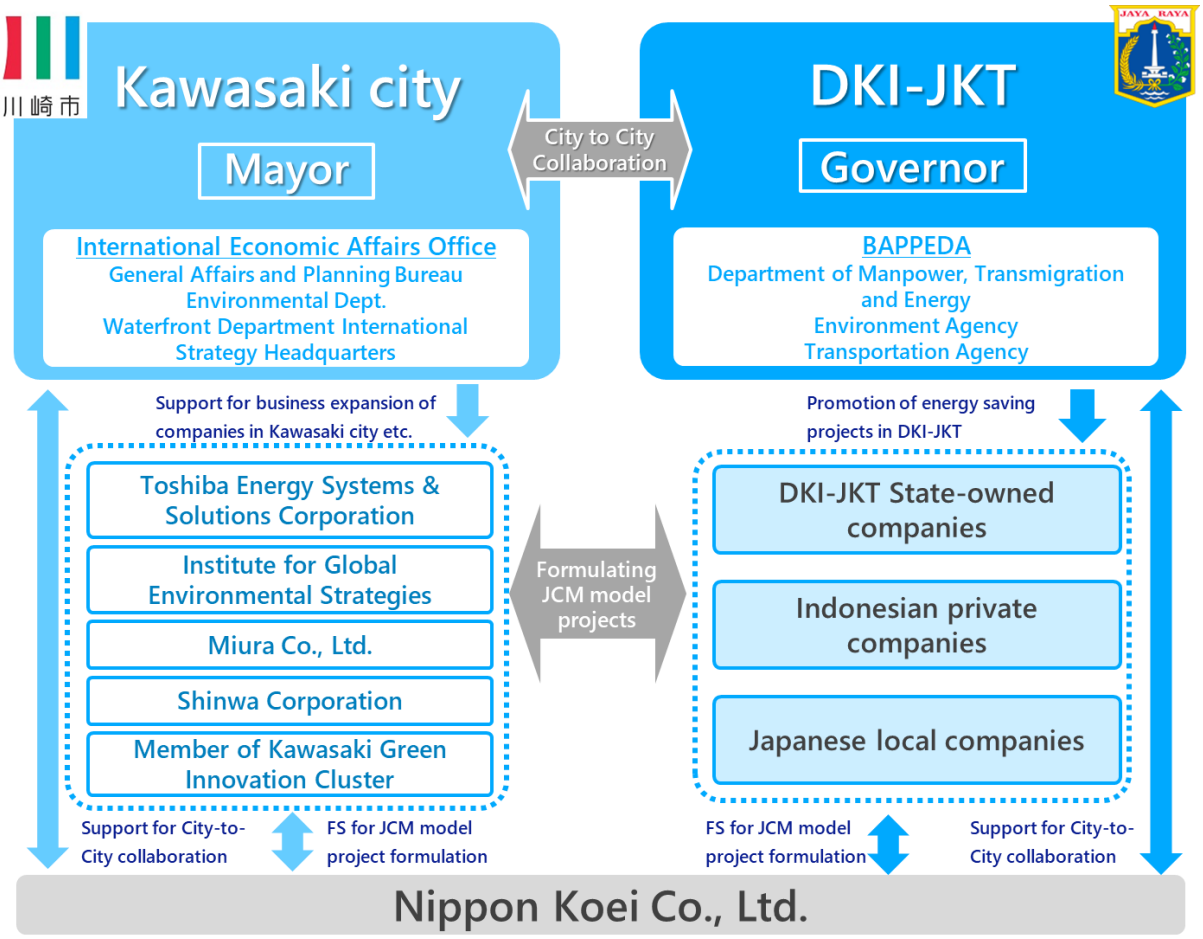
The International Economic Affairs Office of Kawasaki City and the Regional Development Planning Agency (BAPPEDA) of DKI-JKT mainly implemented the Project.

From Kawasaki City, departments related to this fiscal year's activities participated in the project such as General Affairs and Planning Bureau, Environmental Department and Waterfront Department International Strategy Headquarters. Similarly from DKI-JKT, Department of Manpower, Transmigration and Energy, Environment Agency and Transportation Agency participated, as well as SDGs Secretariat concerning sustainable development goals (SDGs).

Furthermore, studies were conducted in cooperation with private companies and research institutions such as Toshiba Energy Systems & Solutions Corporation and Institute for Global

Environmental Strategies (hereafter "IGES") to develop projects utilizing Joint Crediting Mechanism (JCM) in DKI-JKT. Nippon Koei Co. Ltd. (hereafter "Nippon Koei") supported City-to-City Collaboration activities and carried out studies for introducing energy-saving technologies and renewable energy.

The implementation structure of the Project is as follows.



Source: Prepared by Nippon Koei

Figure1.1 Implementation structure of the Project

1.5 PROJECT SCHEDULE

The implementation period of the Project is between August 20, 2020 and March 10, 2021. The Project schedule is as follows.

Activities		2020					2021		
		Aug	Sep	Oct	Nov	Dec	Jun	Feb	Mar
1. JCM Model Project Formulation on Energy Saving in Industrial Sector									
1-1.	Consideration of specification of introduced technologies			■	■	■	■		
1-2.	Formulation of project plan & project evaluation					■	■	■	
1-3.	Coordination of International Consortium							■	■
1-4.	Formulation of MRV								■
2. JCM Model Project Formulation on Installation of Hydrogen Energy in remote islands									
2-1.	Data collection of the target island	■	■	■					
2-2.	Date analysis of energy demand and existing power plant in Sebira Island			■	■	■	■		
2-3.	Consideration of system structure & layout and calculation of annual electricity generation based on 2-2.					■	■	■	
3. JCM Model Project Formulation on Installation of EV bus to Public Transportation									
3-1.	Information collection of EV buses installation in DKI-JKT	■	■	■	■	■	■		
3-2.	Development of plans of JCM Model Project Formulation in FY2021						■	■	■
4. City-to-City Collaboration for achieving SDGs									
4-1.	Sharing knowledges and experiences of Kawasaki City on SDGs				■	■	■		
4-2.	Consideration and Implementation of City-to-City Collaboration for achieving SDGs					■	■	■	
5. Workshop etc.									
5-1.	Workshop on SDGs					●			
5-2.	Workshop for promotion of green innovation						●		
5-3.	Presentation of the City-to-City Collaboration Project		●				●	●	
6. Field Survey, Meetings, Report etc.									
6-1.	Field Survey by cooperating with local staff		■	■	■	■	■	■	■
6-2.	Monthly report to MOE		○	○	○	○	○	○	○
6-3.	Progress meeting with MOE		○			●		●	
6-4.	Meeting with Kawasaki City and related companies	●	●	●	●	●	●	●	
6-5.	Final report					■	■	■	■

■ : Implemented both in Japan and DKI-JKT (Continuously) ● : implemented online (Single)
○ : Implemented in Japan (Single)

Source: Prepared by Nippon Koei

Figure1.2 Project schedule in FY2020

CHAPTER 2 OVERVIEW OF THE CITIES

2.1 DKI-JKT

2.1.1 Overview of DKI-JKT

Indonesia is the world's largest island country, with the capital DKI-JKT, located on the northwest coast of Jawa Island. DKI-JKT is Indonesia's political, economic, cultural and industrial center, as well as one of the largest cities in Southeast Asia with an office of the Association of Southeast Asian Nations (ASEAN) . The city is also an active member of international city networks such as C40 (The Large Cities Climate Leadership Group)[1], 100 Resilient Cities, Citynet, and Compact of Mayors.

Its administrative subdivisions consist of five cities (Kota Administrasi) and an administrative regency (Kabupaten Administrasi). The five administrative cities consist of 44 districts (Kecamatan), under which are 267 villages (Kelurahan).

Source: Prepared by Nippon Koei

Figure2.1 Map of Indonesia and DKI-JKT

DKI-JKT's statistical key data is shown in the table below.

Table2.1 Statistical data of DKI-JKT

#	Item	Statistical data
1	Area	662.33 km2 (2018)
2	Population	10,374,235 (2018)
3	Gross city product (nominal)	USD 200.9 billion (2019)
4	Main language	Indonesian
5	Religion	Islam (86%), Christianity (10%), other
6	Climate	Tropical monsoon climate (dry season from July to October, rainy season from November to June)

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

[1] https://www.c40.org/

DKI-JKT's population has increased every year, by 1.13% in 2012, 1.09% in 2013, 1.06% in 2014, 1.09% in 2015 and 0.98% in 2016. DKI-JKT's population density is higher than in any other cities in Indonesia, with 15,510 people/km2.

The number, area and population of the region's municipalities and regencies are shown in the table below.

Table2.2 Statistical data of administrative subdivisions (2018)

#	**Administrative cities** (Kota/Kab. Administrasi)	**Administrative districts** (Kecamatan)	**Administrative villages** (Kelurahan)	**Area [km2]**	**Population**
1	Jakarta Pusat (Central Jakarta)	8	44	48.13	921,344
2	Jakarta Utara (North Jakarta)	6	31	146.66	1,781,316
3	Jakarta Barat (West Jakarta)	8	56	129.54	2,528,065
4	Jakarta Selatan (South Jakarta)	10	65	141.27	2,226,830
5	Jakarta Timur (East Jakarta)	10	65	188.03	2,892,783
6	Kep. Seribu (Seribu Islands)	2	6	8.70	23,897
Total		**44**	**267**	**662.33**	**10,374,235**

Source: Prepared by Nippon Koei, based on Table 2.1 and Table 2.6 of "Peraturan Daerah Nomor 1 tahun 2018 tentang RPJMD Provinsi DKI Jakarta Tahun 2017-2022"

2.1.2 Regional Medium-Term Development Plan (RPJMD)

Regional Medium-Term Development Plan (RPJMD) is a DKI-JKT's five-year development plan. It is based on the Regional Long-term Development Plan (RPJPD), which was developed in accordance with National Long-Term Development Plan (RPJPN), and also takes National Medium-Term Development Plan (RPJMN) into consideration.

At present, DKI-JKT's RPJMD is targeting five years from 2018 to 2022 and lists 18 strategic issues for promoting the area's development.

Table2.3 DKI-JKT's strategic issues in RPJMD (2018-2022)

#	**Sector**	**Strategic Issues**
1	Human development	1) Improving the quality of education 2) Improving the quality of health 3) Strengthening equal access for disability persons 4) Empowerment of women 5) Improving sports infrastructure to encourage youth activities
2	Acceleration of developing economy and infrastructure	6) Strengthening food security 7) Increasing competitiveness of creative industries

#	Sector	Strategic Issues
		8) Reducing economic inequality and expanding job opportunities 9) Prediction of flood and inundation 10) Energy security 11) Development of transportation system 12) Control of urban spatial use
3	Integrity of governmental apparatus	13) Bureaucratic reform 14) Management of development finance
4	Sustainable city	15) Improving the quality of environment, housing, and settlements 16) Environmental protection and management
5	Building Jakarta as a node of growth	17) Development of multicultural city 18) Strengthening reginal innovation and creativity

Source: Prepared by Nippon Koei based on "Table 4.4 Isu-isu Strategis Pembangunan DKI Jakarta Tahun 2017-2022" of "Peraturan Daerah Nomor 1 tahun 2018 tentang RPJMD Provinsi DKI Jakarta Tahun 2017-2022"

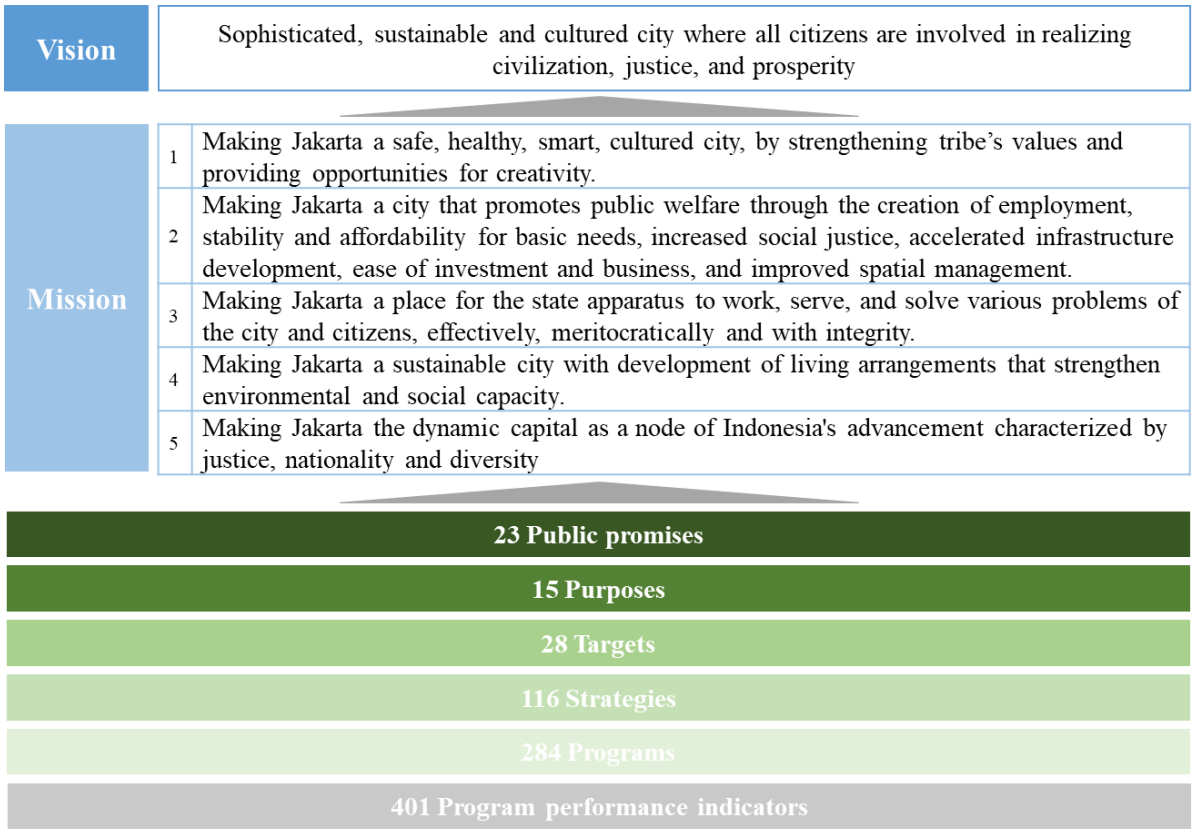
The 18 strategic issues above include those that RPJMN and RPJPD (2005-2025) have focused on. They have been designed based on "RTRW (Spatial Plan DKI-JKT, 2011-2030)", the highest-level spatial plan for whole DKI-JKT, and other factors such as SDGs for the world to achieve.

In RPJMD, to solve the strategic issues and move DKI-JKT development forward, the Governor and Deputy Governor have formulated a vision for the province.

Source: Figure 4.3 of "Peraturan Daerah Nomor 1 tahun 2018 tentang RPJMD Provinsi DKI Jakarta Tahun 2017-2022"

Figure2.2 The background of setting RPJMD's strategic issues

Currently the vision is to make Jakarta: "sophisticated, sustainable and cultured city where all citizens are involved in realizing civilization, justice, and prosperity." RPJMD lists five missions to achieve this vision and 23 public promises and specific implementation programs under the missions. The structure of the RPJMD plan is shown in the figure below. Each item in detail is mentioned in RPJMD.



Source: Prepared by Nippon Koei, based on "Peraturan Daerah Nomor 1 tahun 2018 tentang RPJMD Provinsi DKI Jakarta Tahun 2017-2022"

Figure2.3 Structure of RPJMD

2.1.3 Policy for climate change countermeasures of DKI-JKT

(1) Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK)

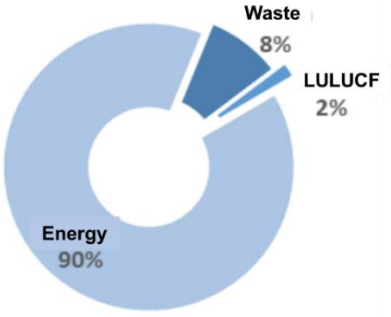
The DKI-JKT Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK) was enacted in September 2012 as Governor Degree No.131. RAD-GRK aims to reduce 30% (35 million tCO2) of GHG emissions reduction by 2030 compared with Business-as-usual (BaU) scenario of the city (117 million tCO_2).

There are three targeted sectors expected to reduce emissions: energy (transport, commerce, households and other); waste; and Land Use, Land-Use Change and Forestry (LULUCF). Each sector's BaU emissions are calculated and then each sector is expected to reduce GHG emission by 30%. In energy sector, low-carbonization of public transport and promotion of green buildings are set as especially high-priority areas.

Table2.4 GHG reduction target by sector

#	Sector	Sub-sector	Target by 2030 [million tCO2e]
1	Energy	Industry	10.8
2		Transportation	9.8
3		Commercial	5.7
4		Household	5.2
5		Others	0.07
6	Waste	Solid	2.6
7		Liquid	0.3
8	LULUCF	Forest	0.6
Total			**35.07**

Source: Prepared by Nippon Koei based on DKI-JKT material



Source: Prepared by Nippon Koei based on DKI-JKT material

Figure2.4 Breakdown of reduction targets by sector

(2) Actions for low-carbon urban transportation

In August 2019, the President of Indonesia, Joko Widodo, announced Presidential Decree (No.55/2019) to accelerate installation of Battery Electric Vehicles (BEV) to road transportation system. This was the first Decree related to dissemination of BEV.

Also, the Ministry of Energy and Mineral Resource (MEMR) of Indonesia announced Decree No.13/2020 "Provision of Electricity Charging Infrastructure for Battery-based Electric Motor vehicles"[2] in August 2020. This Decree regulates general provisions, private and public charging facilities for BEV, electricity price of charging for BEV, roles of national electricity company, Perusahaan Listrik Negara (PLN) etc. in order to development of charging facilities required for dissemination of BEV.

To respond to the movements for dissemination of BEV at national level, the Governor of DKI-JKT, Anies Baswedan positions spread of zero-carbon mobilities as one of the most important tasks. Especially replacement of public buses in DKI-JKT to Electric Vehicle (EV) is prioritized and practical activities for installation of EVs has started in 2020. Details of the plan to introduce EV buses in the Province are presented in Chapter 4 (Section 4.3.3).

In addition to installation of EV buses, DKI-JKT has been proceeding with actions to increase the number of users of public transportation as a countermeasure to air pollution, by cooperating with state-own companies such as PT. Transportasi Jakarta. One of those actions is Jak Lingko. Jak Lingko aims to enforce the convenience of public transportation by installing microbuses for First Mile (home to bus stops/train station) and Last Mile (bus stop/train station to home) to effectively connect to Jakarta Mass Rapid Transit (MRT) and public buses etc.

[2] https://jdih.esdm.go.id/storage/document/PM%20ESDM%20No.%2013%20Tahun%202020.pdf

Source: PT. Transportasi Jakrta

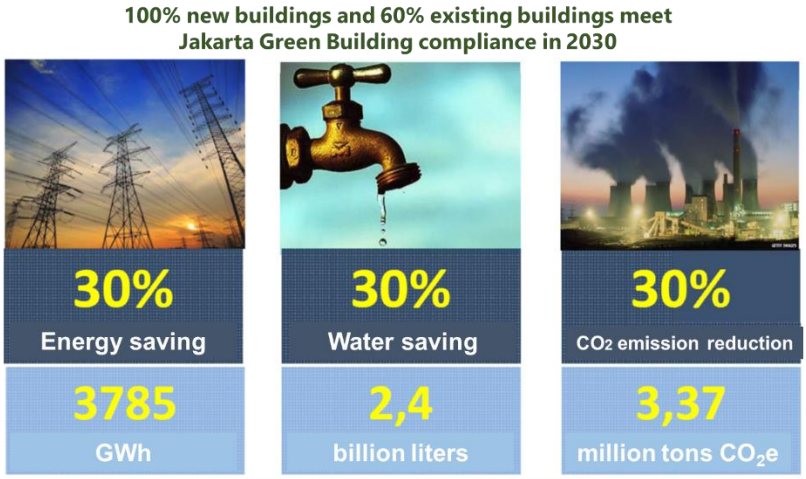
Figure2.5 Overview of Jak Lingko

(3) Governor's Degree on green building and related policies

Green Building regulation were enacted by DKI-JKT Governor Degree No.38/2012. The objective of the Green Building regulation is to improve the energy efficiency and water saving of the buildings in DKI-JKT. They were enforced as part of the regulation reform for 30% reduction of GHG emissions by 2030 as stated in RAD-GRK. This regulation targets both new and existing buildings.

Even though the Green Building regulation began in 2013, progress has not been smooth as the importance of Green Building has not been understood enough in Jakarta. Considering this situation, in order to disseminate Green Building, , DKI-JKT judged that it is important to make stakeholders understand its importance and to develop grand design as a basic concept to lead to implementations. Thus, , DKI-JKT developed Grand Design of Green Building in 2016 with support from International Finance Corporation (IFC). The main concept of the Grand Design is "30:30 Commitment", which aims to cut 30% of energy consumption, 30% of water consumption, and 30% of GHG emissions of all new buildings and 60% of existing buildings.

