

FY2016
Feasibility Study of Joint Crediting
Mechanism Project by City to City
Collaboration

Project for Development of JCM Projects
under City to City Collaboration between Batam City and
City of Yokohama (Energy Saving Sector: BIFZA)

Report

March 2017

Nippon Koei Co., Ltd.
City of Yokohama (Y-PORT center)
iFORCOM Tokyo Co., Ltd.

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by City to City Collaboration**

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Collaboration between Batam City and City of Yokohama
(Energy Saving Sector: BIFZA)**

Report

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Attachment

- Attachmet 1. Kick-off seminar
- Attachmet 2. Invitation to City of Yokohama & Kita-Kyusyu
- Attachmet 3. COP22
- Attachmet 4. Final seminar in Batam (January 2017)
- Attachmet 5. JCM seminar in Tokyo (January 2017)
- Attachmet 6. Project Map
- Attachmet 7. Survey Report

ABBREVIATION

BIFZA	Batam Indonesia Free Zone Authority
GHG	Greenhouse Gas
IGES	Institute for Global Environmental Strategies
INDC	Intended Nationally Determined Contributions
JCM	Joint Crediting Mechanism

CHAPTER1 OVERVIEW OF THE PROJECT

1.1 PURPOSE OF THE PROJECT

Japan Government submitted INDCs (Intended Nationally Determined Contributions) to UNFCCC (United Nations Framework Convention on Climate Change) last year, and the target reduction of GHG (Green House Gas) emission, as a feasible target by energy mix, is 26.0% (approximately 1,042,000,000 t-CO₂), compared to the emission in FY 2013 (25.4% in FY 2005). The target year to achieve is FY 2030. Japan Government intends to count reduction of GHG emission with Joint Crediting Mechanism (JCM) as Japan's reduction/sink. Japan Government introduce technologies, products, system, service and infrastructure that reduce GHG emission to developing countries, and will evaluate the reduction quantitatively for the counts. Japan must produce substantial JCM projects to achieve the reduction target using JCM.

Indonesian Government has promised to reduce 29% of GHG emission compared to Business as usual (BAU) according to their INDC, and in case JCM is introduced using international assistance, their target is 41% in the INDC. Therefore, Indonesia has strong expectation to implementation of JCM, which Indonesia and Japan signed for, taking account of the achievement of the target in the INDC.

Population in Batam city is about 1,200,000, and located in Riau Archipelago Province, distance to south coast of Singapore is about 20 km. The city is developing with Batam Island development agreement (1980) and economic cooperation agreement for development of the province (1990) through collaborative development with Singapore and Johor Province in Malaysia. However, thus, several problems such as solid waste disposal and sewage treatment has been appearing. Sufficient energy use is also an issue, while many factories has constructed mainly in industrial complexes, Batam city has designated as free trade zone. Batam city and Yokohama city have implemented technical cooperation since FY 2015, and as a 1st City-to-City Collaboration Project, FY 2015 JCM Project Formulation Study for Realizing Low Carbon Cities in Asia, Ministry of Environment, was implemented. The purpose of this project is to formulate JCM projects using information obtained during the survey, for reduction of GHG emission in Batam area.

1.2 PROJECT IMPLEMENTATION

Based on the preparatory study conducted in FY2015, the energy saving project to install air conditioning system with advanced technology at Hang Nadim International Airport has been formulated to apply to JCM Model Project in FY2016. The same advanced technology is planned to be introduced in a hospital (Otoria BATAM, one facility) and ferry terminals (six facilities including Sekupang) under Batam-Indonesia Free Zone Authority (BIFZA). BIFZA succeeded its responsibility from its former organization, Batam Industrial Development Authority (BIDA) by Presidential Order No.41 in 1973 at the time of Batam area development. Since then, BIFZA has been the key authority responsible for the industry development of Batam for a long period.

The preliminary study for the above project has already been started. In this fiscal year, detailed survey was conducted including calculation of possible energy saving and estimation of project cost and recovery year. Based on the result, detailed discussion was held with partners toward application of JCM Model Project.

Survey items and survey methods to formulate JCM Model Project are as follows.

Table 1-1: Survey Item and Survey Method

#	Survey Item	Survey Method
1. Consideration of JCM Project Formulation		
1-1	Detail design and calculations of economic effects with introduction of Energy Solution	<ul style="list-style-type: none"> • Discussion with BIFZA • Excision of solution cost estimation • Effectiveness survey of alternative fuel made from regenerated fuel oil in case it is used for newly introduced boiler • Survey of regenerated fuel oil market and multifaceted utilization method • Confirmation of disassemble cost of existing facilities and method
1-2	Establishment of monitoring plan	<ul style="list-style-type: none"> • Explanation of monitoring method to BIFZA • Discussion with BIFZA and related people • Establishment of monitoring plan and cost estimation
1-3	Confirmation of order and contract by Mega Green accompany the project implementation	<ul style="list-style-type: none"> • Discussion of project formation with BIFZA • Confirmation of funding method by BIFZA • Confirmation of contract format by BIFZA, and so on
1-4	Arrangement of detail condition in the consortium towards application to JCM Model Project	<ul style="list-style-type: none"> • Explanation of JCM Model Project • Discussion of MOU for international consortium, and so on
1-5	Estimation and planning for	<ul style="list-style-type: none"> • Collection of information about energy-saving potential

	horizontal development of introduction of Energy Saving Solution System in Indonesia	in Indonesia <ul style="list-style-type: none"> • Identification of possible horizontal development and estimation of effect in Indonesia • Coordination of a survey using other scheme
1-6	Confirmation of procedure to obtain environmental certificate	<ul style="list-style-type: none"> • Confirmation of certificate for project implementation and preparation to obtain • Survey for disposal or utilization of processed sludge
1-7	Confirmation regarding operating body and plan	<ul style="list-style-type: none"> • Selection of project participant who is in charge of O&M after commencement of the project, and discussion • Preparation of operation plan • Consideration of utilization of natural gas infrastructure • Consideration of synergy with material recycling
2.Participation and presentation in related meetings		
2-1	Participation in high-level meeting (if necessary) (one person)	<ul style="list-style-type: none"> • If requested by Ministry of Environment Japan, project participants will participate and make a presentation in high-level meeting that would be held in Bangkok
2-2	Participation in COP22 (if necessary) (one person)	<ul style="list-style-type: none"> • If requested by Ministry of Environment Japan, project participants will participate and make a presentation in COP 22 to be held in Marrakech

Source: Nippon Koei

1.3 BACKGROUND AND PRESENT CONDITION OF CITY-TO-CITY COLLABORATION



LoI with Batam City in May, 2015

Source: City of Yokohama

Batam City was one of priority areas at “17th economical cooperation and infrastructure strategy meeting on March 20, 2015 (the theme was Indonesia)”, and cooperation schemes

were discussed as pioneering cases, JCM Model Project by Ministry of Environment Japan and Private Sector Investment Finance by JICA. Batam City is now under the spotlight among Japanese companies that are interested in overseas operation.

In January 2011, Yokohama City launched Y-PORT Project, international technical cooperation project utilizing material and technology in Yokohama, which is core project for the policy, supporting overseas infrastructure business of enterprises in Yokohama, under “Midterm 4-year plan 2014-2017”, proceeding with overseas infrastructure business through public and private collaboration. In May 27, 2015, Yokohama City established “Y-PORT Center” to advance public private collaboration as a platform to accelerate joint projects between enterprises in Yokohama and international organizations.

In the above situation, Mayor of Batam City visited to Japan on May 27, 2015, and signed on MOU regarding technical cooperation with Yokohama City. Yokohama City and Batam City have following activities through “FY 2015 JCM Project Formulation Study for Realizing Low Carbon Cities in Asia” that is the 1st project of Y-PORT Center.

Table 1-2: Activities in FY 2015 (Batam City – Yokohama City)

Date	Project identification	FS	Place
20-24/April/ 2015	Inception meeting	—	Batam
25-27/May/ 2015	Visit to Yokohama (Sign on MOU)	—	Yokohama
17-21/August/ 2015	Business matching	Inception meeting	Batam
19-23/October /2015	JCM Workshop, Asia smart-city meeting, site inspection, etc.		Yokohama
30/November- 1/December/ 2015	Small scale workshop with companies that BIFZA selected	Follow up of the survey and opinion exchange	Batam
20/January/ 2016	Final debrief session (including enterprises) Task force team consists of 4 entities (founding declaration)		Batam

Source: Nippon Koei

Director General of Environment Bureau of Batam City and Managing Director of Planning Coordination Bureau of BIFZA recommended establishing a special window at JCM workshop organized by the Ministry of Environment Japan in Yokohama City in October 2015. Then, establishment of a task force (described in the following table) that comprises

four entities (Batam City, BIFZA, Yokohama City and IGES) was approved. This project has planned to make further horizontal development as the 1st project that centers on the task force.

Table 1-3: Approved City-to-City Collaboration Task Force

Entity	Department
Batam City	Environmental Impact Management Board
	Development Planning Board
	MSW Management Project
BIFZA	Deputy Chairman of Other Business Facilities
	Directorate of Promotion and Public Relations
	Bureau of Program Planning and Research & Development
Yokohama City	Development Cooperation Division, International Affairs Bureau
IGES	Climate and Energy Area

Source: Nippon Koei

CHAPTER2 SCHEDULE AND PROJECT IMPLEMENTATION FRAMEWORK

2.1 WORK SCHEDULE

Major activities of this project in this fiscal year is as follows

Table 2-1: Major Activities of this project

Time	Activity
May 2016	Kick off meeting at Ministry of Environment Japan
July 2016	Kick off meeting at Batam
Aug, 2016	Establishment of task force for City-to-City collaboration
Aug 2016	Progress debrief meeting at Ministry of Environment Japan
October 2016	Study tour in Japan Seminar for City-to-City Collaboration Project in Kitakyusyu City
November 2016	Participation in COP22 (presentation by a staff of Yokohama City) in Marrakech, Morocco Batam investment seminar in Yokohama City
December 2016	Progress debrief meeting at Ministry of Environment Japan
December 2016	Discussion of project map
January 2017	Final seminar in Batam City-to-City Collaboration Project seminar in Tokyo
February 2017	Completion of project map (1 st draft)
March 2017	Final debrief meeting at Ministry of Environment Japan
March 2017	Proposal for City-to-City Collaboration Project in FY 2017
April-May 2017	Proposal for JCM Model Project in FY 2017

Source: Nippon Koei

Field trip, participation of meetings, and study tour in Japan has been carried out as follows.

Table 2-2: Schedule of Field Trip

No	Title	Period	Work Contents
1	1 st Field Trip	1-4/June/ 2016	◆ Discussion with Batam City and BIFZA
2	2 nd Field Trip	12-16/July/ 2016	◆ Discussion with BIFZA ◆ Kick of Seminar in Batam Island (14 July) ◆ Courtesy call to Chief of BIFZA and Mayor of Batam City ◆ Discussion with Ferry Terminal Batam Center ◆ Discussion with Ferry Terminal Sekupang ◆ Discussion with Ferry Terminal Batam Harbour Bay

			<ul style="list-style-type: none"> ◆ Discussion with Ferry Terminal Telaga Punggur ◆ Discussion with Ferry Terminal Nongsa
3	3 rd Field Trip	10-25/ August/ 2016	<ul style="list-style-type: none"> ◆ Discussion with BIFZA ◆ Discussion with Ferry Terminal Harbour Bay ◆ Discussion with Ferry Terminal Nongsa ◆ Discussion with MARINA FERRY TERMINAL ◆ Discussion with Ferry Terminal Batam Center
4	4 th Field Trip	21/Nov-10 /Dec/2016	<ul style="list-style-type: none"> ◆ Discussion with Ferry terminal Batam Center
5	5 th Field Trip	18-20/ January/ 2017	<ul style="list-style-type: none"> ◆ Final seminar ◆ Discussion with BIFZA and Batam City ◆ Courtesy call to Chief of BIFZA and Mayor of Batam City
6	6 th Field Trip	21-24/ February/ 2017	<ul style="list-style-type: none"> ◆ Report of FS result ◆ Discussion regarding green building ◆ Discussion with BIFZA and Batam City

Source: Nippon Koei

Table 2-3: Schedule of Study Tour in Japan

No	Title	Period	Contents
1	1 st Study Tour	17-21/ October/ 2016	<ul style="list-style-type: none"> ◆ Discussion with Yokohama City ◆ Site observation of facilities of Finetech Co., Ltd. ◆ Site observation of technology introduction facilities of iFORCOM Tokyo Co., Ltd ◆ Participation in City-to-City collaboration seminar ◆ Site observation of low carbon technology and project in Kitakyusyu City
2	2 nd Study Tour	22-24日/ January/ 2017	<ul style="list-style-type: none"> ◆ Site observation of technology introduction facilities of iFORCOM Tokyo Co., Ltd ◆ Discussion with Yokohama City ◆ Site observation of enterprises in Yokohama City ◆ Participation in City-to-City collaboration seminar

Source: Nippon Koei

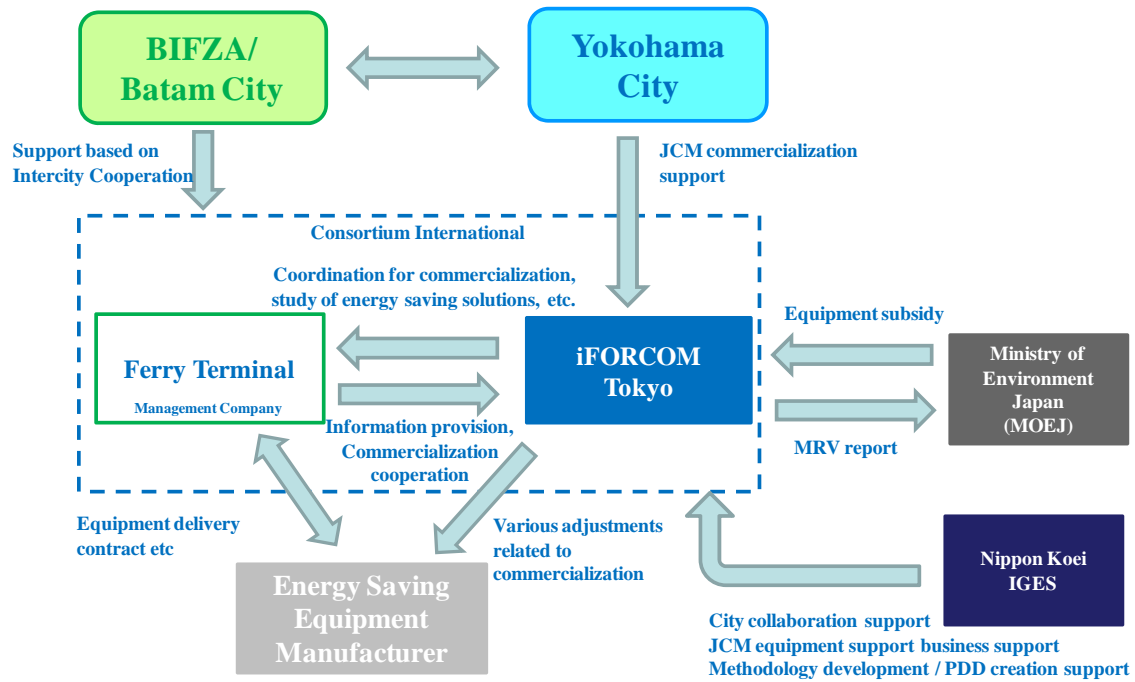
Table 2-4: Participation in International Session

No	Title	Period	Contents
1	Participation in COP	8/ November/ 2016	<ul style="list-style-type: none"> ◆ Participation in COP (Marrakech)

Source: Nippon Koei

2.2 PROJECT IMPLEMENTATION FRAMEWORK

Project implementation framework is as follows.



Source: Nippon Koei

Figure 2-1: Project Implementation Framework

CHAPTER3 FEASIBILITY STUDY OF JCM PROJECT

3.1 OUTLINE OF FACILITIES FOR INTRODUCTION OF ENERGY SOLUTION, AND CALCULATION OF ECONOMIC EFFECT

1. Design in the energy saving facilities to facilities of the central air conditioning and the operative improvement consulting introduction

I. Targets

Ferry Terminal Sekupang

II. Energy saving equipment design

a) Hearing survey was conducted for following items and possibility of facility improvement was examined.