The DKI-JKT government launched a website for Green Building to release details of Grand Design of Green Building and a guideline to contribute to the concept , as well as current progress of energy savings, water savings and reduction of GHG emissions.



Source: Grand Design of Green Building (with some additions by Nippon Koei)

Figure2.6 Targets of 30:30 Commitment

Source: DKI-JKT site (https://greenbuilding.jakarta.go.id/index-en.html)

Figure2.7 Website for DKI-JKT's green building

Source: DKI-JKT

Figure2.8 Green building guideline

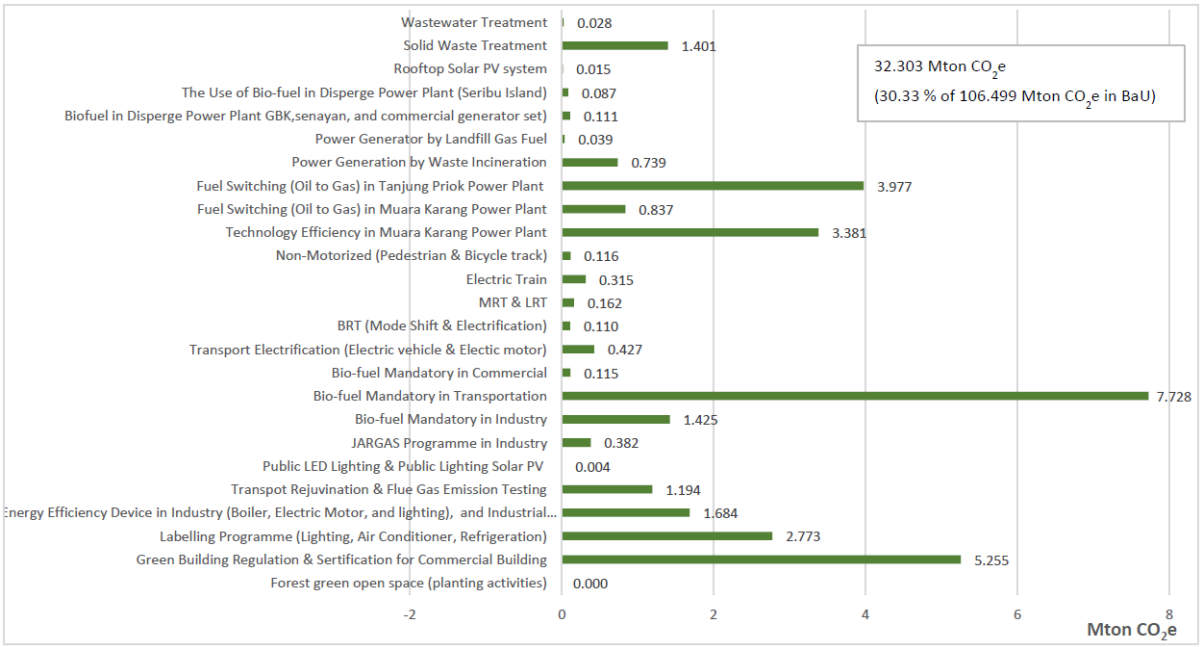
(4) Long-term strategy for realization of low-carbon society

Paris Agreement requires all parties of the agreement to prepare "Mid-century long-term low GHG emissions development strategy (Long-term strategy)" to achieve 1.5 degree C target, in addition to submission of Nationally Determined Contributions (NDC) with the target of GHG emission reduction. To respond to the requirement, Indonesia has started establishment of long-term strategy by 2050.

DKI-JKT is preparing for development of provincial long-term strategy in accordance with national long-term strategy being established by the central government. For preparation of long-term strategy, DKI-JKT implemented studies to consider mitigation scenario by 2030 and 2050, with Japanese institutes including National Institute for Environmental Studies (NIES) and IGES. As a result of the studies, it was confirmed that GHG emission from energy

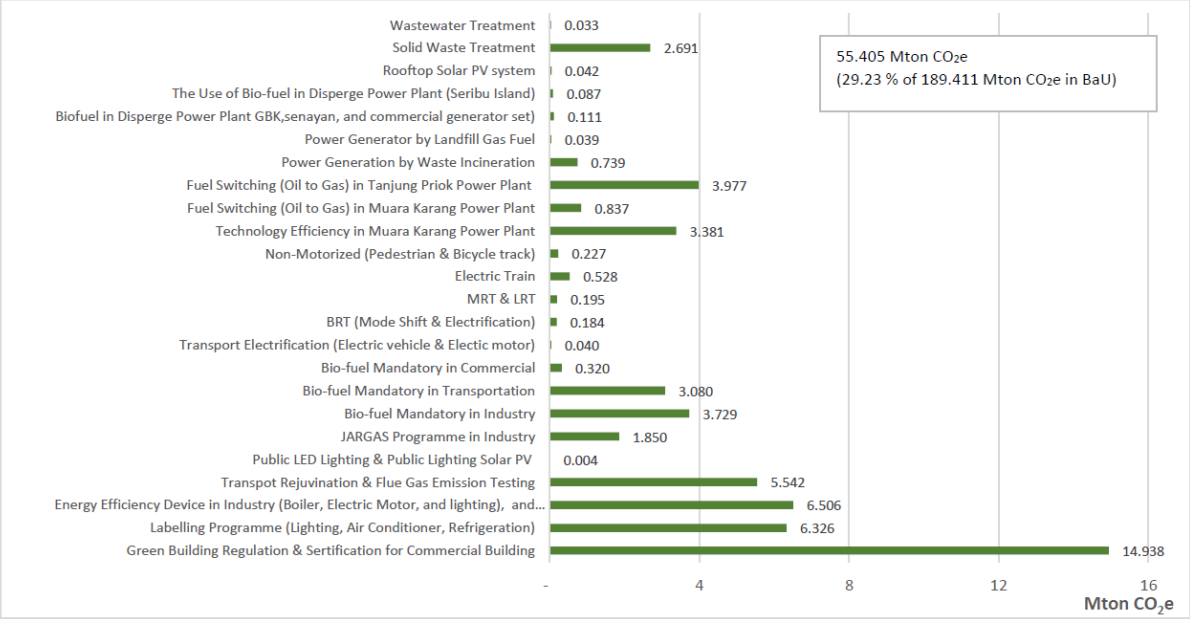
consumption in DKI-JKT increase 28.249 million tCO2e in 2010 to 165.274 million tCO2e in 2050 in BaU scenario. On the other hand, in the scenario that climate change countermeasures are implemented, GHG emission in 2050 is predicted to be 121.804 million t CO2e, which means countermeasures will lead to the reduction of 43.470 million tCO_2e (22.95%) in comparison with BaU scenario.

Figure2.9 and 2.10 show trial calculation of GHG emission reduction potential in each sector in 2030 and 2050. The result of the calculation indicates high potentials in transportation sector and green building both in 2030 and 2050. Thus, it can be expected that technologies considered in JCM Model Project formulation study of the Project supports for climate change countermeasures. This calculation is implemented with assumption that Gross Domestic Product (GDP) of DKI-JKT will increase average 5.7% every year from 2010 to 2050.



Source: IGES (https://www.iges.or.jp/jp/pub/aaa/en-4)

Figure2.9 GHG emission reduction potentials of each sector in 2030



Source: IGES(https://www.iges.or.jp/jp/pub/aaa/en-4)

Figure2.10 GHG emission reduction potentials of each sector in 2050

2.1.4 Activities for achieving SDGs

(1) SDGs Regional Action Plan

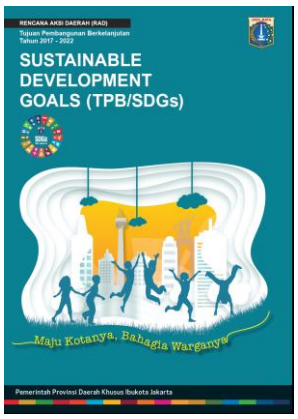
By Presidential Degree No.59/2017 on SDGs, municipalities were directed to develop a five-year Regional Action Plan (RAD) to achieve SDGs. RAD is required to be aligned with RPJMD and its plan is set for RPJMD's target period. Therefore, DKI-JKT's current SDGs action plan targets years 2018-2022, the same as RPJMD.

	Year	2017	2018	2019	2020	2021	2022	2023	2024	2025
National	RPJMN	RPJMN -2019			RPJMN 2020-2025					
	National Action Plan (RAN)	RAN 1st			RAN 2nd					
Regional	RPJMD	-2017	RPJMD 2018-2022					RPJMN 2023-		
	Regional Action Plan (RAD)		RAD 1st					RAD 2nd		

Source: Prepared by Nippon Koei based on the SDGs Regional Action Plan (RAD)

Figure2.11 Relationship between development plans and SDGs Action Plans

DKI-JKT's SDGs Regional Action Plan is structured as follows.



Source: SDGs Regional Action Plan (cover page)

Figure2.12 SDGs Regional Action Plan

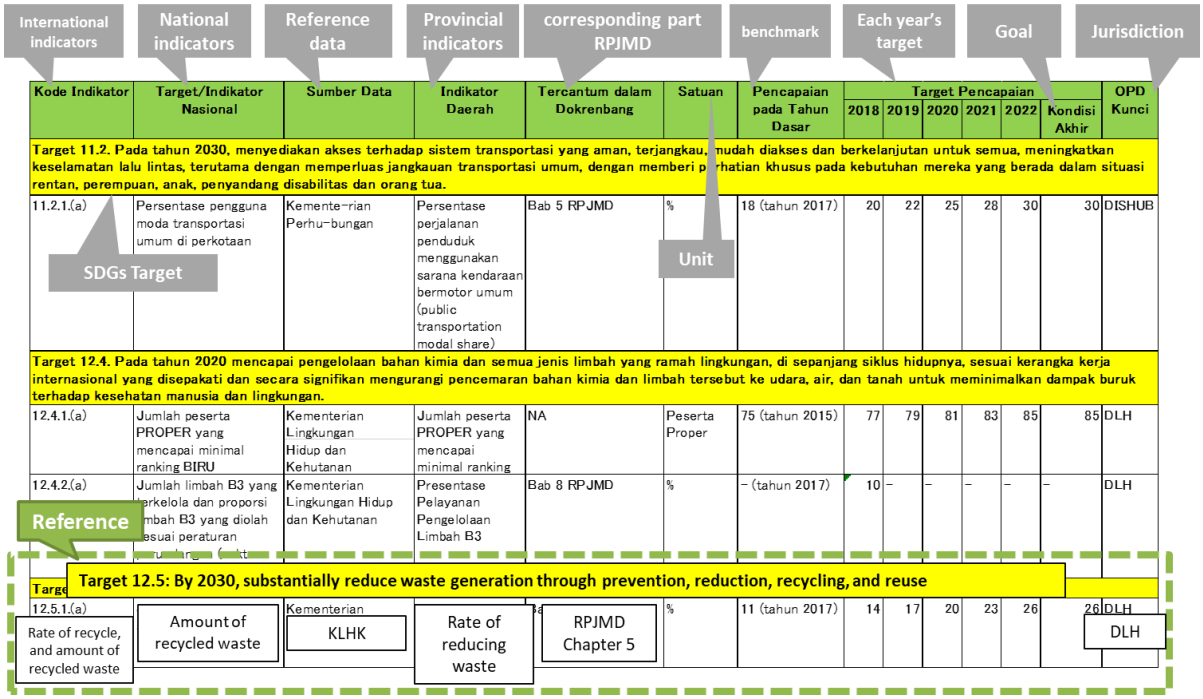
Table2.5 Structure of SDGs Regional Action Plan

Chapter	Detail
Chapter 1	Introduction (including SDGs Regional Action Plan's consistency with other plans (such as RPJMD) and implementation policy)
Chapter 2	Requirements and issues to achieve TPB/SDGs (Goal 1～Goal 17)
Chapter 3	Targets and indicators to achieve goals (Goal 1～Goal 17)
Chapter 4	Procedures for monitoring, evaluating and reporting on SDGs implementation
Chapter 5	Epilogue
Attached documents	Legal documents to promote SDGs, and a table summarizing goals, targets, programs, activities, indicators, budget indicators, funding sources and programme period (Goal 1～Goal 17)

Source: Prepared by Nippon Koei based on the SDGs Regional Action Plan

Targets and indicators for Goal 1-Goal 17and five-year target figures are listed in SDGs Regional Action Plan Chapter 3. DKI-JKT lists 253 indicators (241 international indicators and 319 national indicators).

Shown below are examples of the indicators and targets for the goals shown in DKI-JKT's SDGs Regional Action Plan Chapter 3.

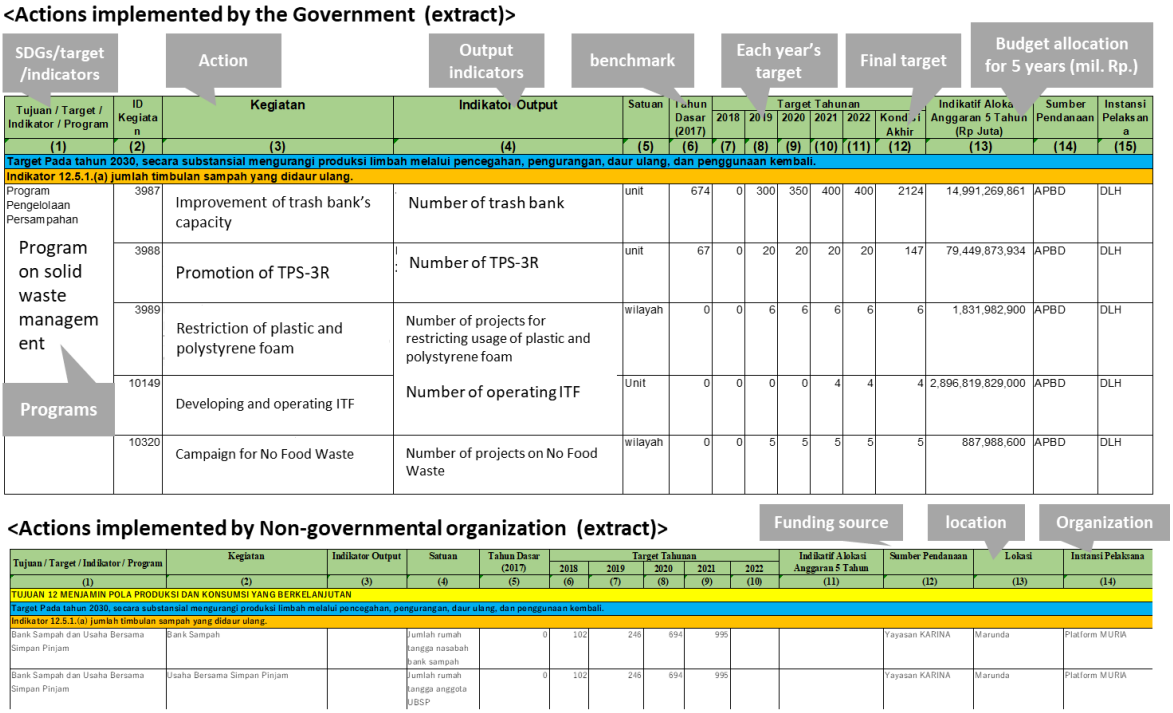


Kode Indikator	Target/Indikator Nasional	Sumber Data	Indikator Daerah	Tercantum dalam Dokrenbang	Satuan	Pencapaian pada Tahun Dasar	Target Pencapaian 2018	2019	2020	2021	2022	Kondisi Akhir	OPD Kunci
Target 11.2. Pada tahun 2030, menyediakan akses terhadap sistem transportasi yang aman, terjangkau, mudah diakses dan berkelanjutan untuk semua, meningkatkan keselamatan lalu lintas, terutama dengan memperluas jangkauan transportasi umum, dengan memberi perhatian khusus pada kebutuhan mereka yang berada dalam situasi rentan, perempuan, anak, penyandang disabilitas dan orang tua.													
11.2.1.(a)	Persentase pengguna moda transportasi umum di perkotaan	Kementerian Perhubungan	Persentase perjalanan penduduk menggunakan sarana kendaraan bermotor umum (public transportation modal share)	Bab 5 RPJMD	%	18 (tahun 2017)	20	22	25	28	30	30	DISHUB
Target 12.4. Pada tahun 2020 mencapai pengelolaan bahan kimia dan semua jenis limbah yang ramah lingkungan, di sepanjang siklus hidupnya, sesuai kerangka kerja internasional yang disepakati dan secara signifikan mengurangi pencemaran bahan kimia dan limbah tersebut ke udara, air, dan tanah untuk meminimalkan dampak buruk terhadap kesehatan manusia dan lingkungan.													
12.4.1.(a)	Jumlah peserta PROPER yang mencapai minimal ranking BIRU	Kementerian Lingkungan Hidup dan Kehutanan	Jumlah peserta PROPER yang mencapai minimal ranking	NA	Peserta Proper	75 (tahun 2015)	77	79	81	83	85	85	DLH
12.4.2.(a)	Jumlah limbah B3 yang terkelola dan proporsi limbah B3 yang diolah sesuai peraturan	Kementerian Lingkungan Hidup dan Kehutanan	Presentase Pelayanan Pengelolaan Limbah B3	Bab 8 RPJMD	%	- (tahun 2017)	10	-	-	-	-	-	DLH
12.5.1.(a)		Kementerian			%	11 (tahun 2017)	14	17	20	23	26	26	DLH

Source: Prepared by Nippon Koei based on the SDGs Regional Action Plan

Figure2.13 Examples of the indicators and targets specified by DKI-JKT for SDGs targets

There is also a total of 5,822 action plans to achieve SDGs indicators and targets. The action plans are divided into two, that is activities by the government and ones by non-governmental bodies groups.



<Actions implemented by the Government (extract)>

Tujuan / Target / Indikator / Program	ID Kegiatan	Kegiatan	Indikator Output	Satuan	Tahun Dasar (2017)	Target Tahunan 2018	2019	2020	2021	2022	Kondisi Akhir	Indikatif Alokasi Anggaran 5 Tahun (Rp Juta)	Sumber Pendanaan	Instansi Pelaksana
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Target Pada tahun 2030, secara substansial mengurangi produksi limbah melalui pencegahan, pengurangan, daur ulang, dan penggunaan kembali.														
Indikator 12.5.1.(a) jumlah timbulan sampah yang didaur ulang.														
Program Pengelolaan Persampahan	3987	Improvement of trash bank's capacity	Number of trash bank	unit	674	0	300	350	400	400	2124	14,991,269,861	APBD	DLH
Program on solid waste management	3988	Promotion of TPS-3R	Number of TPS-3R	unit	67	0	20	20	20	20	147	79,449,873,934	APBD	DLH
	3989	Restriction of plastic and polystyrene foam	Number of projects for restricting usage of plastic and polystyrene foam	wilayah	0	0	6	6	6	6	6	1,831,982,900	APBD	DLH
	10149	Developing and operating ITF	Number of operating ITF	Unit	0	0	0	0	4	4	4	2,896,819,829,000	APBD	DLH
	10320	Campaign for No Food Waste	Number of projects on No Food Waste	wilayah	0	0	5	5	5	5	5	887,988,600	APBD	DLH

<Actions implemented by Non-governmental organization (extract)>

Tujuan / Target / Indikator / Program	Kegiatan	Indikator Output	Satuan	Tahun Dasar (2017)	Target Tahunan 2018	2019	2020	2021	2022	Indikatif Alokasi Anggaran 5 Tahun	Sumber Pendanaan	Lokasi	Instansi Pelaksana
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
TUJUAN 12 MENJAMIN POLA PRODUKSI DAN KONSUMSI YANG BERKELANJUTAN													
Target Pada tahun 2030, secara substansial mengurangi produksi limbah melalui pencegahan, pengurangan, daur ulang, dan penggunaan kembali.													
Indikator 12.5.1.(a) jumlah timbulan sampah yang didaur ulang.													
Bank Sampah dan Usaha Bersama Simpan Pinjam	Bank Sampah		Jumlah rumah tangga nasabah bank sampah	0	102	246	694	995			Yayasan KARINA	Marunda	Platform MURIA
Bank Sampah dan Usaha Bersama Simpan Pinjam	Usaha Bersama Simpan Pinjam		Jumlah rumah tangga anggota UBSP	0	102	246	694	995			Yayasan KARINA	Marunda	Platform MURIA

Source: Prepared by Nippon Koei based on SDGs Regional Action Plan

Figure2.14 Examples of action plans for the government and non-governmental bodies

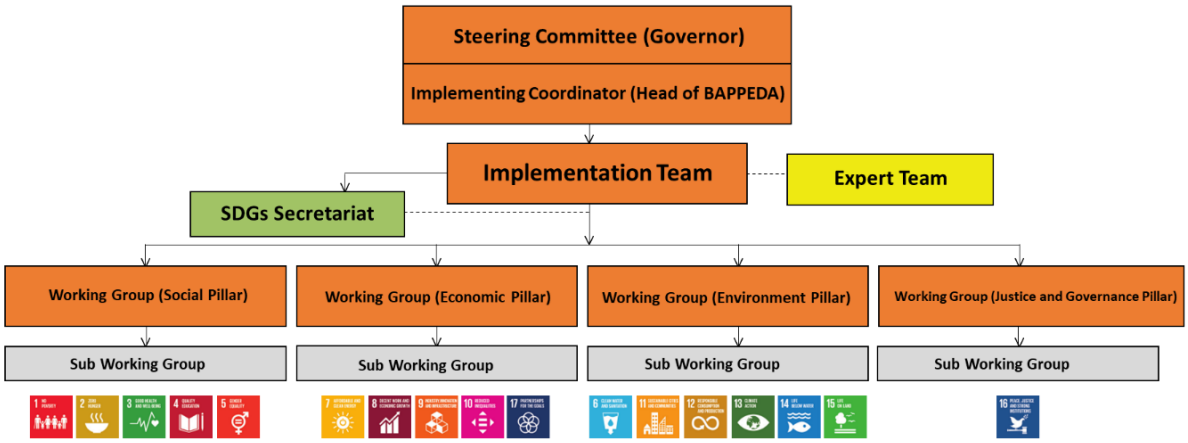
(2) Implementation structure of SDGs actions

The organization to implement DKI-JKT's SDGs Regional Action Plan consists of Steering Committee, Implementation Team, Expert Team, SDGs Secretariat and Working Groups. The Steering Committee is headed by the Governor of DKI-JKT, with the Head of BAPPEDA managing the committee's activities as an implementing coordinator. For years 2018-2022, DKI-JKT's Public Welfare Agency is appointed to represent the Implementation Team. Under the Implementation Team, the Working Groups for four pillars, "Social Pillar", "Economic Pillar", "Environmental Pillar", and "Justice and Governance Pillar", are positioned.