- Number of Chillers (operating number)
- Operating time of Chillers
- Capacity of Chillers
- Number of Circulating Pump (operating number)
- Operating time of Circulating Pump
- Capacity of Circulating Pump

b) Inverter control of circulating pump (cooling pump)

Inverter control is usually set year around, but to control in terms of operation improvement, it is recommended that control values are adapted with the fluctuation of temperature in rainy season, dry season, weekdays and weekend.

c) Remote control system of inverter

Values mentioned above can be controlled from Japan, and in case the inverter would not be controlled on site, it will be able to control from Japan.

III. Operative improvement

Air conditioning method that doesn't impair the effect with low energy consumption, environmental improvement to reduce energy consumption, improvement of operation procedure, among those, an optimized method will be recommended to realize energy

saving that doesn't make negative impact to productivity and structure.

2. Design in the energy saving facilities to facilities of the separate type and the operative improvement consulting introduction

I. Targets

- Ferry Terminal Batam Center
- Ferry Terminal Harbour Bay
- Ferry Terminal Nongsa

II. Suggestion for Energy saving facilities

a) Possibility of facility improvement was examined with hearing survey of following items.

Air conditioning system

Number and capacity of outdoor unit

Introduction of inverter

b) Cyclic control of compressor of outdoor unit

A system to turn off the compressor of outdoor unit except at rising.

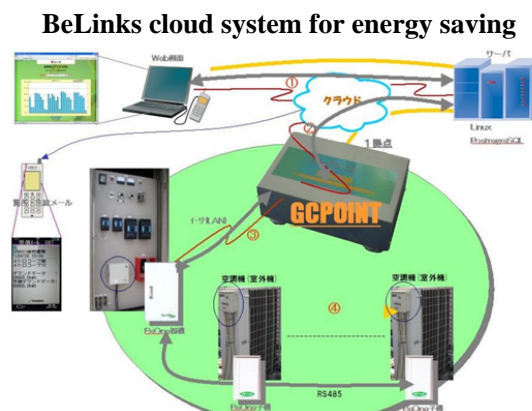
It is usually able to control twice in 30 minutes, for 3-5 minutes each time.

Rise/down schedule is recommended per the fluctuation of temperature, to control from the viewpoint of operation improvement.

Indoor condition survey and operation test are quite important as room temperature rise might happen with halt of outdoor unit.

c) Remote operation system of Cyclic control

Above set values can be controlled from Japan, and in case it could not be controlled on site, it will be able to control from Japan.



Source: iFORCOM Tokyo

Figure 3-1: Remote operation system of Cyclic control

III. Operative improvement

Air conditioning control method that doesn't impair the effect with low energy consumption, environmental improvement to reduce energy consumption, improvement of operation procedure, among those, an optimized method will be recommended to realize energy saving that doesn't make negative impact to productivity and structure.

IV. Consulting design for operative improvement

a) Site survey

Hearing survey of following items was conducted to examine operation improvement.

Number of outdoor units (actually operating unit)

Operating time of outdoor units

Capacity of outdoor units

Indoor temperature

Indoor illuminance

b) Tuning and shortening of rise/down time

Following operations are likely to be improved taking account of indoor temperature.

Shortening operation time of outdoor units

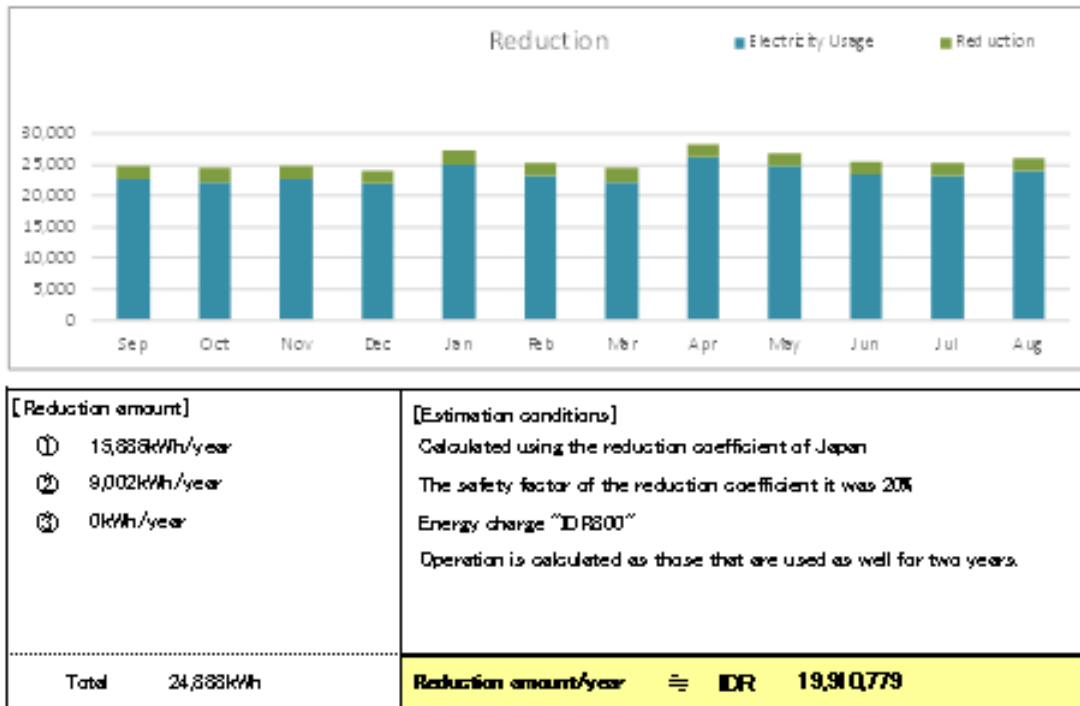
Control the number of outdoor units

Making a rule to set indoor temperature

Maintenance of indoor temperature by the control of intake and exhaust (reduction of load of outdoor unit compressor)

3. Economic Effects
 I. Ferry Terminal Nongsa

Reduction potential and power trend



Source: iFORCOM Tokyo

Figure 3-2: Reduction potential and power trend

3.2 MONITORING PLAN

1. Central air conditioning type

Measurement function

a) Real time measurement

Measurement and display of electricity data every 10 minutes are executed.

Importance of real time measurement is appeared to improve operation.

Because it is possible to confirm the result promptly from air conditioning control method that doesn't impair the effect with low energy consumption, environmental improvement to reduce energy consumption, and improvement of operation procedure.

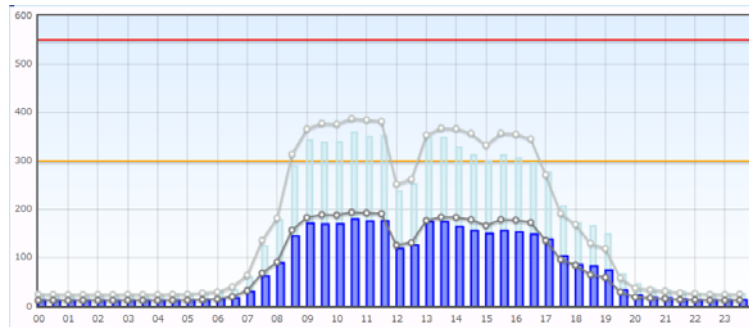
b) Remote monitoring

Monitoring situation can be controlled from Japan, and it is possible to confirm from Japan

whether operation improvement is implemented.

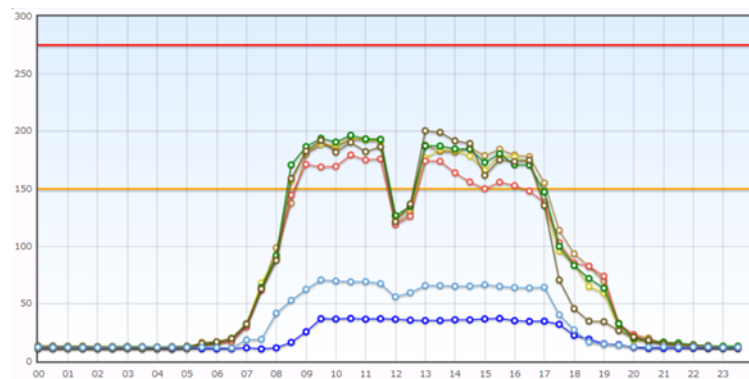
c) Analysis function

Several analyses will be implemented from electric power data at every 10 minutes
 Representative displays are as follows.