Each goal of SDGs is categorized to each of these four pillars. Goals concerning zero-carbon and low-carbon society (SDGs 7, 9, 11, and 13) belong to the "Environment" and "Economic" pillars.

DKI-JKT has placed SDGs Secretariat under the Implementation Team. SDGs Secretariat manage the four Working Groups, checks the plans' progress, and gives the groups advices of how to achieve SDGs.

The organizational structure of SDGs Regional Action Plan is shown below.



Source: Provided by DKI-JKT・SDGs Secretariat

Figure2.15 Structure for implementing SDGs Regional Action Plan

(3) SDGs indicators

The 253 indicators above consist of 98 social, 57 economic, 67 environmental, and 31 low and-governance indicators.

Source: DKI-JKT SDGs Secretariat

Figure2.16 The goals for each Working Group and the numbers of respective targets and indicators

Report of activities in 2019 under SDGs Regional Action Plan of DKI-JKT was published in 2020. According to the report, data of 220 (86.96%) out of 253 indicators was sufficient for evaluation but data of the rest, 33 indicators (13.04%) was not enough. The reason is difficulties to collect data of whole province such as Indicator 16.1.4 (Proportion of population that feel safe walking alone around the area they live).

82 (37.27%) out of 220 indicators with sufficient data achieved target figures and 87 indicators (39.55%) improved from previous period. On the other hand, it was found that 51 indicators (23.18%) did not reach at targets of previous period.

Source: the SDGs secretariat of DKI-JKT

Figure2.17 SDGs annual report (2019)

25 (47.17%) out of 53 indicators related to environmental sector with sufficient data achieved targets and 23 indicators improved from the previous period. The outcome of public transportation is discussed specially in the environmental sector. Extension of microbus services by Jak Lingko mentioned above and MRT being operated since 2019 led to convenience of public transportation and the increase in the number of users. It can be said that outcomes of transportation sector largely contribute to achievement of SDGs in DKI-JKT.

2.2 KAWASAKI CITY

2.2.1 Overview of Kawasaki City

Kawasaki City is a government ordinance city located in the northeast part of Kanagawa Prefecture, next to Tokyo across Tama River.

The city underpins Japan's economic growth as the core city of waterfront Keihin Industrial Zone. Kawasaki, with a history and experience on solving environmental pollutions with citizens, business operators and public services, has attracted many companies with competitive environmental technologies. In addition, the western part of the city boasts large areas of greenery including Ikuta Ryokuchi Park.

Source: Kawasaki City

Figure2.18 Map of Kawasaki City

Table2.6 Statistical data of Kawasaki City

#	Item	Statistical data
1	Area	144.35km2
2	Population	1,539,657 (as of June 1, 2020)

#	Item	Statistical data
3	Number of households	750,256 (as of June 1, 2020)
4	Gross city product (nominal)	6,158.4 billion yen (2016)

Source: Kawasaki City

In addition to activities for environmental improvement and preservation, recently Kawasaki City was appointed to be the ambassador of "RE 100 Declaration RE Action", a new framework for small and medium-scale companies, municipalities, and educational and medical institutions who do not meet the standard for joining RE100[3] (the standard of RE100 is over 10 GWh energy consumption a year) to commit to 100% renewable energy. Through the activities as the ambassador, the city is expanding renewable energy initiatives across Japan. In July 2019, as a result of experience of solving various issues together with citizens and business operators and initiatives for sustainable society were highly evaluated, Kawasaki City was selected by the Regional Revitalization Promotion Office of Cabinet Office as a "SDGs Future City [4]". Through such activities and awards, Kawasaki City has been actively promoting climate change countermeasures and SDGs.

2.2.2 Policy for climate change countermeasures of Kawasaki City

(1) Kawasaki City Basic Plan to Promote Global Warming Countermeasures

In 2010, based on Kawasaki City Ordinance for Promotion of Global Warming Countermeasures released in 2009, Kawasaki City enacted the Basic Plan to Promote Global Warming Countermeasures (hereafter "Plan 2010") to drive actions against global warming in a comprehensive and systematic manner, and to set reduction target for FY2020. Plan 2010 was revised in 2018 (hereafter "Plan 2018") to set new reduction target for FY2030, and to illustrate plans to achieve the target.

The overview of Plan 2010 and Plan 2018 is shown in Table 2.7. Plan 2018 is currently being revised in line with the declaration of 2050 Zero Carbon City and release of Kawasaki Carbon Zero Challenge 2050.

Source: Kawasaki City

Figure2.19 Basic Plan to Promote Global Warming Countermeasures

3 RE100 is international business initiative to promote 100% renewable energy consumption by companies, operated by The Climate Group and CDP. RE100 visualizes 100% renewable energy use by companies and aims at promotion of renewable energy. Influential large companies in the world are participating in RE100.

4 SDGs Future City cities and regions with high potential to achieve sustainable development and create new values, especially economic, social and environmental values are chosen from cities and regions promoting the basic and comprehensive activities based on SDGs philosophy, these. In 2019, 31 cities were newly selected (total 60 cities).

Table2.7 Overview of Plan to Promote Global Warming Countermeasures (Plan 2010 and Plan 2018)

Item	2010 Plan	2018 Plan
Period	FY2011-2020	FY 2018-2030
Basic concept	To develop a sustainable low-carbon society based on harmonization and positive cycle of the environment and economy and to preserve positive environment for the next generations.	To develop a low-carbon society with multi-benefit measures against global warming.
Basic policy	(1) To develop a social and economic system leading to reduction of GHG emissions effectively. (2) To use locally available energy resources such as renewable and unutilized energy efficiently and effectively. (3) To reduce GHG emissions by business operators, citizens and the city in their respective capacity. (4) To encourage joint activities. (5) To contribute to reduction of GHG emissions worldwide. (6) To contribute to countermeasures to heat island phenomenon.	(1) To proceed reduction of GHG emissions. (2) To implement of introduction of renewable energy and optimization of energy consumption. (3) To promote adaptation measures for climate change. (4) To contribute with environmental technologies and industries. (5) To encourage collaboration among citizens, business operators and public sector.
Reduction target	To aim at 25% reduction of GHG emissions compared with FY1990, by FY2020.	To aim at 30% reduction of GHG emissions by FY2030, compared with FY1990 (or 20% compared with FY2013).

Source: Prepared by Nippon Koei based on Kawasaki City Plan to Promote Global Warming Countermeasures

(2) Zero carbon strategy "Kawasaki Carbon Zero Challenge 2050"

On February 17, 2020, the Governor of Kawasaki City Norihiko Fukuda announced 2050 Zero Carbon City, stating that by the end of the year, the city will show a future image and a strategy toward zero carbon city. In November, "Kawasaki Carbon Zero Challenge 2050" was released as a starting point for zero carbon initiatives, which illustrates 2030 milestones (medium-term targets), basic concept, and leading activities to reduce 100% of net CO2 emission by 2050.

2030 milestone was calculated by back casting the figures required to achieve zero carbon by 2050. It includes targets from the Basic Plan (reduction of about 2.5 million tCO2 by FY2030 (26% reduction compared with FY2013) and 80%

Source: Kawasaki City

Figure2.20 Kawasaki Carbon Zero Challenge 2050

of the emissions by FY2050 compared with FY2013) and aims to reduce additional one million tCO2 in the 10 years to FY 2030.

The strategy lists images of achievements of zero carbon society in Kawasaki as shown below.

Table2.8 Images of zero carbon society in Kawasaki in 2050

Sector	Images
Private sector (households and business operations)	(1) Zero-energy buildings (shifting to Net Zero Energy Building (ZEB) and Net Zero Energy House (ZEH)) become general. (2) Power sources based on renewables are widespread, as well as local power supply and consumption by utilizing the potential of the region. (3) Realization of compact city, decarbonization of buildings and realization of urban forest by generalizing wooden buildings. (4) 100% renewable energy utilization for the city's activities and minimization of energy consumption in public facilities.
Transportation	(1) Replacement of vehicles including cars, buses, taxis and trucks with Zero Emission Vehicle (ZEV). (2) Replacement of all official cars with ZEV.
Waste	(1) Transformation of lifestyle such as to stop using single-use plastics, transformation to biomass materials, generalization of behaviors for food loss by generalizing environmentally friendly manners of citizens and companies.
Industry	(1) More companies in Kawasaki turn to decarbonization voluntarily. (2) Innovation and business model of environmental and energy sectors generated in Kawasaki lead industries inside and outside the city. (3) Promotion of renewable energy as main energy. (4) Realization of technological innovation and industrialization to contribute to zero carbon and contributions to zero-carbon lifestyle of citizens by collaborating with companies in Kawasaki. (5) Development of society based on hydrogen energy networks. (6) Generalization of sustainable finance to contribute to decarbonization.

Source: Prepared by Nippon Koei based on Kawasaki Carbon Zero Challenge 2050

The basic approach of Kawasaki City for realization of zero-carbon society is "to realize zero-carbon society by that consumer activity movement influences on the society. This is based on the role of municipality, "to encourage citizens and companies to act in environmentally friendly manner as a familiar existence in the community" and characteristics and advantages of Kawasaki City "accumulation of environmental technologies, industries and research institutes and existence of a lot of citizens and companies with high awareness on the environment".

"Consumer activity movements" means that consumers select environmentally friendly products and services and dramatically boost their needs (demand). Also, "Influencing society" means to accelerate supply of products and services for zero carbon and to develop new innovations. Furthermore, the city has set three pillars as drivers of these three cogwheels to achieve zero-carbon society by 2050.

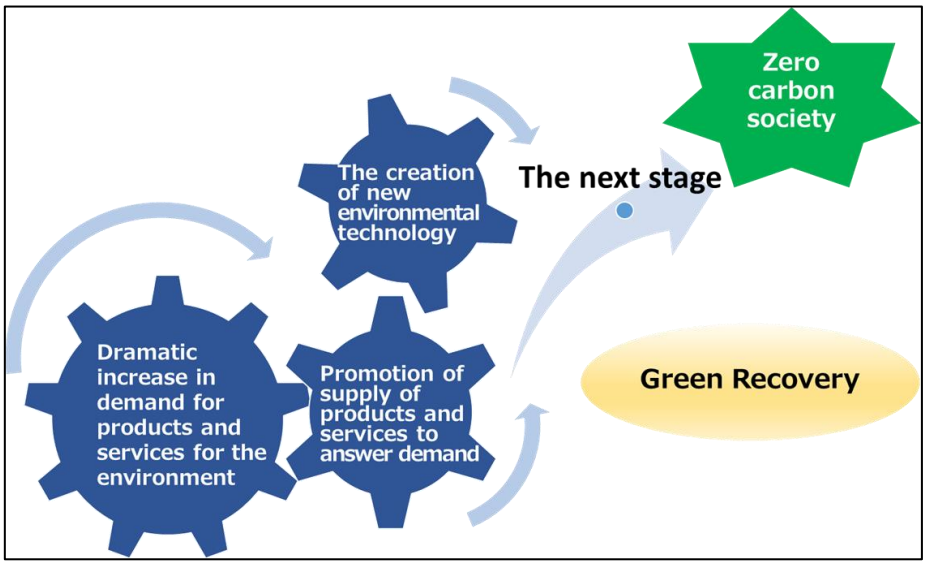


Figure2.21 Image of the approach to zero-carbon society

Source: Kawasaki Carbon Zero Challenge 2050

Table2.9 Three activity pillars and unique activities

Activity pillars	Initiatives led by the city (unique activities)
Pillar I (Participation and collaboration of various stakeholders)	Establishment of zero-carbon model district (as a familiar zero-carbon model
Pillar II (Kawasaki City takes initiative)	Introduction of renewable energy to public facilities, thoroughness of energy saving and change of awareness of officers. - To reduce 10% energy consumption in city halls by 2030, by thoroughness of energy saving. - To achieve RE100 in main public facilities such as city halls and ward offices by local generation of renewable energy and procurement of renewable energy.
Pillar III (Promotion of green innovations from Kawasaki)	To consider evaluation supports and evaluation measures for companies implementing activities for decarbonization.

Source: Prepared by Nippon Koei based on Kawasaki Carbon Zero Challenge 2050

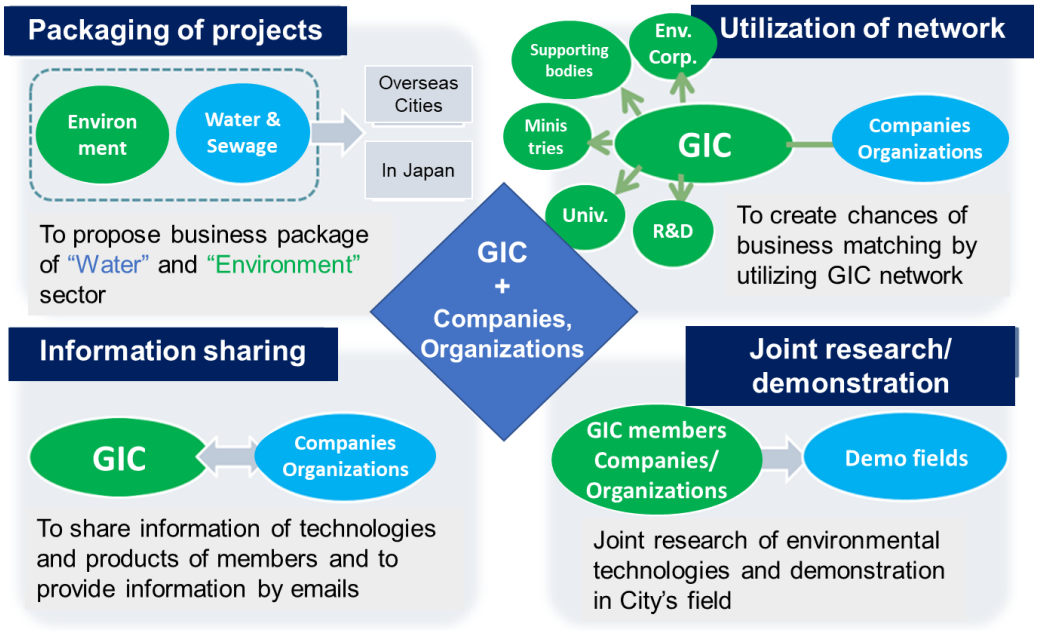
(3) Kawasaki Green Innovation Cluster (GIC)

In 2014, Kawasaki City released its Promotion Policy on Kawasaki Green Innovation. It describes basic policies and practices on how to create sustainable cities by taking an advantage of environmental technologies and industries and to develop and extend Green Innovation initiatives more. The four pillars for Green Innovation are:

I. To revitalize local economy by creating and supporting environmental technologies and industries
II. To apply competitive environmental technologies and industries to city life
III. To collaborate with diverse parties to utilize environmental technologies and industries

IV. To contribute to international communities with Kawasaki's environmental technologies and industries

In 2014, Kawasaki Green Innovation Cluster (GIC) was established as a structure to promote these four pillars. It is a network for collaboration among industries, academia, and private and public sectors to improve the environment and to promote industrial development and international contributions. GIC functions to provide "access to utilization of schemes of Kawasaki City and supporting organizations", "promotion and information sharing opportunities" and "support of business development by utilizing environmental technologies, and know-how of public services".



Source: Kawasaki City

Figure2.22 Image of activities utilizing GIC

(4) Kawasaki Eco-Town

Kawasaki City positions "Zero-Emission Concept" as the basic concept for creating a local circular economy and recognize it as the basis for revitalizing the local community. In 1997, the city developed "the Kawasaki Eco-Town Plan" targeting the entire coastal area of Kawasaki (about 2,800 hectares) and received approval from the government as the first eco-town in Japan. The target areas are working on resource circulation activities, with companies circulating and reusing resources and waste emitted in the city among themselves by taking an advantage of the high concentration of companies and environmental technologies in the coastal area. Also, resource circulation activities are carried out not only in the city, but in wider in Japan and overseas.

Shown below are the four pillars and concrete measures based on the Kawasaki Eco-Town Concept.

Table2.10 The four pillars and concrete measures based on the Kawasaki Eco-Town concept

Pillars of the activities	Measures
Promoting eco-friendly measures by each company	- To organize advanced recycling facilities - To encourage resource circulation based on characteristics and strengths of companies - To realize zero-emission of industrial waste and wastewater
Promoting eco-friendly measures with other companies	- To develop Kawasaki Zero-Emission Industrial Park - To implement joint recycling in the district
Undertaking researches for environment-based, sustainably developing districts	- To research on effective energy usage - To research on advancing Eco-Town initiatives - To vitalize the research and development industry
Documenting the achievements of the companies and districts and contributing to developing countries	- To provide study tours - To hold Kawasaki International Eco-Tech Fair

Source: Prepared by Nippon Koei based on Kawasaki City website

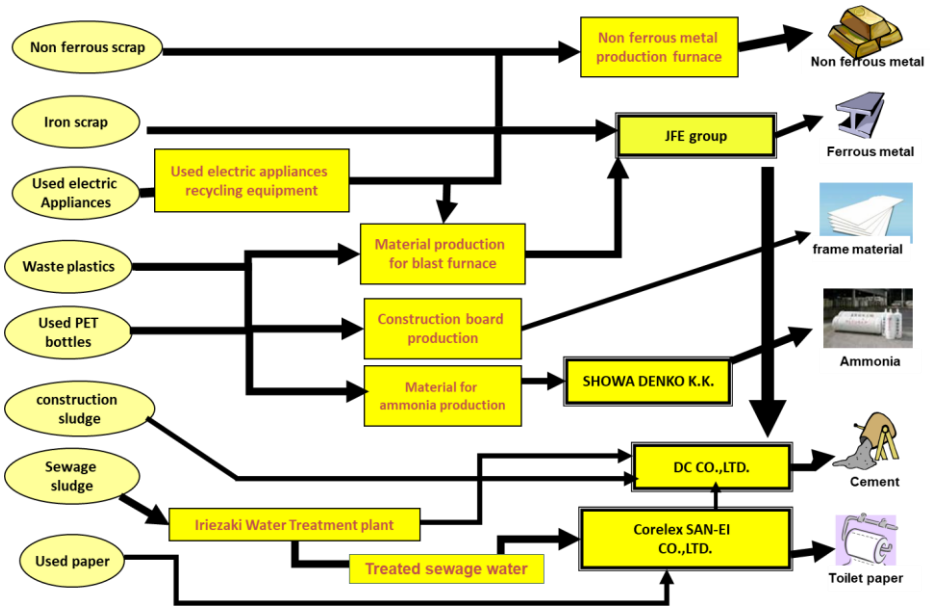
In 2002, in Kawasaki Eco-Town target areas, Kawasaki Zero-Emission Industrial Park started operation as a model facility of the Kawasaki Eco-Town Concept. It saves waste from business activities and aims to minimize environmental burden by reusing and recycling resources and utilizing circulated energy.

The concept and concrete measures of the Zero-Emission Industrial Park are as follows.

Table2.11 The concept and concrete measures of Zero-Emission Industrial Park

Concept	Measures
- To set own basic environmental policies by each company. - To set a higher goal (zero-emission) than the emission criteria. - To work together with other companies in the industrial park to make the activities more efficient. - To integrate factors of environmental burden into processes by cooperation among companies. - To realize total zero emission by linking things, difficult to be made zero emission in the industrial park, - with surrounding circulation function	- They set waste reduction targets for and actively save internally generated waste - The industrial park's union collects all paper waste from the companies to be recycled - To reuse waste heat energy from incineration plants - To reuse highly treated water from Kawasaki Iriezaki Water Treatment Center in the industrial park, as well as water treated in the plants - To recycle as much water as possible and reduce the work of waste treatment facilities - To reuse incineration fly ash as a raw material for cement - To compost organic waste from the companies and use as a fertilizer for communal green area in the industrial park - To use rainwater as fire protection water and irrigation water - To share each self-generated power among companies

Source: Prepared by Nippon Koei based on Kawasaki City website



Source: Kawasaki City

Figure2.23 Resources circulation in Kawasaki Eco-Town including Zero Emission Industrial Park

2.2.3 Activities for achieving SDGs

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 in three areas: "economy", "environment", and "social".