Source: iFORCOM Tokyo

Figure 3-3: Graph (one day)



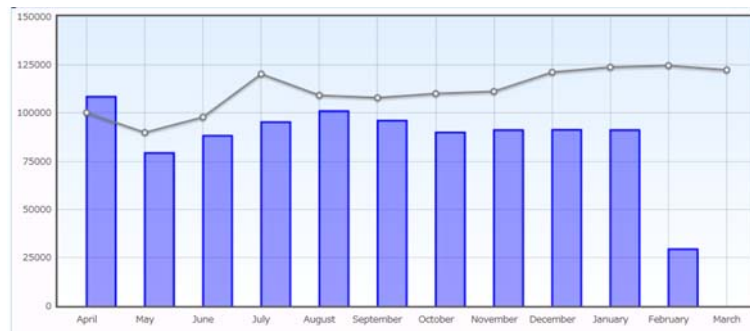
Source: iFORCOM Tokyo

Figure 3-4: Graph (one week)

Date	Object month			Comparison month		
	Operating electric energy (kWh)	Maximum demand value (kW)	Generating time	Operating electric energy (kWh)	Maximum demand value (kW)	Generating time
01	4,036.75	385.54	11:00	484.90	21.80	17:00
02	3,813.60	364.90	10:30	624.00	36.68	07:00
03	1,580.98	128.74	16:00	616.75	35.14	07:00
04	1,075.49	90.72	10:30	722.30	48.68	08:00
05	3,876.19	369.12	09:00	4,082.64	395.04	13:00
06	3,976.03	364.60	13:30	4,171.63	393.70	11:00
07	4,039.73	366.82	10:30	1,217.14	99.64	11:00
08	4,293.46	391.40	11:00	896.59	62.12	13:00
09	3,941.66	384.68	09:00	887.28	58.94	14:00
10	1,245.70	101.56	11:30	4,357.06	400.70	11:00
11	800.54	62.68	15:00	4,367.52	395.80	11:00
12	4,411.97	401.08	14:00	4,259.23	378.44	09:00
13	4,446.53	409.06	11:30	4,190.98	386.40	11:00
14	4,154.59	377.28	13:00	1,979.38	181.82	11:00

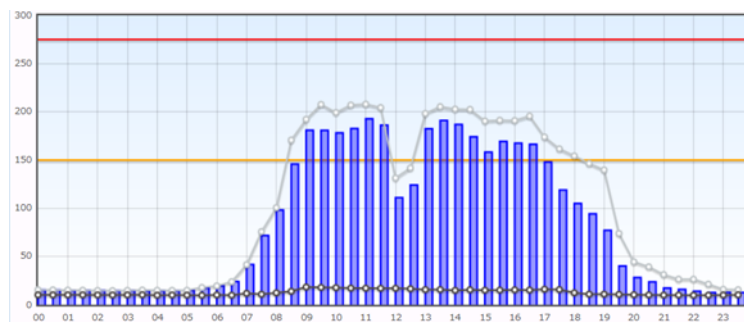
Source: iFORCOM Tokyo

Figure 3-5: Graph (one month)



Source: iFORCOM Tokyo

Figure 3-6: Graph (one year)



Source: iFORCOM Tokyo

Figure 3-7: Monthly Max-Min Graph

2. Separate type (EHP)

a) Real time measurement

Measurement and display of electricity data every 10 minutes are executed.

Importance of real time measurement is appeared to improve operation.

Because it is possible to confirm the result promptly from air conditioning control method that doesn't impair the effect with low energy consumption, environmental improvement to reduce energy consumption, and improvement of operation procedure.

b) Remote monitoring

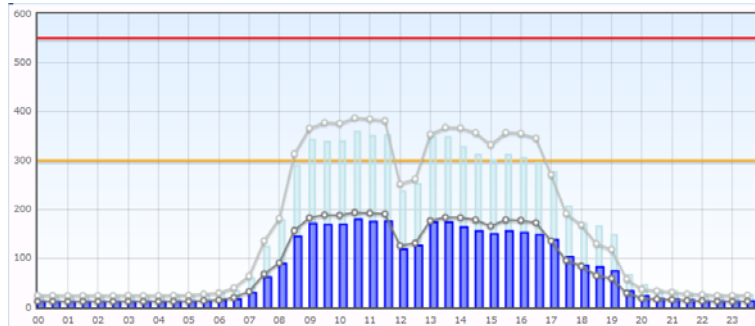
Monitoring situation can be controlled from Japan, and it is possible to confirm from Japan whether operation improvement is implemented.

c) Analysis function

Several analyses will be implemented from electric power data at every 10 minutes

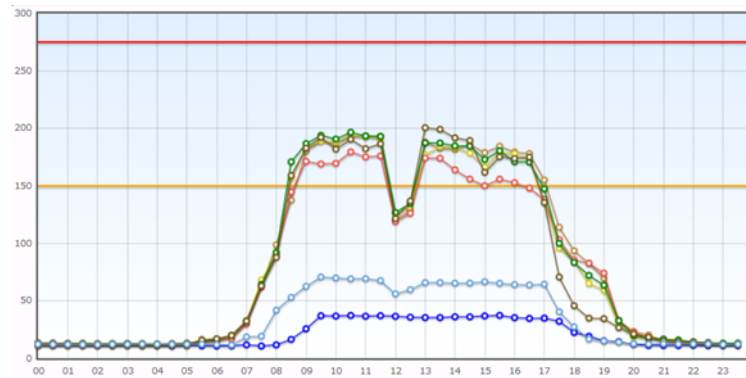
Representative displays are as follows.

*Note) Source: iFORCOM Tokyo (all figures)



Source: iFORCOM Tokyo

Figure 3-8: Graph (one day)



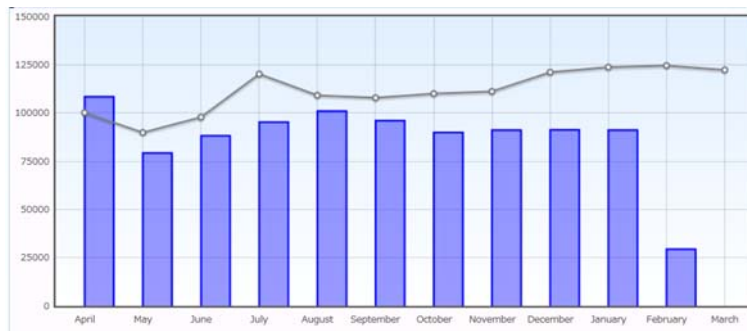
Source: iFORCOM Tokyo

Figure 3-9: Graph (one week)

Date	Object month			Comparison month		
	Operating electric energy (kWh)	Maximum demand value (kW)	Generating time	Operating electric energy (kWh)	Maximum demand value (kW)	Generating time
01	4,036.75	385.54	11:00	484.90	21.80	17:00
02	3,813.60	364.90	10:30	624.00	36.68	07:00
03	1,580.98	128.74	16:00	616.75	35.14	07:00
04	1,075.49	90.72	10:30	722.30	48.68	08:00
05	3,876.19	369.12	09:00	4,082.64	395.04	13:00
06	3,976.03	364.60	13:30	4,171.63	393.70	11:00
07	4,039.73	366.82	10:30	1,217.14	99.64	11:00
08	4,293.46	391.40	11:00	896.59	62.12	13:00
09	3,941.66	384.68	09:00	887.28	58.94	14:00
10	1,245.70	101.56	11:30	4,357.06	400.70	11:00
11	800.54	62.68	15:00	4,367.52	395.80	11:00
12	4,411.97	401.08	14:00	4,259.23	378.44	09:00
13	4,446.53	409.06	11:30	4,190.98	386.40	11:00
14	4,154.59	377.28	13:00	1,979.38	181.82	11:00

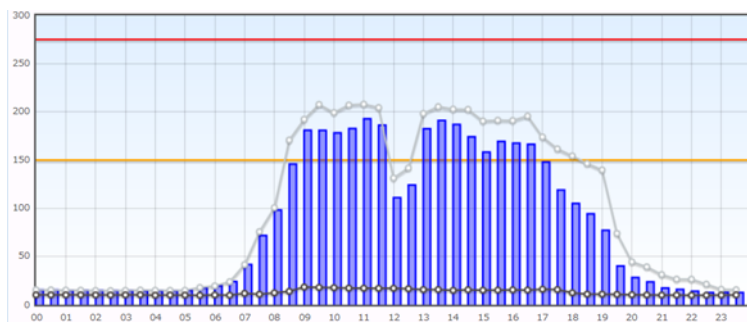
Source: iFORCOM Tokyo

Figure 3-10: Graph (one month)



Source: iFORCOM Tokyo

Figure 3-11: Graph (one year)



Source: iFORCOM Tokyo

Figure 3-12: Monthly Max-Min Graph

3.3 CONFIRMATION OF PROCEDURE FOR CONTACT WITH LOCAL CONTRACTOR

BIFZA

According to the Presidential Order No. 41 (1973), BIFZA had played a key role in industrial development, as Batam Industrial Development Authority: BIDA during Batam development period.