Table2.12 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 "environment", actions for GHG emission reduction and utilization of JCM are included, which shows the direction of this Project is same as Kawasaki City's

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

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

3.1 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" (hereafter "LoI") signed in March 2019. The LoI mentions that utilizing JCM for realization of zero carbon society, and promotion of favorable cooperation to achieve SDGs. This LoI will be valid for three years from the date of signing.

The achievements of the past city-to-city collaboration are as follows.

Table3.1 Achievements 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 Model 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	Mar. 2019	LoI on Technical Cooperation for Zero Carbon Development between DKI-JKT and Kawasaki city	On 22 Mar. 2019, Secretary of DKI-JKT and Mayor of Kawasaki city has concluded the LoI to realize Zero Carbon society in DKI-JKT. The LoI also mentions the promoting activities regarding SDGs.

#	Year	Item	Outline
7	Aug. 2019	Application and selection of JCM Model Project in FY2019	"Introduction of high efficiency boiler system to carton box Factory", which was studied in the previous City-to-City Collaboration Programme, was applied for and selected by the Ministry of the Environment (MOE) as a JCM Model Project.
8	Sep. 2019	FY2019 City-to-City Collaboration Programme for low-carbon society	Study for JCM Model Project development regarding Green Industry and Clean Energy was carried out. Also, City-to-City Collaboration activities for SDGs started.
9	Jan. 2020	Workshop for officers of DKI-JKT	Workshop for officers of DKI-JKT was held in Jakarta. Kawasaki City officers shared with DKI-JKI officers Kawasaki's public services know-how and experience on renewable energy (solar power generation, hydrogen energy generation), low-carbon city transportation (introducing EV buses) and river purification efforts.
10	Jan. 2020	Invitation to Kawasaki and study tours of facilities in Kawasaki	A DKI-JKT officer was invited to Japan to visit and study the operations of recycling facilities, EV garbage collection trucks and mega solar facilities, as well as a food waste processing plant run by a private sector business operator.

Source: Prepared by Nippon Koei

The objectives of collaboration between Kawasaki City and DKI-JKT are as follows.

1) Dissemination of energy-saving and renewable energy technologies in DKI-JKT by utilizing JCM Model Project
2) Promotion of Green Innovation by utilizing knowledges and experiences of Kawasaki City

The project aimed 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. It succeeded by utilizing superior technology in private companies and efforts of government and citizen. Currently, urban development is rapid in DKI-JKT and it has several environmental problems such as air pollution, water pollution and waste management problem. Therefore, the experience in Kawasaki City can be used to help to solve the problems in DKI-JKT.

3.2 IMPLEMENTATION APPROACH OF CITY-TO-CITY COLLABORATION

The activities by the two cities was carried out on two pillars: Approach (1) Feasibility studies for JCM Model Project; and Approach (2) City-to-City Collaboration activities. The former includes studies on development of JCM Model Project to introduce Japanese companies' decarbonizing and low-carbon technologies, especially those of GIC companies in DKI-JKI and its suburbs. The latter is to consider and implement activities which Kawasaki can provide in order to support DKI-JKT to overcome environmental issues.

Through discussions with DKI-JKT, it has been confirmed that the six sectors shown in the table below are high-priority sectors for DKI-JKT. The current situation of each sector is as follows.

Table3.2 High-priority sectors in DKI-JKT

Priority sector	Current situations
(a) Green industry	Indonesia has been introducing low-energy measures and renewable energy to industry sector facilities under the Ministry of Industry's Green Industry policy. Multiple industrial complexes have been built in the suburbs of DKI-JKT, housing many plants including those of Japanese companies. These plants have not fully introduced energy-saving technologies. Saving energy in the industry sector is essential not just in DKI-JKT, but nationwide, to reduce GHG emissions.
(b) Clean energy	Equipped with a reliable power network of PLN, the west side of Jawa, where DKI-JKT is located, sees almost no power outages, and enjoys steady power supply. Meanwhile power supply from PLN is insufficient in the Pacific Ocean islands, which are part of DKI-JKT, forcing facilities in the islands under DKI-JKT's administration to rely on power generators. From the standpoint of running and managing the facilities safely, introducing renewable energy is a matter of great interest. Indonesia's Electricity Supply Business Plan (RUPTL) states that the proportion of renewable energy facilities be improved from 12.52% in 2017 to 23% by 2020. Also, in the RPJMD (2018-2022), DKI-JKT clearly states that it will advance renewable energy introduction. Furthermore, DKI-JKT has a strong wish to introduce renewable energy in areas like remote islands. In addition to these, there is potential for renewable energy projects in DKI-JKT as Indonesia has a Feed in Tariff (FIT) system.
(c) Low-carbon city transportation	DKI-JKT is a city with one of the worst traffics in Asia, not just because of cars but the increasing number of motorbike taxis by businesses including Grab, Uber and GOJEK. As it is, the city has recently been limiting traffic in congested areas by the license plate number[5]. To ease chronic traffic, it is also evaluating improving Transjakarta operation, by introducing EV buses (making all public buses EV by 2030) and building MRT, but the heavy traffic has remained a serious issue to this day.
(d) Green Building	Thanks partly to Indonesia's rapid economic growth in recent years, DKI-JKT has become one of the most rapidly being developed cities in Southeast Asia. The central area is packed with office buildings and residential skyscrapers, whose energy consumption has become a serious issue for the city. As it is, with support from Green Building Council Indonesia (GBCI), a

[5] Limiting entry of cars to the specific parts of central Jakarta by odd-even rule, restricting entry by the last digit of the car number plate. On days whose last digit is an even number, only cars with car number plate's last digit being an even number are allowed entry.

Priority sector	Current situations
	Non-Governmental Organization (NGO) in Indonesia promoting Green Building, DKI-JKT has released a policy to promote developing energy-saving buildings. However, building owners have shown little interest in saving energy and Green Building has not yet seen many buildings built or spread.
(e) Waste management	DKI-JKT sees an average of 7,000 ton garbage a day due to the recent rapid urbanization. DKI-JKT Environment Agency is taking multiple responses, from separating recyclables to undertaking pre-disposal/recycling treatment and final processing, but it still has not established structured waste management. In addition, DKI-JKT's final waste disposal is just to bury the waste in a processing area in Bekasi, which is far from the city. The Environment Agency is showing a keen interest in Kawasaki's public services for waste management and final processing that involves citizens, including the recyclables separation and recyclables collection system (including 3R) already running in Kawasaki. With insufficient waste management being part of the problem, waste has been illegally dumped in rivers, contaminating water, and becoming a serious issue. Furthermore, companies in DKI-JKT are not equipped with purification equipment (such as septic tanks), resulting in unprocessed industrial wastewater flowing into the rivers. According to the Environment Agency, in the city's 13 rivers, the water quality is monitored only on Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). As illustrated, river purification is one of the most pressing issues for DKI-JKT, requiring appropriate management and solutions.
(f) SDGs	DKI-JKT's SDGs Action Plan was enacted in 2019, based on the details of the city's five-year plan Regional Medium-Term Development Plan (RPJMD). RPJMD is a development policy / plan of cities and provinces and is based on the National Medium-Term Development Plan. DKI-JKT's latest PJRMD targets five years from 2018 to 2022. The city's current SDGs Action Plan targets the same period, entailing activities for SDGs.

Source: Prepared by Nippon Koei

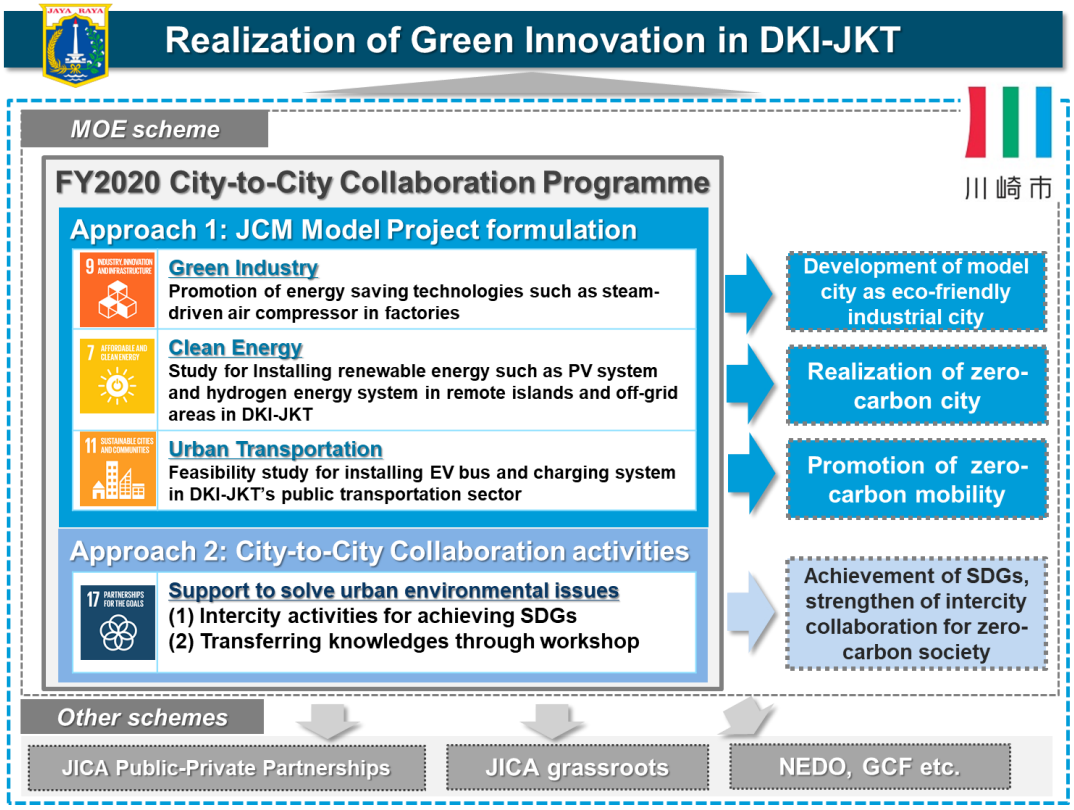
Out of the six sectors above, the following activities were organized in this fiscal year as a result of discussions between DKI-JKT and Kawasaki City. Green building was not included in activities of FY2020 since it had been confirmed that building owners' awareness of green building and interests in energy-saving technologies were still low in the past feasibility studies in this sector. Also, activities for waste management (including river purification) were implemented in case DKI-JKT requires cooperation in the Project. This is because the direction for river purification has been in the internal discussion stage of DKI-JKT as a result of meetings with DKI-JKT officials and local companies in FY2019.

Table3.3 This fiscal year's main activities

Implementation policy	Priority sector	Overview
Approach (1): Feasibility studies for JCM Model Project formulation	Green industry	Study were conducted at locations including plants in the suburbs of DKI-JKT on introducing energy-saving technologies such as steam-operated air compressors.
	Clean energy	Following the previous fiscal year, a study was conducted on introducing hydrogen energy supply systems in remote islands. Based on the study results from the previous fiscal year, the study included evaluations of collecting basic data in target islands, and evaluations of devices for hydrogen energy supply systems.
	Low-carbon city transportation	Together with PT. Transportasi Jakarta , a company run by DKI-JKT, information was collected to launch a JCM Model project on EV buses and power-charging systems from the next fiscal year onward.
Approach (2): City-to-City Collaboration activities	SDGs	Through online workshops and other measures, Kawasaki City, a SDGs Future City, shared its leading initiatives with DKI-JKT, creating opportunities for the two cities to exchange ideas and share information.

Source: Prepared by Nippon Koei

The image of City-to-City Collaboration is as follows.



Source: Prepared by Nippon Koei

Figure3.1 Image of City-to-City Collaboration

Details of approach (1) feasibility studies for JCM Model Project formulation are illustrated in Chapter 4. Overview and results of approach (2) the City-to-City Collaboration activities are explained in the next section (3.3).

3.3 RESULTS OF CITY-TO-CITY COLLABORATION ACTIVITIES

3.3.1 Overview of the activities

The details of this fiscal year's activities such as meetings and workshops with DKI-JKT are summarized in the table below.

Table3.4 Activities for City-to-City Collaboration

Activities	Date	Overview
Kick-off meeting with MOE	September 14, 2020	MOE, Kawasaki City, and Nippon Koei held a face-to-face kick-off meeting. Nippon Koei reported on the progress since pre-kick-off meeting in May and explained the study schedule. In consideration of the COVID-19 pandemic and more chances for online activities, it was agreed with MOE to amend the contract.
Presentation in Indonesia JCM webinar	September 30, 2020	In the "Webinar on implementing JCM in Indonesia: applying JCM in the COVID-19 era" hosted by MOE, GEC, Indonesia Coordinating Ministry for Economic Affairs and Indonesia JCM Secretariat, Nippon Koei gave a presentation about this project as an example of activities for JCM in Indonesia.
Kick-off meeting between DKI-JKT and Kawasaki City	November 20, 2020	33 people in total, from DKI-JKT, Kawasaki City and others attended a kick-off meeting for this project. At the meeting, Kawasaki City gave a brief summary on the city and SDGs Action Plan, and Nippon Koei outlined the current fiscal year's activities and schedule.
1st progress report meeting with MOE	December 18, 2020	MOE, Kawasaki City and Nippon Koei held the first progress report meeting online. Kawasaki City and Nippon Koei reported the progress since the kick-off meeting in September and study schedule.
Workshop for DKI-JKT officers	December 22, 2020	DKI-JKT and Kawasaki City held online workshop regarding SDGs, with a total of 60 participants from both cities. The departments in charge of SDGs of the cities presented about their plans and current activities to drive SDGs, while Kawasaki City Environmental Department outlined the Zero Carbon Strategy released in November. The cities explained their respective initiatives, followed by active discussions and questions and answers on each other's activities.
Online business seminar between GIC member companies and DKI-JKT	January 28, 2021	An online meeting was held between GIC member companies and DKI-JKT during the Kawasaki International Eco-Tech Fair (January 21-February 5). Four GIC companies joined the meeting and introduced their technologies and products to DKI-JKT representatives.
City-to-City Collaboration Seminar held by MOE	February 1, 2021	"Seminar on City-to-City Collaboration for Creating a Zero-carbon Society" was held online by MOE. A total of over 100 representatives attended the meeting from Japanese and overseas cities carrying out City-to-City Collaboration Programme, and its representative entities and partner

Activities	Date	Overview
		companies. Presentations on City-to-City Collaboration Programme and JCM Model Project trends and a panel discussion on how to execute projects in the COVID-19 pandemic.
Final report meeting with MOE	March 1, 2020	This fiscal year's activities and plans for the next fiscal year's activities were reported to MOE

Source: Prepared by Nippon Koei

3.3.2 Kick-off meeting between Kawasaki City and DKI-JKT

A kick-off meeting on the Project was held online on November 20. At the meeting, Kawasaki City gave a brief summary on Kawasaki City and SDGs Action Plan. Nippon Koei outlined activities and schedule of the Project.

DKI-JKT showed a keen interest in dissemination of EV buses and undertaking SDGs activities in the Project. DKI-JKT also requested Kawasaki City to share details about Kawasaki's urban spatial planning and public services expertise on operational management of EV buses and charging stations. The presentation materials are attached as Attachment-1.

[Overview of the meeting]

Date: November 20, 2020 (Fri), 15:45-18:00 (Japan time)
Location: Online meeting
Participants: DKI-JKT (BAPPEDA, Department of Manpower, Transmigration and Energy, Environment Agency , Transportation Agency, SDGs Secretariat)
State-own company of DKI-JKT (PT. Transportasi Jakarta, PT. Jakarta Propertindo)
Indonesia JCM Secretariat
Kawasaki City (International Economic Affairs Office)
Nippon Koei
PT. Indokoei International (Nippon Koei's local subsidiary)
2 Interpreters (Japanese-Indonesian)
Total 33 participants

Table3.5 Agenda kick-off meeting between Kawasaki City and DKI-JKT

#	Time	Program	Speaker
1	15:45-16:10	Speech from Head of BAPPEDA DKI-JKT for opening the kick-off meeting	Head of BAPPEDA, DKI-JKT
2	16:10-16:20	Speech from Kawasaki City	Manager, International Economic Affairs Office, Kawasaki City
3	16:20-16:40	Presentation on "Riding the Tide of Transformation: Jakarta's Urban Planning Post COVID-19"	Head of BAPPEDA, DKI-JKT
4	16:40-17:00	Introduction of overview of Kawasaki City	International Economic Affairs Office, Kawasaki City

#	Time	Program	Speaker
5	17:00-17:20	Explanation of FY2020 City-to-City Collaboration project between DKI-JKT and Kawasaki City	Nippon Koei
6	17:20-17:50	Discussion	---
7	17:50-17:55	Closing remarks	Head of BAPPEDA, DKI-JKT
8	17:55-18:00	Closing remarks	Manager, International Economic Affairs Office, Kawasaki City

Source: Prepared by Nippon Koei

Speech by Kawasaki City

Participants from Kawasaki City

Closing remarks by Head of BAPPEDA

Participants of the online meeting

3.3.3 Online workshop on SDGs for DKI-JKT officers

DKI-JKT and Kawasaki City organized an online workshop regarding SDGs. DKI-JKT SDGs Secretariat explained the city's SDGs Action Plan and current status. Also, Kawasaki City General Affairs and Planning Bureau presented the outline of SDGs Future City, comprehensive policy for economic, social and environmental initiatives, and results of the activities so far (including hydrogen energy uses, introducing electric garbage collection vehicles, and developing Kawasaki City SDGs Registration and Certification System). Kawasaki City Environmental Department also gave a brief summary of the Zero Carbon Strategy "Kawasaki Carbon Zero Challenge 2050", developed in November. Presentation materials of this workshop are attached as Attachment 2.

[Overview of the meeting]

Date: December 22, 2020 (Tue), 12:00-14:00 (Japan time)
Location: Online meeting
Participants: DKI-JKT (BAPPEDA, SDGs Secretariat, Environment Agency, Department of Manpower, and Transmigration and Energy, and others)
Indonesia JCM Secretariat
Kawasaki City (International Economic Affairs Office, General Affairs and Planning Bureau, Environmental Department)
Nippon Koei
PT. Indokoei International (Nippon Koei's local subsidiary)
2 interpreters (Japanese – Indonesian)

Table3.6 Agenda of the workshop for DKI-JKT officers

#	Time	Program	Speaker
1	12:00-12:10	Opening Remarks (1)	BAPPEDA, DKI-JKT
2	12:10-12:20	Opening Remarks (2)	Manager, International Economic Affairs Office, Kawasaki City
3	12:20-12:35	Introduction of actions for achieving SDGs	SDGs Secretariat, DKI-JKT
4	12:35-12:50	Introduction of activities as "SDGs future city"	General Affairs and Planning Bureau, Kawasaki City
5	12:50-13:05	Q&A	---
6	13:05-13:20	Introduction of Zero Carbon Strategy in Kawasaki City	Environmental Dept. Kawasaki City
7	13:20-13:35	Q&A	---
8	13:35-13:50	Discussion	---
9	13:50-13:55	Closing remarks	BAPPEDA, DKI-JKT
10	13:55-14:00	Closing remarks	Manager, International Economic Affairs Office, Kawasaki City

Source: Prepared by Nippon Koei

DKI-JKT asked many questions on Kawasaki City's activities, including the issues for realization of zero carbon city, how to involve citizens, companies and other stakeholders to achieve SDGs, and whether there are penalties and rewards to companies working for zero carbon . Main discussions in Q&A sessions are as follows.