June 25, 2006, Indonesian Government and Singapore Government signed on “Special Economic Area Cooperation Agreement in Batam, Bintan and Karimun Islands”, agreeing that both countries would cooperate to establish Special Economic Zones: SEZs. Both countries established industrialization area in the islands, and designated Free Trade Zone: FTZ in August 2007. BIDA that was organization under the President restructured the organization in 2009, similar development organizations were established in Bintan and Karimun Islands, and the three organizations were placed under Riau Islands. BIDA that targeted only Batam area changed the name to Batam-Indonesia Free Zone Authority: BIFZA.

Thus, BIFZA that is reliable in the structure and finance is adequate as the stakeholder (counterpart) of the project.

Furthermore, the chief of BIFZA has made high evaluation to the performance of City-to-City Collaboration between Batam and Yokohama. The chief has interest to the energy saving project at Hang Nadim airport, and as its horizontal development, the chief is cooperative this survey that targets to the other facilities under BIFZA.

Table 3-1: Targets of Ferry Terminal

No	Ferry Terminal	Management
1	Ferry Terminal Sekupang	Private
2	Ferry Terminal Batam Center	Private
3	Ferry Terminal Telaga Punggur	BIFZA
4	Ferry Terminal Harbour Bay	Private
5	Ferry Terminal Marina City	Private
6	Ferry Terminal Nongsa	Private
7	Rumah Sakit Otorita Batam	BIFZA

Source: iFORCOM Tokyo

1. Ferry Terminal Sekupang

Ferry Terminal Sekupang located at JL RE Martadinata, Kepulauan Riau 29433, Indonesia is operated by PT Indodharma Corpora. PT Indodharma Corpora was established in Jakarta in 1997 along with developments of economy sector and rising industries.

PT Indodharma Corpora supports utility, port, inter modal logistic and export services, and experienced experts are working for the enterprise.

Contact person

- Person in charge : Julmarly
Position : General Manager
- Person in charge : Jhonson Gultom
Position : Chief Engineering

2. Ferry Terminal Batam Center

Ferry Terminal Batam Center located at Jalan Engku Putri (Batam Center), Kelurahan Teluk Tering, Batam Kota, Batam 29461 Indonesia is operated by PT Indodharma Corpora.

Contact person

- Person in charge : Nika Astaga
Position: Director
- Person in charge : Herdiyanto Feri
Position: Chief Engineering

3. Ferry Terminal Telaga Punggur

Ferry Terminal Telaga Punggur located at Jalan Patimura (Telaga Punggur), Batam, Kepulauan Riau, Indonesia is under construction by BIFZA.

4. Ferry Terminal Harbour Bay

Ferry Terminal Harbour Bay located at Jalan Duyung, Kelurahan Sei Jodoh, Batu Ampar, Batam 29453 Indonesia is operated by PT Citra Tritunas

Contact person

- Person in charge : Sugiarto
Position : Director
- Person in charge : Budi
Position : Chief Engineering

5. Ferry Terminal Marina City

Ferry Terminal Marina City is located at Tj. Riau, Marina City, Sekupang, Kota Batam, Kepulauan Riau, Indonesia

6. Ferry Terminal Nongsa

Ferry Terminal Nongsa located at Jl. Hang Lekiu, Sambau, Batam, Kota Batam, Kepulauan Riau 29465, Indonesia is operated by Nongsa Terminal Bahari

Contact person

- Person in charge : Muhammad Ghazali Malik
Position : Director

7. Rumah Sakit Otorita Batam

Rumah Sakit Otorita Batam is a national general hospital located at Dr. Cipto Mangunkusumo, Sekupang, Batam, Kepulauan Riau. This hospital established in 1971, and 1st hospital in Batam. According to the Ministerial order 437/MENKES/SK/V/2002, this

hospital is Type-B, and it has social provider license by Ministerial order YM.02.04.2.2.098 in June 22, 2002. Currently the hospital is expanding based on their masterplan.

When they spend their budget, they need to make tenders as it is national general hospital. They are considering if they can join the Hang Nadim airport project, JCM project by BIFZA.

Contact person

- Person in charge : dr. Zul Indra, MM
Position : Director
- Person in charge : Feri Nawa Pamungkas, SE., MARS
Position : Deputy General Director and Finance

3.4 CORDINATION FOR DETAILED CONDITIONS OF CONSORTIUM FOR JCM MODEL PROJECT

International consortium to apply to JCM Model Project will be formulated with each ferry terminal. Hence, the number of consortium is the number of ferry terminal that may participate in the project. Assumed consortiums are as follows.

3.5 ASSESSMENT AND PLAN FOR INTRODUCING ENERGY SAVING SOLUTIONS IN INDONESIA

Needs of energy saving and potential of solution introduction were surveyed.

There are potential CO₂ reductions about target ferry terminals as the regulation of air conditioner is directly corresponding to energy use. On the other hand, it is difficult to make JCM project as each scale is small. If it is possible to apply some candidates together, the project would be attractive and able to formulate JCM project.

Compared to the CO₂ reduction with facility improvement, the reduction amount of operation improvement and control of each site is small, but the method is applicable to any types of business. Therefore, with integrated approach that intergrades enterprise group, industrial complex, and local government, project size would expand, and emission reduction would largely decrease. Such energy management makes large scale energy saving, and suit to green island framework of Batam City. Therefore, formulation of JCM project could be accelerated.

It is, from now on, necessary to deem the scale and timeline, to aim to formulate attractive JCM projects, not with each enterprise but with industry and association, and to expand project scale with horizontal development for the efficient implementation of emission reduction.

3.6 CONFIRMATION OF CONTRACT WITH EQUIPMENT MANUFACTURES AND SYSTEM DEVELOPER

Through the study, providers of the equipment and systems (3 companies in Japan) agreed to provide their technologies for the JCM project in Indonesia.

CHAPTER 4 HARMONIZATION OF JCM MODEL PROJECT AND THE MASTER PLAN OF BIFZA/BATAM CITY

4.1 FORMULATION OF TASK FORCE

“JCM Project Formulation Study through City-to-City Collaboration between Batam City and Yokohama City” funded by the Ministry of Japan has been conducted since FY 2015, and to firmly advance the project formulation, a task force was established this year. The purpose is to produce a sustainable urban development in Batam City, and the members are Yokohama City, Batam City, and stakeholders of City-to-City collaboration.

Major role of the task force are as follows.

- (i) Regarding activities under JCM, all solutions of issues and support are implemented.
- (ii) Not only JCM, priority projects are identified based on the expertise of urban development and advanced environmental technology of enterprises of Yokohama City. Using those, City-to-City collaboration is proceeded with in a wide range of areas, e.g. project map making to visualize smart green island concept in Batam City.

Responsible organization of the task force is as follows.

(a) Batam side

- (i) Batam City:
Environmental Control Board
- (ii) BIFZA:
Deputy Chairman of Other Business Facilities

(b) Yokohama side

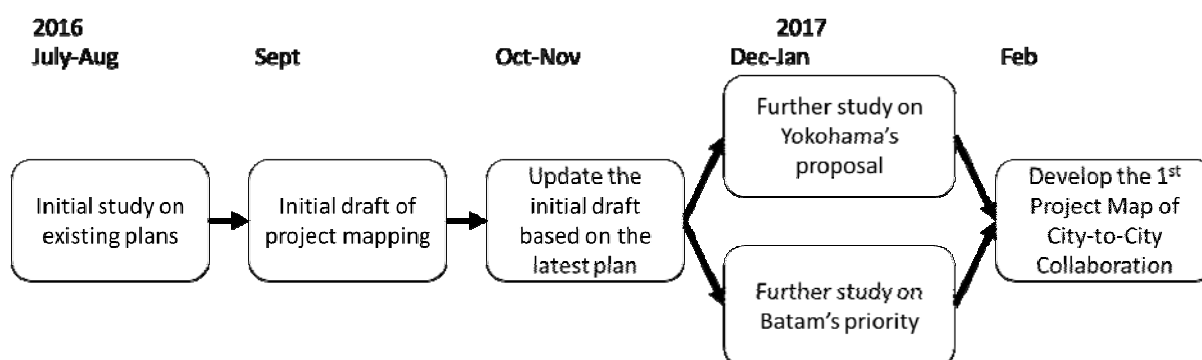
- (i) Yokohama City (Y-PORT center):
- International Cooperation Department, International Bureau
- (ii) IGES (Y-PORT center):
- Climate change and energy division

During implementation period of the JCM study, related people agreed that Nippon Koei would be secretariat of the task force. The secretariat of the task force supports that members

of the task force would make good communication and they could advance the study without any delay.

4.2 STUDY OF MASTER PLANS OF BIFZA AND BATAM CITY

In this project, the project maps were developed to arrange the orientations of city-to-city collaboration between Batam and Yokohama. The flow is shown below. At first, the master plans of BIFZA and Batam City were collected and studied.



Source: Nippon Koei

Figure 4-1: Flow of Project Map Development

Summary of the master plans studied are shown as below.

Table 4-1: Studied master plans

Master Plans	Outlines of Master Plan	Note
RPJMD	Midterm (5 year) development plan of Batam City, whose target period is 2016-2020. It was revised after the new Mayor was appointed in 2016. Following 6 missions are addressed in the plan. 1. Good Governance 2. Human Resource Development 3. City with Comfort 4. Strengthening and diversifying industry 5. Community development 6. Rural area development	Plans mostly covers the activities funded by the city's budget
Green City Program	Batam City is preparing Green City Program with the support of ADB. Target year is 2050. 3 pillars of the program consist of 1. Safe and comfortable city 2. Green city which is resilient to climate change and disasters 3. Smart city which has competitiveness and technologies	To be finalized soon

Green City Action Plan	Detail action plan based on Green City Program Priority program: 19, Selected projects: 9	Everything are not yet budgeted
BIFZA Development Strategy	To promote industry and business, following 5 strategies are raised. 1. Improvement of investment and business environment, 2. Improvement of integrated promotion system, 3. Development and improvement of infrastructure, 4. Regulation and institution, and 5. Improvement and development of human resources.	
BIFZA Project Pipeline	Infrastructure development for transportation and water, cleaner production and renewable energy are studied are following potential projects are listed. 1. Tanjung Sauh Transshipment Container Port 2. General Cargo Port of Sekupang 3. Batam Light Rail Transit (LRT) 4. Passenger Terminal-2 hang Nadim Airport Batam 5. Cargo Terminal of Hang Nadim Airport Batam 6. Batam Toll Road (Phase-1) 7. Batam – Bintan Bridge 8. Batam Waste Water Treatment Plan (WWPT) Phase-2 9. Batam e-Government Phase-2	Considering inviting solar and LED production factory, and introducing renewable energy

Source: summary of each plan by Nippon Koei

4.3 PROJECT MAP

In this project, the objectives of project maps are arranged as below.

1. A Tool to build mutual understanding on the direction of city-to-city collaboration between Batam and Yokohama
 - Needs of Batam towards green city
 - Green technologies and partners of Yokohama
2. A tool enabling to invite outside support more smoothly, such as from Government of Japan (MoE, METI, JICA, etc.), Government of Indonesia (APBN, etc.), development banks and private investors

The expected activities and technologies in need in Batam are summarized as below and information was disseminated through the public information system of City of Yokohama (ex. Y-Port Newsletter and related seminar) and seminars conducted by the project.

Table 4-2: Expected Activities and Technologies for Batam

Sector	Expected activities	Core technology (Sample)
Saving energy	<ul style="list-style-type: none"> - Eco-industrial park - Support for small and Medium sized companies - Eco tourism development and promotion of tourism industry - Development of eco-friendly infrastructure - Building considered for saving energy 	LED lighting, high-efficiency chillers, saving energy technology, renewable energy technology such as solar PV and wind power, utilization of natural gas, development of association for local small and medium sized companies, idea for eco-city, idea for zero-emission industrial park, eco-tourism, telecommunication technology etc
Water	<ul style="list-style-type: none"> - Management of water quality and river head - Conservation of dam and reservoir - Reuse of industrial and commercial waste water - Development of sludge disposal facility 	SCADA system, high efficiency pump, water purification facility, flatling materials, solar PV system, development of recycling water, water treatment facility, compost of sludge, fuel compound etc
Waste management	<ul style="list-style-type: none"> - Development of incinerator facility - Development of waste disposal facility - implementation of 3R 	Incinerator, petrochemical facility, utilization of wastes of building and tankers etc
Transportation	<ul style="list-style-type: none"> - Development of BRT - Development of ITS 	Management of Bus operation, hybrid bus, management of road traffic, utilization of recycle material for road bed, LED street light

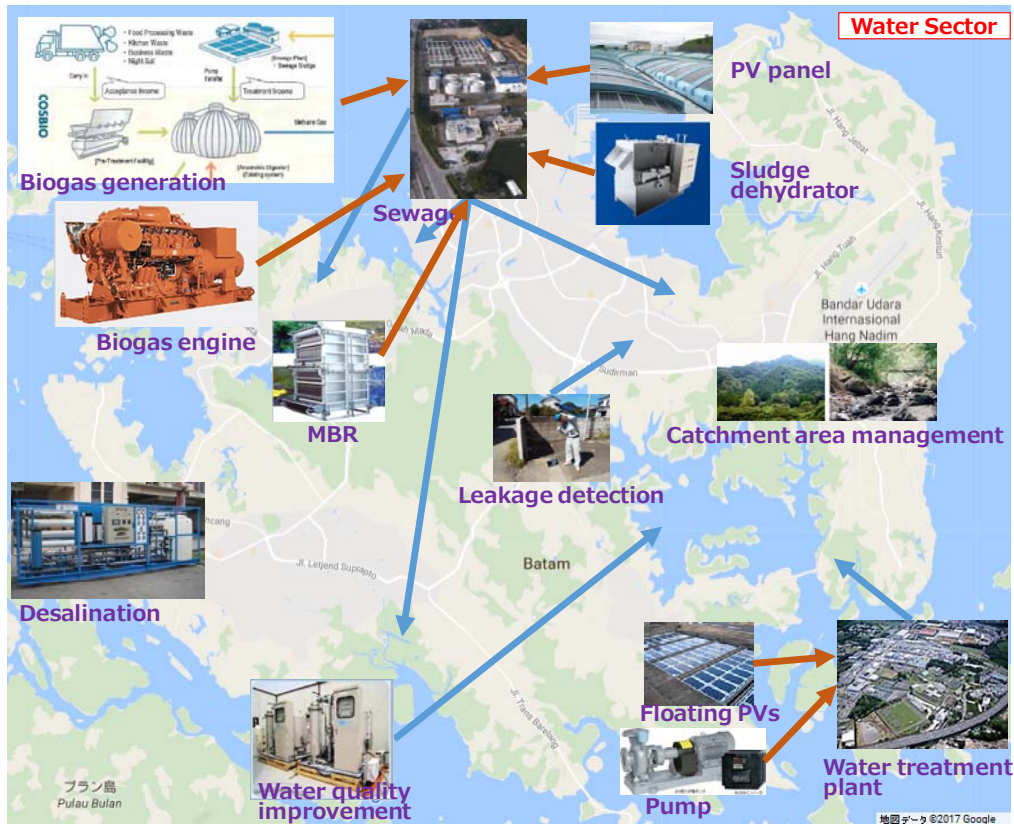
Source: Nippon Koei

Since RPJMD (midterm development plan of Batam City) summarizes mostly the plans which can be implemented by city budget (APBD) and administration of Batam island is unique in the sense that not only City Government but BIFZA holds the authority to promote infrastructure development, the project arranges the concept of green island under city-to-city collaboration from following 6 core aspects through the discussion with Batam side.

Table 4-3: 6 Core Aspects of Green Development

Core Aspects	Reason of setting the aspect
Green Planning	Followings are in need by the government officials: <ul style="list-style-type: none"> - Mainstreaming of climate change mitigation and adaptation is required for master plans such as spatial plan, energy saving plan and water resource management plan - Setting GHG reduction target
Green Water	Water is considered to be in shortage within 10 years and the bottleneck of carrying capacity of Batam Island is studied to be the water issue (without countermeasures, population of 1.7 million is

For some sectors, visualized project maps are prepared. Examples are shown below.