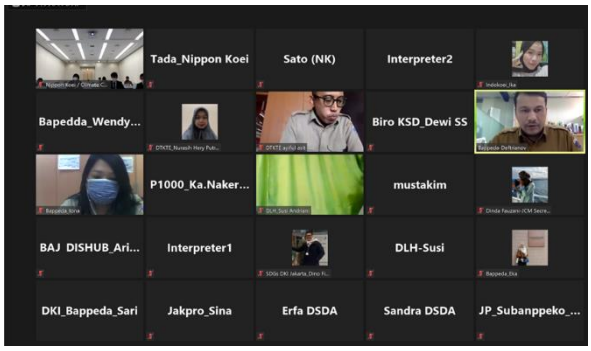
Table3.7 Q&A in the workshop for DKI-JKT officers

#	Question	Answer
1	How Kawasaki City has been involving stakeholders such as companies and citizens with activities for achievement of SDGs? (SDGs Secretariat, DKI-	To implement activities for SDGs, it is essential to collaborate with various stakeholders such as citizens, citizen groups and companies and it is impossible. The role of the municipality is to carry out Goal 17 "Partnerships for Goals" well. While large companies in Japan have actively been implementing

#	Question	Answer
	JKT)	activities for SGDs, small-/medium-scale companies in Kawasaki has not been familiar with SDGs yet. Kawasaki City has been recommending such companies registering for SDGs registration and certificate system "Kawasaki SDGs Partner" so that Kawasaki City could provide information leading to understandings on SDGs and required activities. Also, Kawasaki City encourages registered companies to participate in events for information sharing regarding SDGs. (Kawasaki City)
2	What is a current issue for Kawasaki City to realize zero carbon society? (Environment Agency, DKI-JKT)	At first, how to change behaviors of citizens is an issue. Then it is important to develop society, which can supply services properly and can make innovations when demands of citizens generates. It is possible to realize zero carbon society only when such situations have been achieved. (Kawasaki City)
3	Is Carbon trading carried out in Kawasaki City? (Indonesia JCM Secretariat)	There is no system like Cap & Trade for companies in Kawasaki. However, we would like to establish a system to support companies, who are implementing activities for realization of zero-carbon society. By introducing evaluation system for companies. We think the system should evaluate not only activities in Kawasaki but those in overseas. (Kawasaki City)
4	Are there rewards and/or penalties for activities of companies for climate change mitigation and adaptation set in Kawasaki? (Environment Agency, DKI-JKT)	There is no penalty. Damages caused by recent typhoons were huge, so more companies have an awareness of climate change and started activities for countermeasures. Kawasaki City would like to develop a system to support such companies. (Kawasaki City)
5	How much hydrogen energy is being utilized in Kawasaki City at present? (BAPPEDA)	Although utilization of hydrogen energy is highly expected, it is still in demonstration phase at present. The hotel in Kawasaki introduced in the presentation also utilized a subsidy from MOE for installation of equipment. Approximately 30% of total electricity consumption in the hotel is covered by hydrogen energy. Hydrogen is costly and this problem cannot be solved without increase of demands. At present, the central government carries out consideration for promotion of hydrogen energy. There are many research institutes in Kawasaki, mainly in the bay area and various demonstration on hydrogen is being implemented there. Kawasaki City is currently positioned as model area for hydrogen energy by the Government and installs facilities by utilizing national subsidies rather than Kawasaki City itself secures budgets for installation of hydrogen energy. (Kawasaki City)
6	Please tell us how to support private companies for promotion of renewable energy. (Department of Manpower, and Transmigration and Energy, DKI-JKT)	The Japanese Government has a subsidiary scheme to installation cost of Photovoltaics (PV) and batteries. Kawasaki City supporting companies by adding subsidies on national ones.

Source: Prepared by Nippon Koei

The workshop



Participants of the workshop

3.3.4 Online business seminar between GIC members and DKI-JKT

An online business seminar was held between GIC member companies and DKI-JKT on January 28, 2021, during the 13th Kawasaki International Eco-Tech Fair (January 21-February 5, 2021).

In the meeting, Kawasaki City International Economic Affairs Office gave a brief summary of the Kawasaki International Eco-Tech Fair and how to visit the fair to encourage participants from DKI-JKT to visit the Fair. GIC companies, Japan Thread Co., Ltd., MT Aqua Polymer, Inc., CSD Co., Ltd., and Sinwa Corporation presented on their respective technologies and products, followed by questions and answers from DKI-JKT participants and discussions about how the technologies could be applied in DKI-JKT. Presentation materials of this seminar is attached as Attachment 3.

[Overview of the meeting]

Date:	January 28, 2021 (Thu), 12:00-14:00 (JPT)
Location:	Online meeting
Participants:	DKI-JKT (BAPPEDA, Environment Agency, Department of Manpower, Transmigration and Energy, SDGs Secretariat, and others) Indonesia JCM Secretariat Kawasaki City (International Economic Affairs Office) GIC member companies: Japan Thread Co., Ltd., MT Aqua Polymer, Inc., CSD Co., Ltd., Sinwa Corporation Tepia Corporation Japan (GIC administrative office) Convention Linkage, Inc. (Kawasaki International Eco-Tech Fair's administrative office) Nippon Koei 2 interpreters (Japanese - Indonesian) Total: approximately 90 participants

Table3.8 Agenda of online business seminar between GIC members and DKI-JKT

♯	Time	Program	Speaker
1	12:00-12:05	Opening remark	Manager of International Economic Affairs Office, Kawasaki City
2	12:05-12:10	Opening remark	Head of BAPPEDA, DKI-JKT
3	12:10-12:20	Explanation of Kawasaki International Eco-Tech Fair	Assistant Manager of International Economic Affairs Office Kawasaki City
4	12:20-13:40	Presentation from 4 companies and Q&A (5min PR and 15 min Q&A for each company) 12:20-12:40 Japan Thread Co., Ltd. 12:40-13:00 MT Aqua Polymer, Inc. 13:00-13:20 CSD Co., Ltd. 13:20-13:40 Sinwa Corporation	Kawasaki GIC member companies
5	13:40-13:45	Closing remarks	Manager of International Economic Affairs Office, Kawasaki City
6	13:45-13:50	Closing remarks	Head of BAPPEDA, DKI-JKT

Source: Prepared by Nippon Koei

Table3.9 Q&A in the seminar between GIC members and DKI-JKT

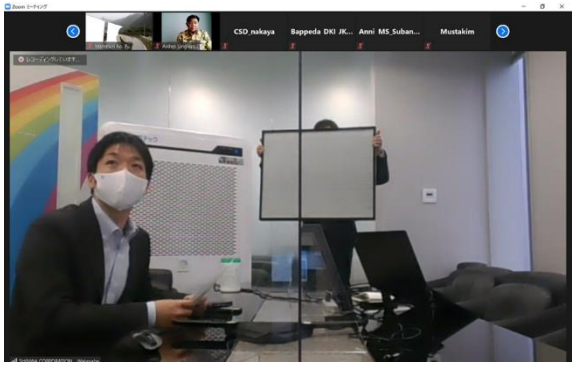
1. Japan Thread: Introduction of inorganic flocculants (SUMI NAX)	
Question	*Answer*
Can SUMI-NAX be effective for only mud? (SDGs Secretariat, DKI-JKT)	SUMI-NAX can be used for flocculation of not only mud but also toxic substances such as wastewater from factories. (Japan Thread)
2. MT AquaPolymer: Introduction of polymer flocculants	
Question	*Answer*
Is it possible to utilize the introduced polymer flocculants for river purification? (Indonesia JCM Secretariat)	Generally, the polymer flocculants are used for sewage. To utilize polymer flocculants for river rehabilitation, special construction method needs to be considered. (MT AquaPolymer)
In DKI-JKT, what kind of measures are used for treatment of sewage. (MT AquaPolymer)	Biological treatment is being adopted and flocculants (Poly Aluminum Chloride, PAC) are being used for high quality water treatment such as drinking water. (Water Resources Agency, DKI-JKT)
3. CSD: Environmental creative solutions of CSD (Energy Management)	
Question	*Answer*
What kind of source of energy is being used for energy controlled by energy management system? Sewage sludge can be energy source? (Water Resources Agency, DKI-JKT)	Photovoltaic, wind farm, biomass and battery has been used as energy sources. Sewage sludge can be applicable but generally not used in Japan. In Japan, wood chip is the most popular as biomass fuel. (CSD)

How large is the scale of micro-grid? (Water Resources Agency, DKI-JKT)	2MW in average. When disaster occurs, electricity for 1,000 people can be supplied. (CSD)
4. Shinwa Corporation: Introduction of gas turbine filter and virus guard filter	
Question	*Answer*
What kind of material is used for the gas turbine filter? Also please tell us lifetime and OM cost. (Water Resources Agency, DKI-JKT)	The filter is made of non-woven faber and glass faber Lifetime depends on the environment, but as an initial filter, lifetime is about one year and as a secondary or tertiary filter, 2 or 3 years. Initial cost is doubled price of conventional filter, but since the efficiency of power generation improve, income increases drastically. In case of demonstration in Malaysia, payback period was 0.5 year, and cost benefit was four times higher than conventional filter. (Shinwa Corporation)
How to dispose the gas turbine filter? (Water Resources Agency, DKI-JKT)	The filter is disposed as industrial waste same as conventional filter. (Shinwa Corporation)
How effective is the virus guard filter? (Water Resources Agency, DKI-JKT)	99.99% of virus collected by the filter is extinguished within 30 mins. (Shinwa Corporation)
Is it possible to integrate the virus guard filter into HVAC of buildings? (Water Resources Agency, DKI-JKT)	Yes. (Shinwa Corporation)

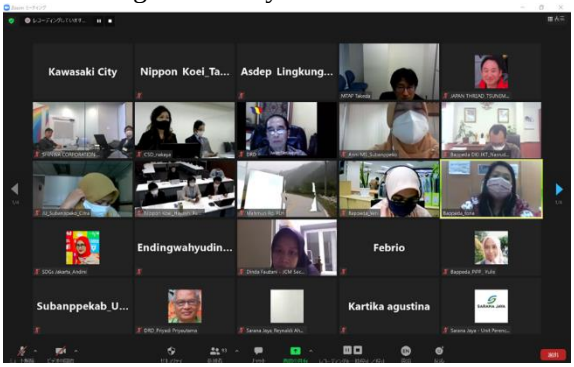
Source: Prepared by Nippon Koei

A scene from the online business seminar

Closing remarks by Head of BAPEDDA



Presentation by Sinwa Corporation



Online meeting participants

3.3.5 The City-to-City Collaboration seminar held by MOE

On February 1, 2021, MOE organized "Seminar on City-to-City Collaboration for Creating a Zero-carbon Society" online, with over 100 participants from Japanese and overseas cities carrying out City-to-City Collaboration Programme, and its representative entities and partner companies

After the organizer gave an opening speech, International Cooperation and Sustainable Infrastructure Office of MOE, Office of Market Mechanisms of MOE, and Asian Development Bank gave presentations entitled "Overview of support menus for development of zero carbon society", on developments and trends of City-to-City Collaboration Programme, JCM Model Project, and Japan Fund for the Joint Crediting Mechanism. In the following panel discussion, City of Kitakyushu, Oriental Consultants Co., Ltd. and Nippon Koei discussed how to carry out the City-to-City Collaboration Programme during COVID-19 pandemic, and on the approaches and means required for overseas business development.

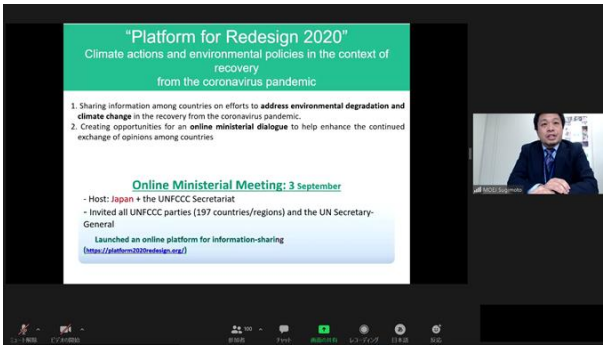
Principal Deputy Director of International Cooperation and Sustainable Infrastructure Office of MOE made a closing speech, saying that Japan will enhance its alliances and support the new needs arising from green recovery activities, and how it is important for Japan and other countries to share each other's experiences.

The overview of the seminar is shown in the table below. And, presentation materials of this seminar are attached as Attachment 4.

Table3.10 Outline of the City-to-City Collaboration seminar

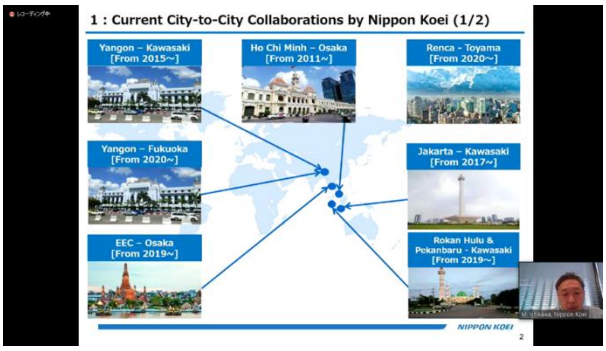
#	Date & Time	Contents	Participants (viewers)
1	January 27 (Wed) – February 3 (Wed)	1. Introduction of the 20 collaboration projects for FY2020 ■On-demand video viewing	Project members & Public (registered people only)
2	February 1 (Mon), 14:00-16:00	2. Closed online seminar (Zoom meeting) ■Information sharing on the Japanese government support and open call for the next fiscal year ■[Panel discussion] How can we proceed projects in the corona era?	Project members only

Source: Quoted from a material created by IGES

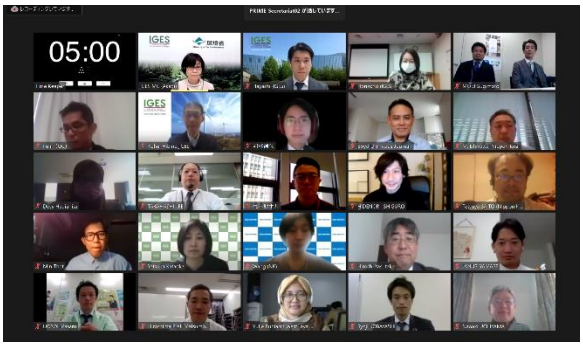


Presentation by MOE

Panel discussion



Presentation by Nippon Koei



Participants in the seminar

CHAPTER 4 FEASIBILITY STUDY FOR JCM MODEL PROJECT FORMULATION

4.1 STUDY FOR ENERGY SAVING IN INDUSTRY SECTOR

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 sufficient 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 and FY2019. 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 FY2020.

Feasibility study in FY2020 targeted particulate air filter for gas turbine and steam-driven air compressor. These are new energy-saving technologies which have not been adopted in JCM Model Projects. Carrying out project formulation with these new technologies and widening targeted business sectors lead to contributions to promotion of green industry further.

Table4.1 Study items for energy saving in industrial sector

#	Study items	Overview
1	Consideration of GHG reduction effect	GHG emission reduction effects of installation of particulate air filter for gas turbine and steam-driven air compressor were considered.
2	Confirmation of applicability for JCM Model Project	Interview to the Office of Market Mechanisms of MOE was implemented to confirm applicability of particulate air filter for gas turbine for JCM Model Project
3	Selection of candidate partner company	Search of candidate companies to install energy-saving technologies was carried out by handing out questionnaires to factories in DKI-JKT and suburb.

Source: Prepared by Nippon Koei

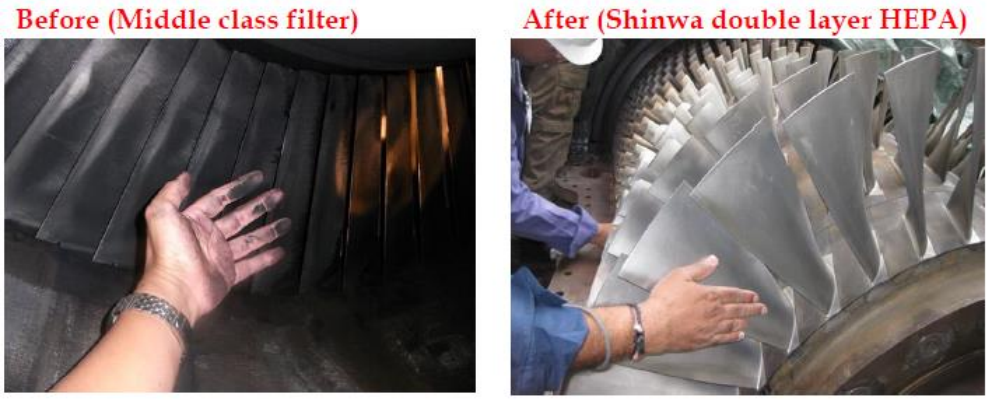
4.1.1 Technology to be installed (High-efficiency particulate air filter)

Feasibility study on installation of high-efficiency particulate air filter for gas turbine manufactured by Shinwa Corporation to a gas turbine facility of a thermal power plant was implemented. Particulate air filter for gas turbine is used to remove dust and particles in the air when taking in air to gas turbine facility. Especially filter with high filtering efficiency is called High-Efficiency Particulate Air Filter (HEPA). HEPA of Shinwa Corporation can efficiently remove particles in the air with 95% filtering efficiency.

Source: Shinwa Corporation

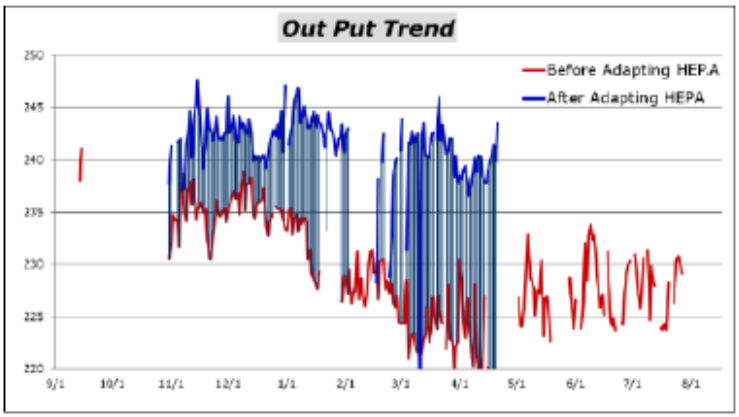
Figure4.1 HEPA of Shinwa Corporation

Also, when dust in the air is coated on gas turbine, heat rate of the facility declines. However, by installation of filter with high filtering efficiency and cleaning air taken in a facility, decline of heat rate can be prevented. Thus, installation of HEPA can contribute to energy saving and GHG emission reduction in gas turbine system.



Source: Shinwa Corporation

Figure4.2 Comparison of before and after installation of HEPAs of Shinwa Corporation



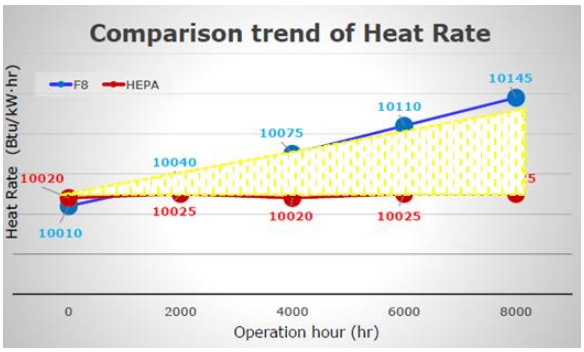
Source: Shinwa Corporation

Figure4.3 Power generation before and after installation of HEPA of Shinwa Corporation

4.1.2 Consideration of GHG reduction effect of HEPA

As mentioned above, HEPA of Shinwa Corporation is able to reduce fuel consumption by preventing heat rate of power generation facility from declining.

In case of installation of general filter, heat rate decreases by approximately 1% in one year (Operation hour: 8,000h). On the other hand, in case of installation of HEPA of Shinwa Corporation, the heat rate does not change almost, as illustrated in Figure4.4.



Source: Shinwa Corporation

Figure4.4 Heat rate before and after installation of HEPA of Shinwa Corporation

Therefore, calculation of energy saving and GHG emission reduction was carried out by considering the difference of heat rate change, that is, the area of yellow triangle circled by blue line (general filter) and red line (HEPA) in Figure4.4 as reduction of fuel consumption.

The result of the calculation is as follows.

Table4.2 Assumed GHG reduction by installation of HEPA

#	Item	Figure	Unit	Remarks
a	Output of gas turbine	245	MWh	Given condition
b	Heat rate	10	MMBtu/MWh	Given condition
c	Operation hour	8,000	hour/year	Given condition
d	Rate of heat rate decrease of normal filter	1	%/year	From study by Shinwa Corp.
e	Reduction of fuel consumption (MMBtu)	98,000	MMBtu/year	= a×b×c×d×1/2 (area of the yellow triangle)
f	Reduction of fuel consumption (kJ)	103,396	GJ/year	= e×1.055
g	Emission factor	0.0495	tCO2/GJ	LNG
h	CO2 emission reduction	5,113	tCO2/year	= f×g

Source: Prepared by Nippon Koei

4.1.3 Confirmation of applicability of HEPA for JCM Model Project

In order to confirm applicability of HEPA for JCM Model Project, the interview to the Office of Market Mechanisms of MOE was implemented. It was found that MOE cannot subsidizes the project for installation of technologies to thermal power plants as their direction.

Main interview results are as follows.

Table4.3 Results of interview to the Office of Market Mechanisms of MOE

#	Question (Nippon Koei)	Answer (Office of Market Mechanisms of MOE)
1)	Technologies, which contribute to reduction of fuel consumption and GHG emission reduction with assuming decline of heat rate of gas turbine, can be applicable for JCM Model Project?	Technology, which can prevent heat rate decline, can be applicable if the energy-saving effect can be proved. However, MOE cannot support projects possible to be recognized as encouragement of thermal power generation.
2)	Can gas fired power be acceptable?	As a result of internal discussion of MOE, gas fired power generation is also out of support.

Source: Prepared by Nippon Koei

Project formulation of installation of HEPA, as JCM Model Project was given up in consideration of the answers from MOE. However, sufficient energy-saving potential of HEPA of Shinwa Corporation was shown through the calculation, thus, it was decided to change the direction and aim at project formulation by B to B or other schemes. As the first activity, Shinwa Corporation participated in "Online Business Seminar between GIC members and DKI-JKT" and had a presentation about HEPA (refer to Chapter 3).