Source: Nippon Koei

Figure 4-2: Project Map: Green Water



Source: Nippon Koei

Figure 4-3: Project Map: Green Industry

4.4 INVITATION TO JAPAN (CITY OF YOKOHAMA, JCM SEMINAR(KITA-KYUSYU), BIFZA INVESTMENT SEMINAR, JCM SEMINAR (TOKYO))

[Invitation to Yokohama City, JCM seminar (Kitakyuusyu City)]

The Study invited staff from BIFZA and Batam City respectively, when JCM seminar organized by the Ministry of Environment Japan was held in Kitakyuusyu City on 20th and 21st October 2016, the period of their trip was from 17th - 21st October 2016. They observed energy saving technology in a factory of iForcom Tokyo and Smart Green Park of Finetech that these companies participate in the Study in this Fiscal Year. They discussed on the progress, issues, and countermeasures of the project at the sites from 17th – 19th October. In JCM seminar, they presented regarding the project and observed facilities of low carbon technologies in Kitakyuusyu.

<Invitation and observation of facilities in Yokohama>



Courtesy call



Discussion with invitees from Batam City



Smart Green Park of Finetech



Smart Green Park of Finetech



Smart Green Park of Finetech



Smart Green Park of Finetech



Shiroyama Industry that use energy saving system of iFORCOM Tokyo



Shiroyama Industry that use energy saving system of iFORCOM Tokyo

Source: Nippon Koei

<JCM seminar in Kitakyuusyu City>



Presentation by Mr. Azril, Batam City

Source: Nippon Koei



Presentation by Mr. Okuno, Yokohama City

<Facilities of low carbon technology in Kitakyuusyu City>



Environmental Museum



Next-generation energy park (wind power energy)



Next-generation energy park (EV bus)



Kougasaki factory

Source: Nippon Koei

[BIFZA investment seminar (City of Yokohama)]

On 25th of November 2016, the seminar of Investment in Batam Free Zone was held by BIFZA in City of Yokohama.

Programme

Time	Program	Speaker
14:00-14:10	Opening remarks	Mr. Ben Perkasa DRAJAT (Deputy Chief of Mission, Indonesian Embassy in Tokyo)
14:10-14:50	The latest situation of investment in Indonesia	Mr. Saribua Siahaan (Representative, Tokyo Office, Indonesia Investment Coordinating Board (BKPM))
14:50-15:30	Batam Free Zone	Mr. Gusmardi (Batam Free Zone Authority, Deputy

		Chairman)
15:30-15:50	Introduction of THE YOKOHAMA RUBBER CO., LTD' factory in Batam	Mr. Tetsuya Tamashiro (THE YOKOHAMA RUBBER CO., LTD)
15:50-16:10	Introduction of Batamindo Industrial Park	Ms. Amelia Chia (Senior Executive, Riau Investment Marketing, Gallant Venture Ltd.)
16:10-16:30	Closing remarks	Mr. Hajime Kinoshita, Chairman (Senior Advisor to Batam Free Zone Authority, Jawa Timur Province)

Source: Nippon Koei

[JCM seminar (Tokyo)]

The Study invited staff from BIFZA and Batam City respectively, when JCM seminar organized by the Ministry of Environment Japan was held in Tokyo on 23rd January 2016, and each participant reported activities and outputs of the project.

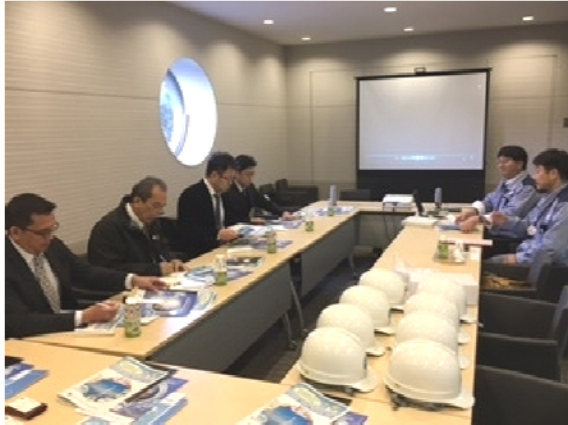
Vice-Managing Director, Mr. Robert visited Japan from BIFZA, and observation of environmental technology related to the projects and meeting with the Ministry of Environment Japan were implemented on 22nd and 24th January. The schedule is as follows.

Programme

Date/ Time	Site	Contents
22/ January/ 2017 13:30~	Hotel New Akao	Explanation on inverter that is used in the hotel (iFORCOM Tokyo plans to install the same type of inverter into Hang Nadim Airport in Batam city.)
24/ January/ 2017 9:30~10:00	MOEJ	Discussion JCM model project in FY2016 in Hang Nadim Airport
13:30~16:30	JFE Kankyo	Inspection of waste disposal treatment plant 1. Introduction of JFE kankyo 2. Recycle plant for wasted fluorescent tube 3. Recycle plant for plastic material 4. The latest incineration facilities of the industrial waste 5. Discussion of potential for developing business in Batam

Source: Nippon Koei

<Observation at JFE Environment>



Explanation of JFE Environment



Recycling factory of Fluorescent light



Plastic recycling factory



Group Photo

Source: Nippon Koei

4.5 SEMINAR (KICK-OFF SEMINAR, FINAL SEMINAR)

[Kick-off seminar]

Kick-off seminar was held in July 2016

Agenda:

- Date: July 14, 2016
- Time: 13:00 to 16:00, to be determined
- Venue: Harris Hotel in Batam

Time	Program	Speaker
13:00-13:05	Introduction of participants	MC
13:05-13:15	Opening remarks	Batam city
13:15-13:25	Opening remarks	BIFZA
13:25-13:45	Opening remarks	City of Yokohama

13:45-14:00	Current situation of JCM in Indonesia (tentative)	Indonesia JCM secretariat
14:00-14:15	Key note – Master plan	Batam city
14:15-14:30	Key note – Waste to energy	Batam city
14:30-14:45	Key note – TBD	BIFZA
14:45-15:00	Tea break	---
15:00-15:15	JCM project formulation study	iFORCOM etc.
15:15-15:30	JCM project formulation study	Finetech etc.
15:30-15:40	Way forward in 2016	Nippon Koei
15:40-15:45	Announcement of new member of “Task force for the city-to-city collaboration between Batam and Yokohama”	
15:45-15:55	Closing remarks	Batam city
15:55	Close	---

Source: Nippon Koei

<Kick-off seminar>



Venue



Opening remarks by Mr. Dendi



Key note by Mr. Azril



Key note by Mr. Binsar



Discussion



Way forward in 2016 by Mr. Ohuchi



Questions and Answer



Group Photo

Source: Nippon Koei

[Final seminar]

On 18th of January 2017, the final seminar was conducted and on 19th site tour in the Batam city was held inviting Japanese companies.

Overall Agenda (18th and 19th January):

Date	Time	Program	Venue
18 Jan (Wed)	AM	Site tour: Visit potential project sites in Batam by Japanese companies with technologies (Sewage, water recycling, desalination, LED streetlight with Wi-Fi, waste management (municipal solid waste and industrial waste), airport expansion)	Sites in Batam island
	PM		
19 Jan (Thu)	AM	Final Seminar	Harris hotel Batam center
	14:00 15:00	Courtesy call on Chairman of BIFZA Courtesy call on Mayor of Batam City	Offices of BIFZA and Batam City

Source: Nippon Koei

The site tour was conducted for the following agenda.

- The tour aims to give prospective business partner, which are Japanese companies with high-end environmental technologies opportunities to see potential project sites.
- It also aims to introduce Japanese technologies which help issues of Batam city to the Batam side
- It discusses with Batam side about necessary data collection and actual needs considering future project.

Several Japanese companies such as Stanley Electric Co., Ltd, AGC, Kashima corporation, and Finetech co., ltd joined the site tour. Those companies have high technologies such as LED light, solar PV system, heat shield paint, sewage disposal, oil sludge treatment, and Advance Energy Management System (AEMS). Staffs from BIFZA and Batam city joined the tour and discussed for development policy of Batam city.

Schedule for site tour is indicated in the following table.