4.1.4 Technology to be installed (Steam-driven air compressor)

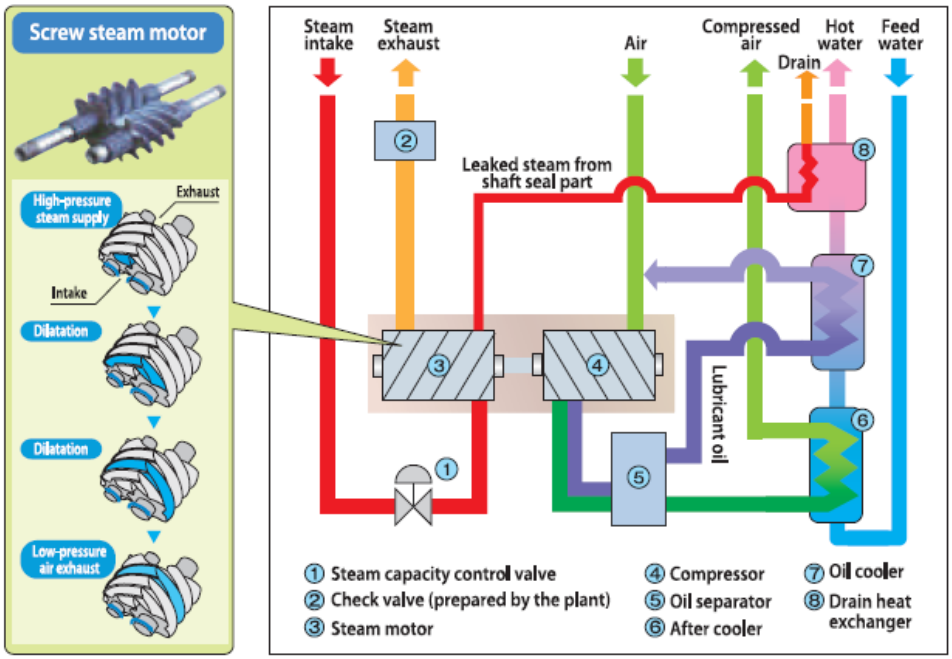
In general, it is said that 20 % of total electricity consumption of a factory is used for air compressor. However, the target technology of the feasibility study, steam-driven air compressor manufactured by Miura enables producing compressed air by taking in decompressed steam and rotating screws with the expansion energy, which can lead to huge reduction of electricity cost and peak cut of electricity power load.

Source: Miura

Figure4.5 Steam-driven air compressor of Miura

In addition, original heat of compression recovery unit recovers the compression heat generated when compressing air and enable the heat to be used to preheat boiler feed water, which realizes huge cut of running cost ad CO2 reduction in combination with steam boiler system.

To date, this technology has been installed in about 200 cases in Japan and its performance has been highly evaluated with Chairman's award of Japan Machinery Foundation as a great energy-saving technology and judging committee's special award in Japan Industrial Technology Award.



Source: Miura

Figure4.6 Internal flow of steam-driven air compressor

4.1.5 Consideration of GHG reduction effect of steam-driven air compressor

GHG reduction potential of steam-driven air compressor was considered. Installation experiences of Miura shows that 90% of electricity consumption can be cut by replacing general electricity-driven air compressor with steam-driven air compressor. Calculation of GHG reduction was carried out by using the past case of installation of one steam-driven air compressor (Compressor input: 75 kW, Rated delivered air quantity: 13.1 m3/min) to factory.

The result of calculation is as follows.

Table4.4 Assumed GHG reduction by steam-driven air compressor

#	Contents	Figure	Unit	Remarks
a	Electricity consumption (Reference)	511,330	kWh/year	Electric air compressor (Output 75kW)
b	Emission factor	0.877	tCO2/MWh	JCM Model Project (Energy saving, Jamali)
c	CO2 emission (Reference)	448.4	tCO2/year	=a x b
d	CO2 emission (Steam-driven air compressor)	44.8	tCO2/year	= c (1-0.9) (90% reduction from electric air compressor)
e	Annual GHG reduction	403	tCO2/year	= c - d

Source: Prepared by Nippon Koei based on information provided by Miura

4.1.6 Selection of candidate company to install steam-driven air compressor

As feasibility study on energy saving in industrial sector, questionnaires were handed out to 20 local companies in sectors with many experiences on installation of steam-driven air compressor (Food: 5, Chemicals: 3, Interior material: 4), so as to collect information of candidates to install the technology. Candidate companies and status of questionnaire collection are sorted out below.

Table4.5 Information of candidate companies

Name	Sector	Status of questionnaire collection
Company A	Food	Project team is waiting for their answer.
Company B	Food	They are sharing the questionnaire with their technician in charge.
Company C	Food	Project team is waiting for their answer.
Company D	Chemicals	Project team is waiting for their answer.
Company E	Chemicals	They are sharing the questionnaire with their technician in charge.
Company F	Chemicals	They are sharing the questionnaire with their technician in charge.
Company G	Interior material	They don’t have a plan for installing energy-saving technologies
Company H	Interior material	Technician in charge is checking the questionnaire

Source: Prepared by Nippon Koei

Due to COVID-19 pandemic, it took long time to confirm contact measures to each company and to find technician in charge and enough answers could not been collected. The contact to companies, who have not provided their answers, will be continued in order to confirm their interests in energy-saving technologies and JCM Model Project.

4.2 STUDY FOR INSTALLATION OF CLEAN ENERGY IN REMOTE ISLANDS

4.2.1 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. RUPTL specifies that total power generation capacity rate of renewable energy will be increased from 12.52% as of 2017 to 23.2% by 2028.

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.

According to the request from DKI-JKT, Toshiba Energy Systems & Solutions (hereafter "Toshiba ESS"), which is a company located in Kawasaki City, has started to implement the feasibility study on installing renewable energy into the Pulau Seribu for JCM Model Project formulation since FY2019. Especially, this feasibility study has been focusing on hydrogen energy supply system. In FY2020, collecting more detail data from DKI-JKT based on the study result in FY2019 was conducted.

Toshiba ESS has concluded a memorandum of understanding (MOU) in August 2018 with Agency for the Assessment and Application of Technology (BPPT), an Indonesian government organization, on the promotion of an autonomous off-grid hydrogen energy system 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 and the optimum system specifications in Indonesia, and aim to install the first system by 2022. Furthermore, Toshiba ESS had implemented "Study for project development on installing a hydrogen-based autonomous energy supply system into remote islands in Indonesia and Philippines" as Ministry of Economy, Trade and Industry's "FY2018 Study on business opportunity of High-quality Energy Infrastructure to Overseas".

The feasibility study for JCM Model Project formulation in FY 2019 implemented data collection about Pulau Seribu with support from DKI-JKT. As the result of the study, Sebira Island was selected as a candidate island for installing the autonomous off-grid hydrogen energy system because the island is not connected to PLN's grid and utilizes electricity supplied by diesel generators.

In FY2020, data of Sebira Island such as electricity demand and operating rate of existing diesel generators was collected, and a system design was considered on the basis of analyzing the data.

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

Table4.6 Study items for installation of clean energy

#	Study Items	Overview
1	Data collection of the candidate island	Electricity demand, operation status of existing diesel generators, weather, topographic information etc. of Sebira Island were collected cooperated with Department of Manpower, Transmigration and Energy of DKI-JKT.
2	Consideration of system design regarding hydrogen energy supply system	Based on the data from DKI-JKT, system design, layout, and annual production of electricity were considered.
3	Support for installing clean energy by the City-to-City Collaboration	During the workshop for DKI-JKT officers which was held in December 2020, Kawasaki City officers introduced their actions for promoting hydrogen energy supply system. The details are described in Chapter 3.

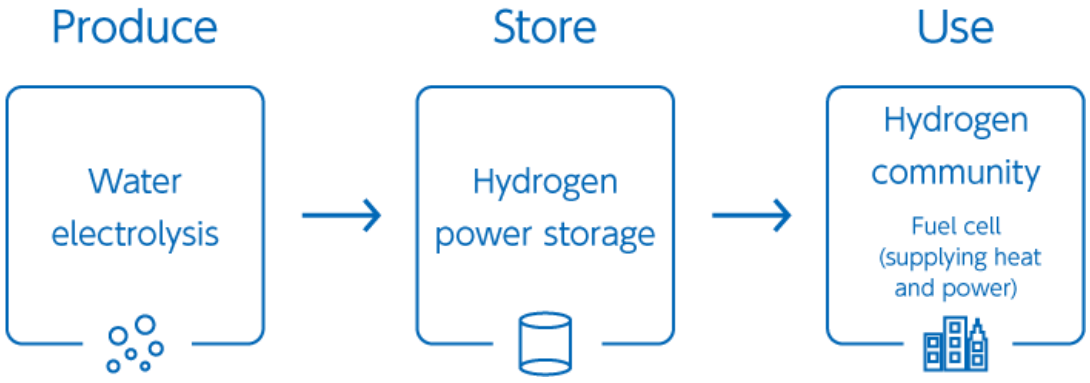
Source: Nippon Koei Co., Ltd.

4.2.2 Technology to be installed (Hydrogen Energy Supply System)

In the feasibility study, "H2One™ Off-grid solution (hereafter "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 islands.

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.

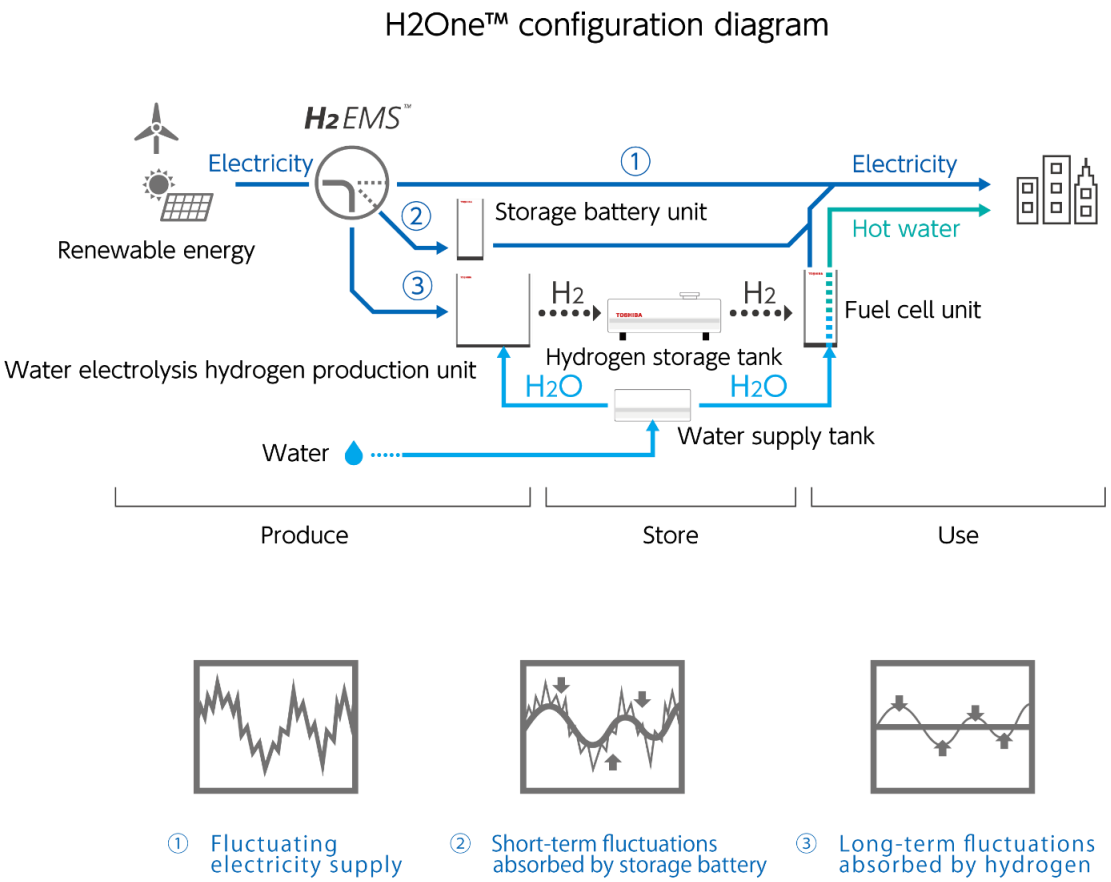
H2One provides a one-stop solution to three hydrogen processes. Specifically, H2One uses renewable energy to "produce" hydrogen, which can be "stored" for later "use" with Fuel Cell technology. "H2One" helps maintain a stable energy supply both in normal times and at times of emergency.



Source: Website of Toshiba Energy Systems & Solutions Corporation

Figure4.7 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 Corporation

Figure4.8 H2One configuration diagram

The outline of each systems are as follows.

Table4.7 Outline of 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.

#	System	Outline
(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.

Table4.8 Feature of H2One

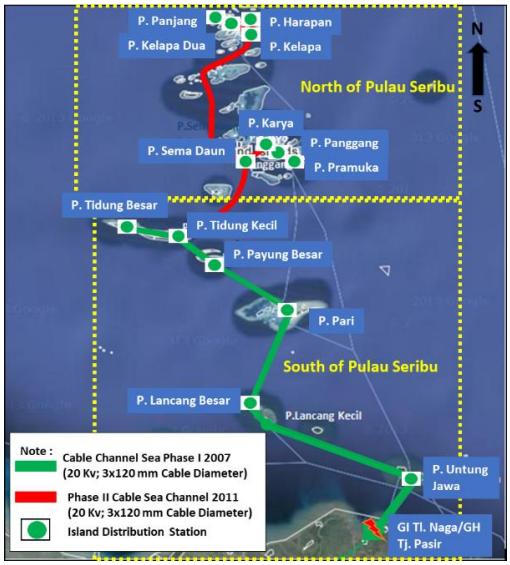
Feature	Outline
Stable energy	Renewable energy such as solar power is affected to climate conditions, and usually its power generation is very fluctuant. However, H2EMS™, hydrogen generation, hydrogen production, and rechargeable battery are applied to H2One, and they can realize stable energy supply 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 Corporation

4.2.3 Data collection about target island and result of its analysis

Based on the result of the study in FY2019, it was confirmed that 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.

At the beginning of the study in FY2019, the Energy Agency nominated 6 islands as potential islands for installing hydrogen energy supply system, which are Sebira、Harapan、Pramuka、TidungBesar、LanchangBesar、Untung Jawa. However, it is confirmed that only Sebira Islands are not connected to the PLN's grid and the electricity in the island is supplied by diesel power generation system. Because an off-grid area is the best site for H2One, so Sebira Islands were selected as a candidate site for the JCM Model Project.



Source: Department of Manpower, Transmigration and Energy of DKI-JKT with minor revision by Nippon Koei

Figure4.9 Current situation of undersea cable in Pulau Seribu

Source: Department of Manpower, Transmigration and Energy of DKI-JKT with minor revision by Nippon Koei

Figure4.10 Location of the Sebira Island

For considering system design of H2One, collecting more detail data on candidate site, Sebira Island, was conducted in FY2020. The data received by Department of Manpower, Transmigration and Energy of DKI-JKT and other relevant agencies is as follows.

Table4.9 Basic information of Sebira Island

#	Item	Data
1. Electricity demand data		
1-1.	Peak demand	70 kW
1-2.	Hourly demand fluctuation	Hourly demand data is not recorded.
2. Existing power generator		
2-1.	Number of generators	3 units
2-2.	Type of fuel	Pertamina Dex (diesel oil)
2-3.	Power generation capacity	Generator (1): 100 kW (125 kVA with power factor 0.8) Generator (2): 100 kW (125 kVA with power factor 0.8) Generator (3): 200 kW (250 kVA with power factor 0.8)
2-4.	Operation rate (hours/ year)	Generator (1): 4,380 hours/year Generator (2): 4,380 hours/year Generator (3): backup
2-5.	Operation rate (hours/ day)	Generator (1): 12 hours/day Generator (2): 12 hours/day Generator (3): backup
2-6.	Electricity generation cost	1,719,774.003 IDR/year
2-7.	Annual fuel consumption	144,000 liter/year
2-8.	Fuel cost	2,367,310,800 IDR/year
3. Information of Solar Power Plant installed by PLN		
3-1.	Generation capacity	400 kWp

#	Item	Data
3-2.	Manufacturers of PV panel	Sky Energy
3-3.	Specification of PV panel	Model Type ST72M-330VA, Maximum Power 330VA, Power Tolerance ±3%, Maximum power voltage 38,6V, Maximum power current 8,6A, open circuit voltage 45,4V, short circuit current 9,1Aweight 25,8kg, temperature -40C-+85C
3-4.	Manufacturers of inverter	SMA
3-5.	Specification of PV inverter	Sunny Island Model SI8.0H-12 Serial No. 300656072 Sunny Tripower Model STP 50-40 Serial No. 3003861414
3-6.	Expected annual electricity generation	367 MWh (estimated by Toshiba ESS)

Sourse: Prepared by Nippon Koei based on the data from DKI-JKT

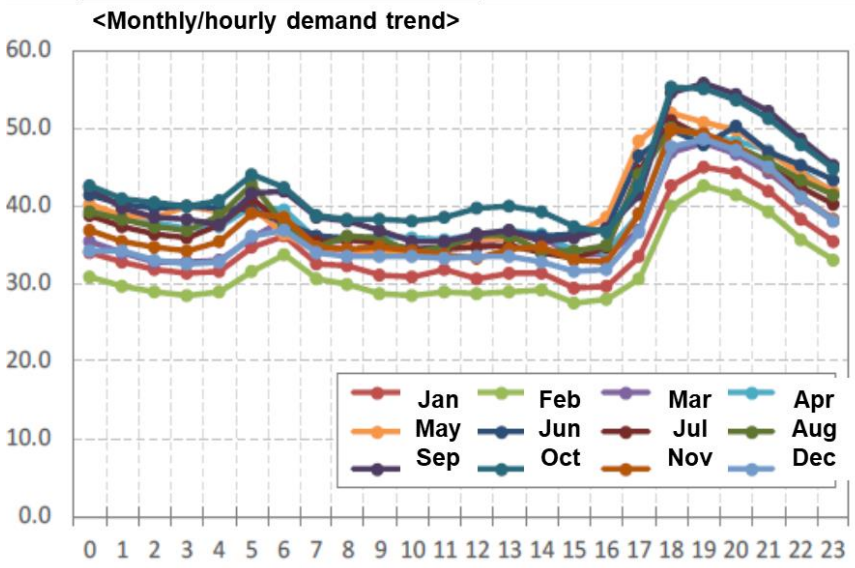
Since hourly demand data in Sebira Island is not recorded, Toshiba ESS calculated expected hourly demand data in each month by utilizing a data of similar island in Indonesia to Sebira Island. The result of hourly demand data in Sebira Island is as follows.

<Monthly/hourly average demand>

Average Demand [kWh/h]		hour																						
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Month	Jan	33.9	32.8	31.9	31.3	31.6	34.7	36.0	32.5	32.3	31.1	31.0	31.8	30.7	31.3	31.4	29.4	29.6	33.5	42.5	45.0	44.2	41.9	38.2	35.4
	Feb	30.9	29.7	28.9	28.5	28.9	31.5	33.9	30.6	29.9	28.8	28.4	29.0	28.7	28.9	29.2	27.5	28.1	30.7	40.1	42.6	41.4	39.3	35.8	32.9
	Mar	35.5	34.1	32.7	32.8	33.1	36.0	38.3	34.9	34.5	33.8	33.9	34.7	34.9	36.1	36.0	33.7	33.7	36.8	47.0	48.1	46.6	44.2	40.8	38.2
	Apr	40.0	38.5	37.8	37.1	37.3	39.9	39.6	35.7	35.6	36.2	35.9	35.6	36.3	37.0	36.4	34.3	34.3	39.0	50.0	49.2	48.5	47.3	44.5	41.7
	Mar	40.2	38.7	38.5	40.1	39.3	39.7	36.4	34.3	34.6	33.9	33.9	34.4	35.6	35.8	36.0	36.3	38.6	48.3	52.0	50.7	49.8	47.0	44.1	42.0
	Jun	41.5	40.3	39.7	39.9	39.8	39.6	37.9	36.1	35.9	35.2	34.5	34.8	36.1	36.7	36.3	36.4	37.1	46.4	49.8	47.9	50.2	47.0	45.4	43.4
	Jul	38.7	37.4	36.3	35.8	37.5	40.9	37.5	35.3	35.8	35.3	34.5	34.6	34.7	34.9	33.9	33.3	34.6	44.5	50.9	48.9	47.5	45.1	42.3	40.2
	Aug	39.4	38.2	37.3	36.9	38.7	42.8	37.5	34.6	36.2	35.8	33.9	34.6	36.4	36.1	34.1	34.2	35.0	44.1	49.9	49.2	47.8	45.7	43.3	41.5
	Sep	42.5	39.8	38.5	38.3	37.6	41.6	41.9	38.5	38.1	36.7	35.5	35.4	36.5	37.0	35.5	36.0	37.0	41.5	54.7	55.8	54.4	52.1	48.5	45.3
	Oct	42.6	41.0	40.4	39.9	40.7	43.9	42.4	38.7	38.4	38.4	38.2	38.6	39.7	40.0	39.2	37.4	36.5	42.5	55.3	55.0	53.6	51.3	47.8	44.7
	Nov	36.9	35.3	34.7	34.1	35.3	39.0	38.5	34.6	34.5	34.7	34.2	33.9	33.3	34.5	34.6	33.1	32.9	39.1	49.7	49.3	47.6	44.7	41.1	38.3
	Dec	34.3	34.1	33.0	32.5	32.9	36.2	36.9	34.0	33.6	33.6	33.5	33.2	33.5	33.5	32.9	31.6	31.7	36.5	47.6	48.6	47.2	45.1	41.3	38.1

Source: Toshiba Energy Systems & Solutions Corporation

Figure4.11 Electricity demand in Sebira Island (monthly and hourly average data)



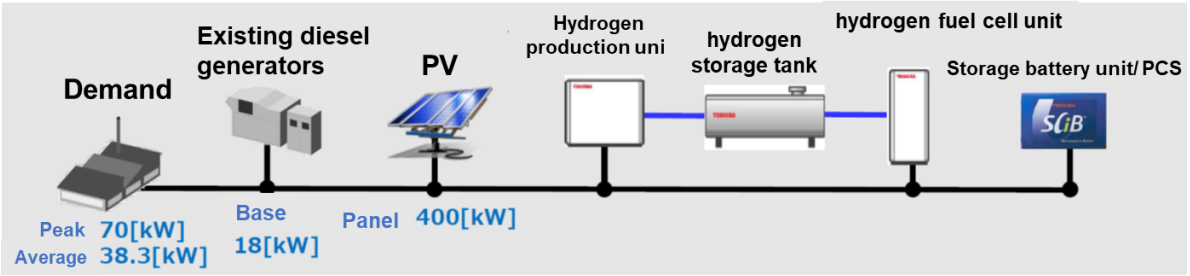
Source: Toshiba Energy Systems & Solutions Corporation

Figure4.12 Electricity demand in Sebira Island (monthly and hourly trend)

4.2.4 Considering a system balance of hydrogen energy supply system

On the basis of electricity demand in Sebira Island, H2One's system design was considered by Toshiba ESS. For the reference, in FY2019, an information was received that PLN had a plan to install PV system of 400 kW in the Sebira island within 2020, and the Department of Manpower, Transmigration and Energy of DKI-JKT proposed to Toshiba ESS to work with PLN together for installing PV system and H2One. PV system (400 kW) has been already installed in Sebira Island in 2020. Thus, Toshiba ESS considered the system design on the assumption of utilizing PLN's PV system and the existing diesel generators in Sebira Island.

The result of consideration showed that it is the best balance economically to make rate of using renewable energy (PV system) 50%. The system design considered by Toshiba ESS is as follows (several values of the system are not disclosed at the figure due to confidentiality).

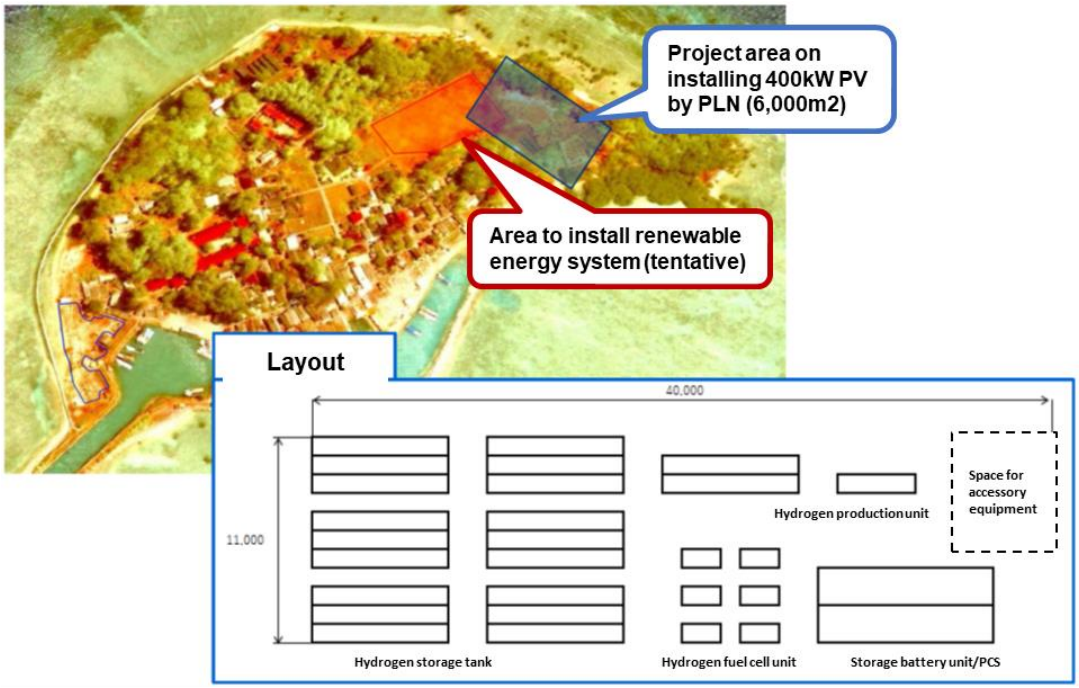


Source: Toshiba Energy Systems & Solutions Corporation

Figure4.13 System design of H2One based on the data of Sebira Island

In the case of using the above system balance, basically electricity generated by diesel generators and PV system would be used in daytime, and surplus electricity will be utilized to make hydrogen and store it into battery. And, in night time and the case of electricity shortage from PV system, charged electricity in the battery and hydrogen would be used for supplying electricity in Sebira Island.

The image of layout to install the system into Sebira Island is shown in the following figure.



Source: Toshiba Energy Solutions & Systems Corporation

Figure4.14 Image of installing H2One into the Sebira Island

4.2.5 Plan for feasibility study in FY2021

Based on the result of feasibility study in FY2020, further detailed investigation in the Sebira island will be continued in FY2021. Although a field survey which was planned in FY2020 could not be implemented due to COVID-19, it is necessary to come to Sebira Island for checking essential information for installing H2One. The study items for FY2021 are as follows.

- Confirmation of available space to install H2One in Sebira Island
- Confirmation of ground condition
- Consideration of a route for installing H2One into the Island
- Checking a connection point to PLN's PV system (in terms of both location and specification)
- Consideration of project plan by discussion with PLN and local Independent Power Producer (IPP) companies

4.3 STUDY FOR INSTALLATION OF EV BUS AS PUBLIC TRANSPORT

4.3.1 Overview of the feasibility study

DKI-JKT has been facing to serious traffic jam, and it is necessary to come out with effective countermeasures for solving air pollution due to exhaust gas by cars. Recently, also with the view of climate change countermeasures, shifting to environmentally-friendly urban transportation systems attract high attention. To respond to the trend, the Governor of DKI-JKT positions prioritizing the shift to zero-carbon mobility as the most important issues. Particularly, EV buses plan to be installed as a public transportation in DKI-JKT on a priority basis, and this plan has just started actively since 2020.

At the discussion among Kawasaki City and DKI-JKT in FY2019, DKI-JKT requested both governmental support and technical support for installing EV bus. On the basis of the request, Kawasaki City introduced their experiences regarding EV buses through the workshop for DKI-JKT officials in FY2019. In FY2020, a feasibility study was conducted to install EV buses and relevant technologies as JCM Model Project after FY2021, which confirmed DKI-JKT's plan and current progress. The feasibility study was implemented according to the following study items in FY2020.

Table4.10 Study items for installation of EV buses

#	Study items	Overview
1	Data collection on DKI-JKT's plan and current progress regarding EV bus	To collect necessary information to confirm DKI-JKT's plan for installing EV buses and their progress, discussion with DKI-JKT and PT. Transportasi Jakarta was implemented. Also, IGES supported to collect the above contents for this feasibility study.
2	Consideration of study contents in FY2021 to formulate JCM Model Project	According to the result of data collection and also discussion with Japanese private companies which are interested in EV bus project in DKI-JKT, a study plan for FY2021 was considered.
3	Support for installing EV buses by the City-to-City Collaboration	During the workshop for DKI-JKT officers which was held in December 2020, Kawasaki City officers introduced their activities regarding EV (EV tracks for waste collection etc.) as one of the action of SDGs future city. The details are described in Chapter 3.

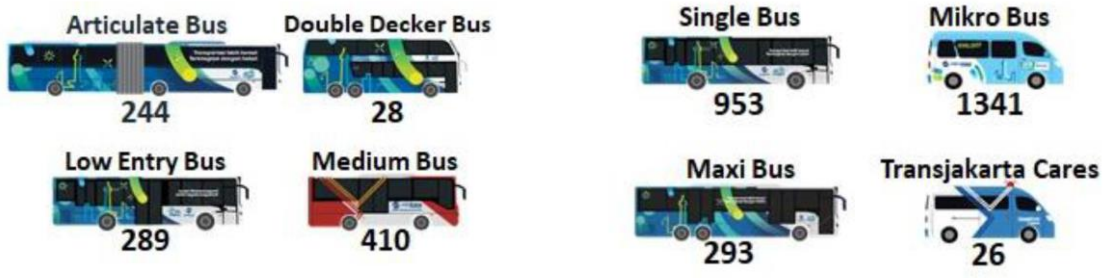
Source: Prepared by Nippon Koei

4.3.2 Public transportation system in DKI-JKT

Public buses run in DKI-JKT and nearby cities (Depok, Tangerang, Bekasi etc.) are generally called "transjakarta" in Indonesia. The numbers of transjakarta have been increasing year by year with the increase of its users, which were 2,380 units in 2017, 3,017 units in 2018, and 3,865 units in 2019 (as of September). Currently, there are 13 corridors and 258 bus stops.

Part of transjakarta are owned by PT. Transportasi Jakarta which is a state-own company of DKI-JKT, however, mostly owned and operated by several private companies that PT. Transportasi Jakarta consigns a bus operation to. There are 19 private operation companies as of September, 2020.

The type of transjakarta and the numbers of each buses owned by PT. Transportasi Jakarta and private operation companies are as follows.



Source: Provided by PT. Transportasi Jakarta (2019)

Figure4.15 Type of transjakarta and their number (as of 2019)

Table4.11 Buses owned by PT. Transportasi Jakarta

Type of Transjakarta	Unit
Articulated Bus	142
Low Entry Bus	289
Maxi Bus	24
Single Bus	371
Medium Bus	20
Double Decker Bus	28
Minibus (TJ Cares)	26

Source: Prepared by Nippon Koei based on the information by PT. Transportasi Jakarta

Table4.12 Buses owned by private operation companies

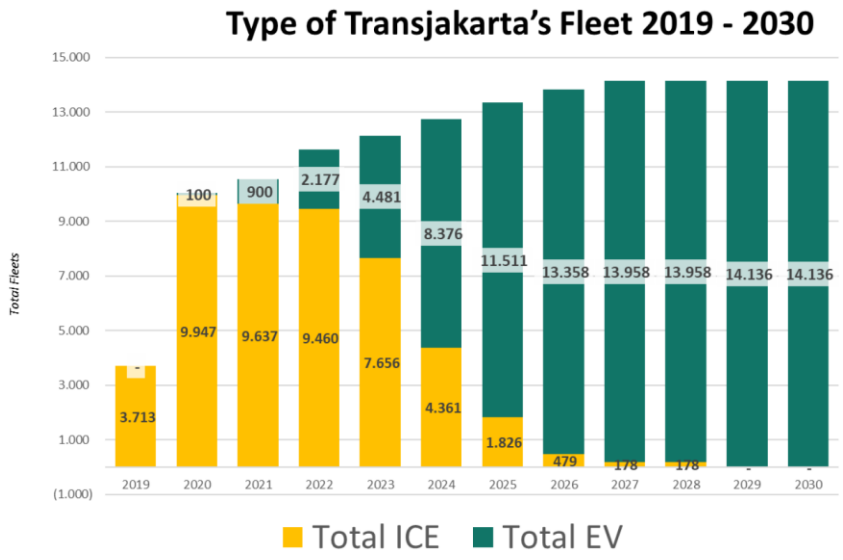
#	Operation Company	Unit (bus type)
Big Bus Operators		
1	Perum Damri	46 (Articulate Bus)
2	Perum PPD	494 (Single Bus)
3	Mayasari Bakti	56 (Articulate Bus)
4		73 (Single Bus)
5		150 (Maxi Bus)
6	PT. Biro Perjalanan Wisara Pahaka Kencana	15 (Single Bus)
7	PT. Steady Safe	119 (Maxi Bus)
Small Bus Operators		
8	Koperasi Wahana Kalpika	858
9	Budi Luhur	100
10	Komika Jaya	49
11	Komilet Jaya	93
12	Kopamilet	24
13	Kolamas	53
14	Purimas	29
15	Puskopau	77
16	Lestari Surya Gemapersada	54
17	Kencana Sakti Transport	4
Medium Bus Operators		
18	Kopaja	310
19	Transwadaya	80

Source: Prepared by Nippon Koei based on the information by PT. Transportasi Jakarta

4.3.3 The plan on installing EV buses in DKI-JKT

To confirm the plan of installing EV buses in DKI-JKT, a meeting with PT. Transportasi Jakarta was conducted in September, 2020. The company shared their plan that they will increase the number of public buses from current approx. 4,000 units (as of September, 2020) to approx. 14,000 units by 2030, and all of these buses will be EV buses.

The following figure shows the original plan to install EV buses from 2019 to 2030 in DKI-JKT. The numbers which PT. Transportasi Jakarta shared in the meeting are different from the following plan because they are behind schedule due to COVID-19 pandemic. They planned to install 100 units of EV buses in 2020 in the original plan, but they have changed it to installing them in 2021. Although the original plan has been implemented on year late, PT. Transportasi Jakarta is trying to recover it and all public buses in DKI-JKT plan to be EV buses by 2030.



Source: PT. Transportasi Jakarta (2019)
Remarks) ICE: Internal Combustion Engine

Figure4.16 The plan to install EV buses in DKI-JKT by 2030

Currently, about half of the public buses are microbus (11 seats/unit), inclusive of microbuses made by Japanese companies such as Suzuki and Daihatsu. As for installing EV buses, firstly large buses such as Bus Rapid Transit (BRT) plan to be changed to EV buses, secondly medium buses (approx. 7-8 m) will be changed to EV buses, and finally microbuses will be EV buses. After 2023, existing buses will be also replaced.

As mentioned above, private operation companies own and manage public buses, however, currently only 3 companies out of 19 (as of September, 2020) have a license to operate EV buses because different condition from operating existing buses are needed to operate EV buses in technical, financial , and manpower aspect. To achieve that all buses will be changed to EV buses by 2030, it is essential to build capacities of the private operation companies.

4.3.4 Support by other countries on installing EV buses

DKI-JKT has received several supports from International donors or other countries to install EV buses as a public transportation.

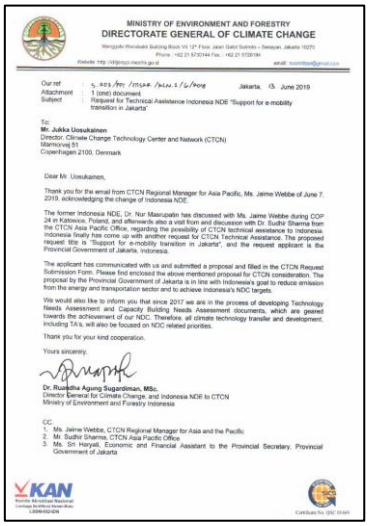
(1) Technical support by Climate Technology Centre and Network (CTCN)

Ministry of Environment and Forestry, Indonesia has submitted a request paper to Climate Technology Centre and Network (CTCN) on technical support (project title: Support for e-mobility transition in Jakarta) in June, 2019 to install EV buses in DKI-JKT. According to the request, CTCN has already started their support to DKI-JKT, and it will be completed by 2021. Main contents of the support are described as follows.

(a) Identifying essential policies of both National level and regional level, and necessary infrastructure to install EV buses

(b) Preparing an investment plan and a document for fund procurement

(c) Evaluating a possibility of application of charging systems utilizing renewable energy


MINISTRY OF ENVIRONMENT AND FORESTRY
DIRECTORATE GENERAL OF CLIMATE CHANGE

Jakarta, 15 June 2019

Subject : Request for Technical Assistance Indonesia NDE "Support for e-mobility transition in Jakarta"

To:
Mr. Jukka Uosukainen
Director, Climate Change Technology Center and Network (CTCN)
Marmorvej 51
Copenhagen 2100, Denmark

Dear Mr. Uosukainen,

Thank you for the email from CTCN Regional Manager for Asia Pacific, Ms. Jaime Webbe of June 7, 2019, acknowledging the change of Indonesia NDE.

The former Indonesia NDE, Dr. Nur Masrupatin has discussed with Ms. Jaime Webbe during COP 24 in Katowice, Poland, and afterwards also a visit from and discussion with Dr. Sudhir Sharma from the CTCN Asia Pacific Office, regarding the possibility of CTCN technical assistance to Indonesia. Indonesia finally has come up with another request for CTCN Technical Assistance. The proposed request title is "Support for e-mobility transition in Jakarta", and the request applicant is the Provincial Government of Jakarta, Indonesia.

The applicant has communicated with us and submitted a proposal and filled in the CTCN Request Submission Form. Please find enclosed the above mentioned proposal for CTCN consideration. The proposal by the Provincial Government of Jakarta is in line with Indonesia's goal to reduce emission from the energy and transportation sector and to achieve Indonesia's NDC targets.

We would also like to inform you that since 2017 we are in the process of developing Technology Needs Assessment and Capacity Building Needs Assessment documents, which are geared towards the achievement of our NDC. Therefore, all climate technology transfer and development, including TA's, will also be focused on NDC related priorities.

Thank you for your kind cooperation.

Yours sincerely,

Dr. Ruandha Agung Sugardiman, MSc.
Director General for Climate Change, and Indonesia NDE to CTCN
Ministry of Environment and Forestry Indonesia

CC:
1. Ms. Jaime Webbe, CTCN Regional Manager for Asia and the Pacific
2. Mr. Sudhir Sharma, CTCN Asia Pacific Office
3. Ms. Sri Haryati, Economic and Financial Assistant to the Provincial Secretary, Provincial Government of Jakarta

Source: Provided by IGES

Figure4.17 Request paper to CTCN

(2) Support by C40 Cities Finance Facility

C40 which DKI-JKT also joins has mainly 2 types of support , "Networks" and "Programmes", and these supports provide various services to member countries. One of the Programmes is called "C40 Cities Finance Facility (CFF)[6]" which supports fund procurement to implement a project regarding climate change countermeasure in developing countries, and DKI-JKT has been received this support to install EV buses. The brief contents of support are as follows[7]. The CFF's support mainly aims to confirm the best way of procuring 100 EV buses for trial runs, and it will be completed within 2021.

(a) Advise technology/system options and technical set-up of EV buses operations as well as associated knowledge management on technical and economic parameters of EV buses operations.

[6] https://www.c40cff.org/

[7] https://www.c40cff.org/projects/jakarta-electric-bus

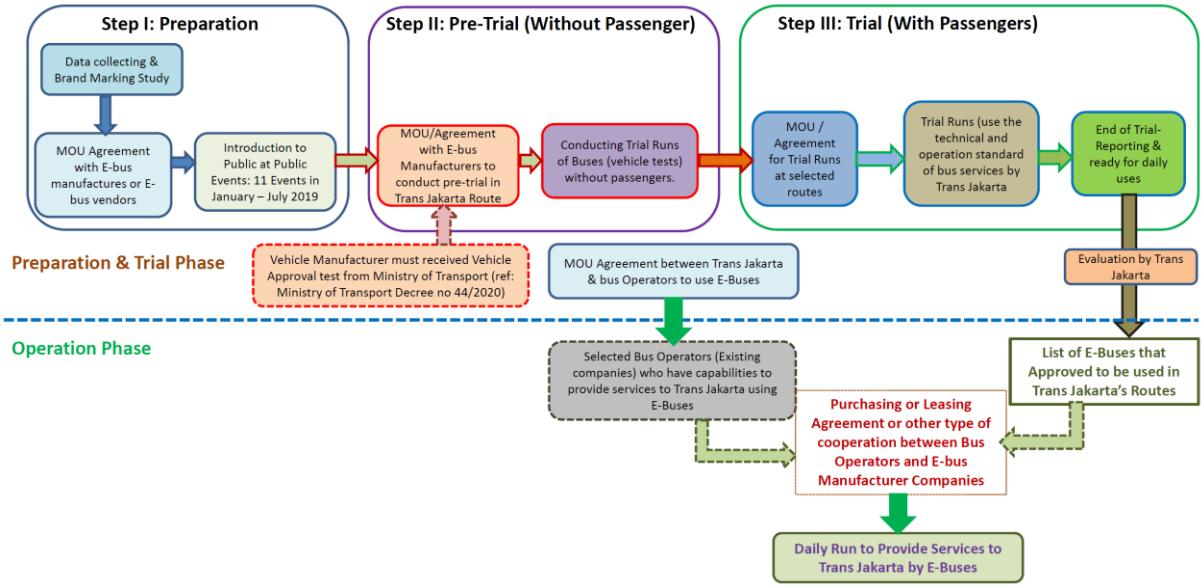
(b) Develop a business case which can advise the financial feasibility of 100 EV buses trials by taking into account all relevant cost parameters, e-bus km tariff, contract parameters (risks, compensation and duration) and subsidy requirements.

(c) Identification of applicable/feasible financing options.

(d) Procurement strategy for 100 EV buses trials.

4.3.5 Progress of trial run for installing EV buses

In order to install EV buses as public transportation, a trial run in several routes is being conducted to check technical validation and necessary procedure for the operation. There are mainly 3 processes by the time when EV buses are provided as transjakarta. Regarding to trial run, 2 types of trial run, first is "Pre-Trial" which is conducted without passengers and second is "Trial" which runs with passengers. The following figure shows a flow chart to install EV buses in DKI-JKT.



Source: Provided by IGES

Figure4.18 Flow chart to install EV buses in DKI-JKT

For conducting trial runs, PT. Transportasi Jakarta has been collecting data from EV manufacturers, and preparing to trial runs. The following table shows the part of study result by PT. Transportasi Jakarta conducted from 2019 to 2020. It seems that Chinese manufacturers show their high interest in the EV project in DKI-JKT in the fact of situation of MOU and Pre-Trial.

Tanle4.13 Study result for implementing trial runs of EV buses (2019-2020)

No	E-bus providers/companies	Type of Buses			Document and Progress			Target of Pre-trial E-Bus	Remarks
		Micro	Medium	Single	Brochure	Schedule	MOU		
1	BYD (China)	1	1	1	√	√	√	October 1st, 2019	Finished Trial in Oct, 2020
2	ITB	-	2	-	√	√	√	16 Dec, 2019	
3	PT Mobil Anak Bangsa (MAB)	-	-	1	√	√	√	Don't join trial	Don't join the trail phase
4	RAC-Danfoss (China)	-	-	1	√	√	√	01 February 2020	
5	Mitsui – Caetano Bus (Japan)	-	-	1	√	-	-	01 Nov, 2019	Preparing MOU
6	Volvo	-	-	1	√	-	-	-	-
7	GAZ	-	-	1	√	-	-	-	-
8	SCANIA	-	-	1	√	-	-	-	-
9	SKYWELL (China)	1	1	1	√	-	-	Dec, 2020	Start trial in December 2020 –
10	MITSUBISHI (Japan)	-	-	1	√	-	-	-	-
11	KINGLONG (China)	-	1	1	√	-	-	January 2021	HIGER bus, trial in January 2021
12	University of Indonesia	-	-	1	√	-	-	-	-
13	HINO (Japan)	-	-	1	√	-	-	-	-
14	Winnerway	-	1	1	√	-	-	15 July, 2019	-
15	Institute of Technology Surabaya (ITS)	-	-	1	√	-	-	-	-
16	Mercedes Benz	-	-	-	√	-	-	-	-
17	Toyota (Japan)	-	-	-	√	-	-	-	-
18	ZHONGTONG (China)	-	1	1	√	-	-	2020	-
19	ZTE (China)	1	1	1	√	-	-	2020	-

Source: Provided by IGES

The current progress of trial runs (Pre-Trial and Trial) from 2020 to 2021 is as follows.

(1) Trial run by BYD (China) and PT Bakrie Autoparts (Indonesia)

Table4.14 Case of trial run (1)

Schedule of Pre-trial	3 months, started from July 6, 2020 and finished in early of October 2020
Operation	10:00 – 22:00, every day
Route	Blok M – City Hall
Bus type	BYD K9 (Length: 12 m, Wide: 2.5 m, Height: 3.3 m), Battery: 324 kwh BYD C6 (Length: 7 m, Wide: 2.1 m, Height: 3.0 m), Battery: 135 kwh
Charging time	4 hours
Travel distance of bus	250 km

Source: Prepared by Nippon Koei based on the data from IGES

Case of trial run (1) photo1

Case of trial run (1) photo2

(2) Trial run by SKYWELL (China) and PT Kendaraan Listrik (Indonesia)

Table4.15 Case of trial run (2)

Schedule of Pre-trial	Pre-trial is not needed because specification of their buses has already followed the general specification of buses for Transjakarta (height of doors, number of doors, seating arrangements etc.)
Schedule of Trial	Started from 22 December 2020
Route	Several corridors
Bus type	NJL 6126 BEV (length: 12 m, weight: 16 ton), Battery: 256 kwh
Charging time	2 hours
Travel distance of bus	260 km

Source: Prepared by Nippon Koei based on the data from IGES

Case of trial run (2) photo1

(3) Trial run by PT INKA (Indonesian national railway manufacturer)

Table4.16 Case of trial run (3)

Schedule of Pre-trial & Trial	From 23 December 2020 to 6 April 2021 (Pre-trial: 2 weeks, Trial: 3 months)
Bus type	E-Inobus (Medium size bus, length: 8 m) Max speed: 90km/h,max grade ability: 14%)
Travel distance of bus	200 km

Source: Prepared by Nippon Koei based on the data from IGES

Case of trial run (3) photo1

Case of trial run (3) photo2

(4) Trial run by HIGER (China)

Table4.17 Case of trial run (4)

Schedule of Trial	3 months from early January 2021
Bus type	Single bus (length: 12 m, weight: 13 ton), Battery: 385 kwh
Travel distance of bus	300 km

Source: Prepared by Nippon Koei based on the data from IGES

Case of trial run (4) photo1

Case of trial run (4) photo2

4.3.6 Meeting with Japanese companies which are interested in EV project

To consider a partner company for conducting a feasibility study on JCM Model Project formulation in FY2021, the meetings with 4 companies were held. DKI-JKT and PT. Transportasi Jakarta mentions they are really expecting Japanese companies to join their EV bus project, and also are interested in utilization of JCM subsidy.

Table4.18 Overview of the meeting with Japanese companies on EV bus project

#	Companies	Overview
1	Company A (automobile manufacturer)	The meeting with Company A was conducted because PT. Transportasi Jakarta shows the highest interest in Company A's products. As the result of the meeting, it was confirmed that Company A had positive attitude to sell BEV buses in DKI-JKT. Currently, Company A has been considering about an sales plan and issues to install BEV buses in DKI-JKT. In FY2021, a meeting among Company A, PT. Transportasi Jakarta and private operation companies plan to be done.
2	Company B (electronic manufacturer)	Company B which saw an information of the Project at MOE's website showed their interest to the EV project in DKI-JKT. Company B produces and sells a storage battery of EV buses. Company B has a business alliance with Company C, so the meeting was held in conjunction with Company C. Company B supposes to join the project by installing the battery when Company C sells their EV buses to private operation companies.
3	Company C (distributor of EV buses etc.)	Company C which has business alliance with Company B is located in Kita-Kyushu city. Company C imports EV buses

#	Companies	Overview
		from reliable Chinese companies to Japan and sell them. They have an experience to install Chinese EV buses in Vietnam, and shows high interest in installing EV buses in DKI-JKT as well.
4	Company D （Information technology (IT) company）	Company D is a member company of GIC in Kawasaki City. The company provides several services by utilizing EMS with IoT, for example remote monitoring/ management of renewable energy located in separate areas, and microgrid solutions. Company D has an idea to apply EMS to EV bus's charging system in DKI-JKT. It is expected to charge EV buses effectively and make an opportunity to promote and optimize renewable energy for charging system.

Source: Prepared by Nippon Koei

4.3.7 Plan for feasibility study in FY2021

On the basis of the study result in FY2020, the feasibility study for JCM Model Project formulation will start in FY2021 for installing EV buses. At the beginning of the feasibility study, it will be conducted to confirm the possibility to install technologies which 4 companies propose through information exchange with the above 4 companies and relevant organization in DKI-JKT. The main purchasers of EV buses are not PT. Transportasi Jakarta but private operation companies, so it will be necessary to have a discussion with the operation companies which have a license to operate EV (there are 3 companies as of September, 2020) in FY2021. International consortium and project plan of JCM Model Project will be considered after confirmation of a feasibility to implement the Japanese companies' proposed ideas by the study.

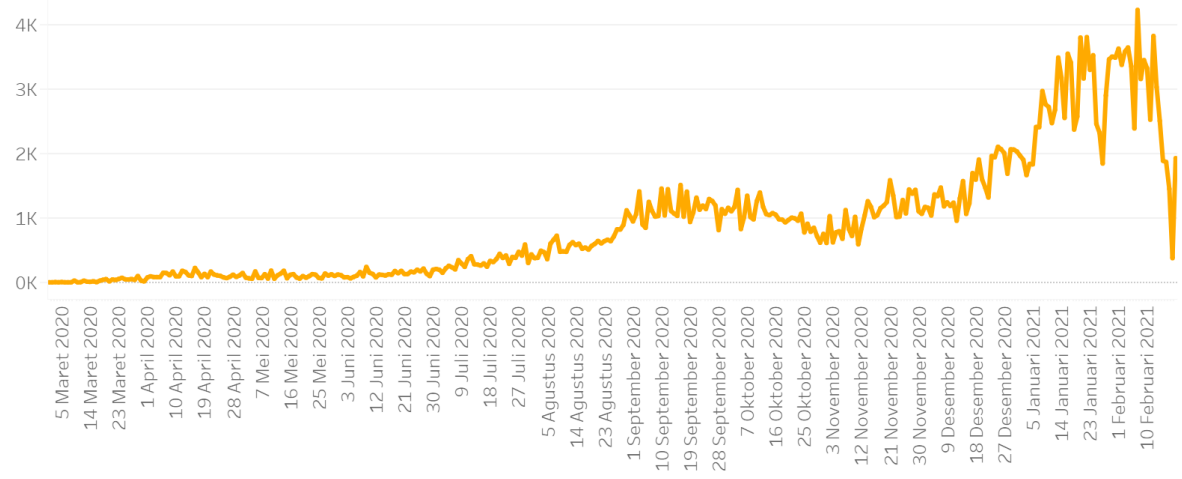
CHAPTER 5 ISSUES AND INGENUITY IN CONDUCTING THE PROJECT AGAINST THE BACKDROP OF COVID-19

The field surveys, consultations between the two cities, local workshops, City-to-City Collaboration seminars, etc., which should have been major activities if 2020 were a normal year, were held completely online and conducted under physical restrictions due to the impact of the spread of COVID-19 after January 2020 in the City-to-City Collaboration programme of FY2020. However, some of the activities were carried out with ingenuity or replaced by alternative activities even against the backdrop of the COVID-19 pandemic. Also, some activities were postponed until FY2021. Those activities are summarized below for reference in FY2021.

5.1 IMPACT OF COVID-19

According to a report by the International Monetary Fund (IMF) (June 2020), the global economic growth rate in 2020 will be -4.9% due to the impact of the global spread of COVID-19, and the result was 1.9 points below compared with the World Economic Outlook (WEO) in April 2020. It is also reported that the economic growth rate of Southeast Asia and Oceania was 5.8% in 2019, but dropped to 0.5% in 2020.

Indonesia surpassed 1.2 million COVID-19 cases as of February, 2021, that is one of the most infection countries in Southeast Asia. In DKI-JKT, total number of infection cases has exceeded 320 thousand (as of February 19, 2021), and the number of newly infection cases per day is also on the rise.



Source: The special site of DI-JKT to provide information on COVID-19 (https://corona.jakarta.go.id/en)

Figure5.1 Shift of the number of newly infection cases in DKI-JKT

With the spread of the infection, the Governor of DKI-JKT has been implementing large-scale social regulations (PSBB) intermittently since April 2020. PSBB obliges people to work from home in industries other than the 11 industries that are directly related to people's lives, and

restrains the movement of people. The 11 industries that are exceptions to the restrictions are (1) health, (2) food and beverages, (3) energy, (4) communications and information technology, (5) finance, (6) logistics, (7) hotels, (8) construction, (9) strategic industry, (10) basic services, public benefits, industry related to the country's most important facilities and specific facilities, (11) daily necessities.

5.2 INGENUITY IN CONDUCTING THE PROJECT SMOOTHLY UNDER COVID-19

In FY2020, it was difficult to carry out field survey and face-to-face meetings with DKI-JKT officials and relevant persons since overseas travel has been restricted due to COVID-19. Thus, original plan on intercity collaboration activities, discussions, and seminars was necessary to be changed to alternative activities or new way of conducting.

The Project was implemented on two pillars: Approach (1) Feasibility study for JCM Model Project; and Approach (2) City-to-City Collaboration activities. The following table shows original activities and modified activities in each approach.

Table5.1 Original and alternative implementation policy of the Project

Activities	Original Plan	Modified Plan
Approach 1: Feasibility study for JCM Model Project formulation		
Data collection	Interview investigation to DKI-JKT and local companies directly	• Desk research with cooperation by PT. Indokoei International • Online meeting with relevant entities of DKI-JKT
Meeting with local companies	Face-to face meeting in DKI-JKT	• Online meeting
Approach 2: City-to-City Collaboration activities		
Workshop	• Face-to-face workshop in DKI-JKT's meeting room • Once per year, half-day or one-day workshop • Sharing knowledges from Kawasaki City on SDGs actions, and also other priority sectors (e.g. urban transportation) based on the request from DKI-JKT.	• Online • Once per year, 2 hours • Focusing on 2 themes (SDGs and zero-carbon strategy), and transferring knowledges on them from Kawasaki City
Training in Kawasaki City	• Inviting two DKI-JKT's officials to Kawasaki • Once per year, 7-8 days training • Site visit to the leading facilities in Kawasaki City, and training on technical and political aspects.	• Online • Once per year, 2 hours • Introduction of GIC companies' technologies, introduction of Kawasaki International Eco-tech Fair
JCM City-to-City Collaboration seminar organized by MOE in Japan	• Inviting two DKI-JKT's officials to Japan • Once per year, 2 days seminar	• Online • Once per year, 2 hours • On-demand video viewing to introduce the Project

Source: Prepared by Nippon Koei

Regarding the feasibility studies for JCM Model Project formulation, the data (e.g. basic information of Sebira Island) which was listed in the original plan could be smoothly collected as planned by cooperating with Nippon Koei's local subsidiary (PT. Indokoei International). On the other hand, it was slightly difficult to find new local companies as a partner company of JCM Model Project, and also communicate with them compared with companies which had been contacted in the past fiscal year.

Regarding City-to-City Collaboration activities, all original activities (mainly meetings and seminars between the cities) were carried out by online. Indeed, there were several merits to conduct these activities by online. For example, the bureau/department of Kawasaki City other than the International Economic Affairs Office (main contact office of the Project) gave a presentation and also GIC companies introduced their own technologies to DKI-JKT, which were difficult to do if the seminar was conducted by face-to-face. In addition, more participants from DKI-JKT than the past year joined the workshop and seminar. After the pandemic as well, continuously utilizing online tools will make good opportunities for both Kawasaki City and DKI-JKT, also private companies.

As for the online activities such as workshop, not a consecutive interpreter but a simultaneous interpreter was arranged to implement the activities smoothly and effectively because online activities are not suitable for long duration.

With the above ingenuity, almost all activities of the original plan could be completed although the steps of some activities were modified.

5.3 ISSUES OF IMPLEMENTING THE PROJECT UNDER COVID-19

The implementation of the Project was not significantly affected by the COVID-19 due to collaboration with Nippon Koei's local subsidiary (PT. Indokoei International) and utilization of online tools. On the other hand, regarding the feasibility studies for JCM Model Project formulation , it was difficult to carry out smoothly because it took longer than usual to select candidate companies that could introduce the technologies and also to discover new needs of DKI-JKT. According to the information from an expatriate staff of Japanese companies in Indonesia, it is still difficult for local companies to hold business negotiations face-to-face, and when conducting face-to-face, it may be necessary to present the PCR test results. So basically it has been done by online even among companies in Indonesia.

In FY2021 or later, it will be essential to discuss closely with relevant entities for formulating JCM Model Project among Japanese companies and local entities. It means that more ingenuity or other ways to find candidate partner companies and communicate with them will be needed if the COVID-19 still spreading in FY2021.

CHAPTER 6 FUTURE PLAN

According to the result in FY2020, the following sections describe future plan for FY2021.

6.1 PROPOSED PROJECT 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 FY2021. The cities will implement their activities according to "Letter of Intent for City-to-City Collaboration for Zero-Carbon Society" which was conducted in March 2019.

As the theme of continuous City-to-City Collaboration for zero carbon society in FY2021, "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 Project, Kawasaki City's experiences and good technologies of Kawasaki companies such as a member of GIC 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 Project in FY2021 will be conducted with 2 approaches: "JCM Feasibility Study", and "Intercity Collaboration".

Based on the idea proposed by DKI-JKT and the result of the Project in FY2020, the following activities regarding 4 sectors plan to be implemented between both cities for FY2021.

Table6.1 Proposed activities for FY2021

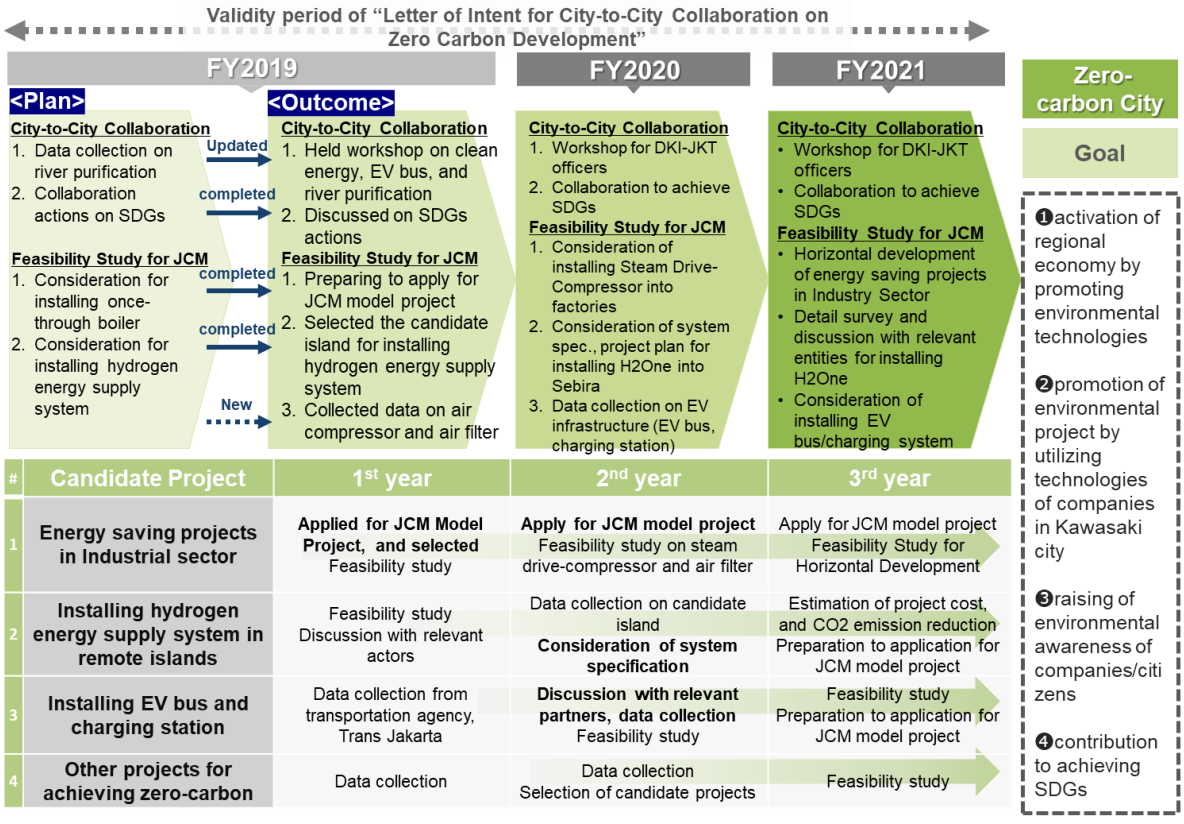
Policy	Sector	Outline
Approach 1: JCM Feasibility Study	**Clean Energy**	Based on the result of feasibility study in FY2019 and FY2020, **additional study for installing H2One into the remote islands** will be conducted.
	Urban Transportation	Based on the data which was collected from DKI-JKT and PT. Transportasi Jakarta, installing **EV bus and relevant technologies such as charging facility** will be considered for JCM Model Project formulation.
	Green Industry	Promotion of energy saving solutions/ technologies (such as **once-through boiler, air-compressor**) at factories in DKI-JKT will be implemented for JCM Model Project formulation.

Policy	Sector	Outline
Approach 2: Intercity Collaboration	**SDGs**	Collaboration activities in terms of achieving SDGs will be considered between Kawasaki City and DKI-JKT (mainly SDGs secretariat of DKI-JKT). In addition, **Kawasaki City's knowledge to realize zero carbon society such as "Kawasaki Carbon Zero Challenge 2050"** will be transferred to DKI-JKT through a workshop.

Source: Prepared by Nippon Koei

6.2 3-YEAR PLAN OF CITY-TO-CITY COLLABORATION

The original 3-year plan was considered when the Project in FY2019 started, however, it was confirmed that several activities should be modified to meet the results of the Project. Then the plan was revised before starting the Project in FY2020 as follows. The revised 3-years plan will be followed in FY2021 as well.



Source: Prepared by Nippon Koei

Figure6.1 Three year's plan of the Project