Time	Site	Technology	contents
08:30~10:00	Waste Water Treatment Plant in Batam Centre	Waste water treatment	
10:30~12:00	Dinas PU Kota Batam	LED streetlight	
12:30~13:30	Lunch		
14:00~14:30	Garbage Collection site	Waste disposal treatment	
15:00~16:30	Hang Nadim International Airport	Heat insulating coating structure , AEMS	

Source: Nippon Koei

Approximately 70 participants from BIFZA, Batam city, Yokohama city, and Japanese companies attended the final seminar on 19th. In the seminar, the result of the feasibility study was reported. Also, Japanese companies presented their technology and actual cases in the world.

Detail agenda for Final Seminar on 19th January 2017

Time	Program	Speaker
8:40-9:00	Registration	---
9:00-9:05	Introduction of participants	Mr. Amir Rusli (MC)

9:05-9:15	Opening remarks	Dr. Ir. Purba Robert Sianipar (BIFZA)
9:15-9:25	Opening remarks	Batam city
9:25-9:45	Presentation on City to City Collaboration/City of Yokohama	Mr. Toru Hashimoto
9:45-9:55	Overall progress of the study/Nippon Koei	Mr. SAITO Tetsuya
9:55-10:15	Result of JCM project formulation study/ iFORCOM	Mr. Erwin Avianto
10:15-10:35	Result of JCM project formulation study/ Finetech	Mr. Motoyuki Okada Mr. Kikuo Sagawa
10:35-10:50	Tea break	---
10:50-11:00	Introduction of green technologies/ Hitachi, Ltd.	Mr. Katsumi Shida
11:00-11:10	Introduction of green technologies/ AGC Asahi Glass Co., Ltd.	Mr. LIM Yew Meng
11:10-11:20	Introduction of green technologies/ Kajima Corporation	Mr. Ryohei Tsukada
11:20-11:30	Explanation of relevant technologies of 3 or 4 companies (LED: Stanley Electric and Sodick LED, water leakage monitoring system: Suido Technical Service, IT: NEC)	Nippon Koei Co., Ltd
11:30-12:20	Panel session on Project Map - Introduction of RPJMD and green city program (Batam City) - Potential development projects (BIFZA) - Draft project map (Nippon Koei) - Contribution from City of Yokohama (City of Yokohama) Discussion	BIFZA Batam City City of Yokohama Nippon Koei iFORCOM Finetech
12:20-12:30	Implementation of JCM Project in Indonesia/ Indonesia JCM secretariat	Mr. Dicky Edwin Hindarto
12:30-12:35	Closing remarks	BIFZA
12:35-12:40	Closing remarks	Batam city
12:40-12:50	Way forward to Activities in 2016/ City of Yokohama	Mr. Toru Hashimoto
12:50-	Lunch	---

Source: Nippon Koei

< Site tour and final seminar >



Site Tour(WWTP)



Site Tour (group photo)



Site Tour (LED streetlight)



Site Tour (Waste Disposal)



Site Tour (Hang Nadim Airport)



Final seminar: Opening remarks by Mr. Dendi
(Batam City)



Presentation by AGC



Presentation by Kajima Corporation



Presentation by Mr. Dicky



Venue



Panel Discussion



Presentation by Nippon Koei



Closing remarks by Mr. Robert
(BIFZA)



Closing remarks by Mr. Hashimoto
(City of Yokohama)

Source: Nippon Koei

CHAPTER 5 ATTENDANCE TO INTERNATIONAL CONFERENCE

5.1 PARTICIPANTION IN COP22

Yokohama city staff, Mr. Nakamura attended to COP22 which was held in Marrakech from 8th to 18th of November in 2016. The project for city to city collaboration between Batam city and Yokohama city was presented at Japan pavilion on 8th as one of the event of JCM seminar.

The main points of the presentation were summarized in the following.

- Overview and history of development of Yokohama city
- Activities aiming for reduction of GHG emission by Yokohama city such as private and public collaboration by YSCP and YSBA and action plan
- Feasibility study for JCM project by city to city collaboration such as B to B and B to G projects in Batam city

In the panel discussion after the presentation, the following issues were discussed.

- Merits for project formulation under city to city collaboration compared to project formulation without such scheme
- Making consensus in the city as well as the external entities for local government's international cooperation
- Issues for conducting feasibility study by city to city collaboration from the view point of under policy

-

<COP22>



Japan pavilion at COP22



Panel discussion



Booth at Japan pavilion



PR by Yokohama city



COP22 venue



COP22 venue

Source: City of Yokohama

CHAPTER 6 ISSUES AND FUTURE PLANS

6.1 ISSUES

Through this project, especially through the development of project map, various kinds of needs of Batam are confirmed and arranged. These needs are related to low carbon development and climate change mitigation and adaptation, however, there are many of them being difficult to be solved with JCM projects considering the cost effectiveness on GHG reduction from energy sources.

Not only the feasibility studies of individual projects, but also the support from City of Yokohama regarding policy planning and target setting toward Batam administrations under the umbrella of city-to-city collaboration is needed as well. Thus, it is even clearer now that promotion of city-to-city collaboration should not be limited to the project development and participation in seminars but transferring administrative knowledge, methodologies and experiences of City of Yokohama as experienced local government toward Batam is required.

More concretely, these are pointed out from Batam side.

1. BIFZA requested City of Yokohama to sign officially for the collaboration.
2. Not only the technologies of companies in Yokohama, administrative capacity of City of Yokohama is expected to be transferred.
 1. Setting energy saving / GHG reduction target
 2. Promotion of green building
 3. Green land use planning
3. Comprehensive support for water sector both in planning and implementation, and participation for waste sector projects
4. Pilot projects in industrial parks

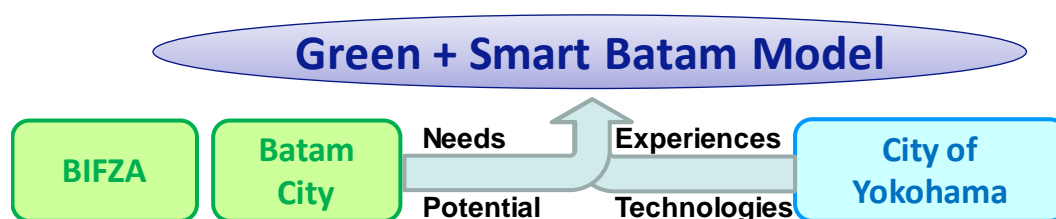


Source: Nippon Koei

Figure 6-1: 2017/1/19: Courtesy call to the chairman of BIFZA (BIFZA suggested the more officialized collaboration with City of Yokohama)

6.2 FUTURE PLANS

Based on the issues identified as above, it was agreed by Batam side and City of Yokohama to find the best available solutions for Batam not by copying the experience and regulations of Yokohama, but by developing the most appropriate system through discussions in city-to-city collaboration.



Source: Nippon Koei

Figure6-2: Image of City-to-City Collaboration between Batam and Yokohama

From April 2017, based on the result of these F/S, following three JCM model projects are under development to be proposed. The ideas are already explained to Batam side and confirmed this orientation.

Table 6-1: JCM Model Projects to be proposed in FY2017

	Company	Project	Cost (million JPY)	Emission Reduction (tCO ₂) *
1)	iForcom	Energy saving of Hang Nadim Airport	40	585
2)	iForcom	Energy saving of Haris Hotels/18 hotels	100	2,368
3)	Finetech	Thermal desorption unit + PV(2MW)	700-800	12,000

Source: Nippon Koei

*Emission reduction is under review

For FY 2017, both Batam side and City of Yokohama showed strong interest in continuing this city-to-city collaboration scheme and considering the preparation of several proposals. Followings are the key points for developing F/S idea in FY2017 through the experiences of this project.

1. Proposal of rules, regulations and/or institutions
 - (I) Introduction of green building concept

In the center of Batam, many high buildings are planned to be constructed. Considering the urgent needs of water and energy conservation, green buildings are highly expected.

Department of Environment of Batam City and JCM secretariat of Indonesia mentions that Batam needs the regulations on green buildings like Jakarta and Bandung and support from City of Yokohama through city-to-city collaboration is important to introduce systems to promote green buildings in Batam.

(II) Setting emission reduction target

Government of Indonesia commits the GHG emission reduction to the international society following Paris agreement. Currently, GHG emission reduction action plan is under development in the central and provincial level in Indonesia, but not in the city and regency level. Through city-to-city collaboration it is expected that Batam city becomes one of the pioneer local government body to set such target.

(III) Incentives and drivers for better spatial management, permissions for construction and energy saving

It is necessary to issue Mayor's decree in line with promoting system for green building. Sharing experience and advice from City of Yokohama would be beneficial for drafting such decrees.

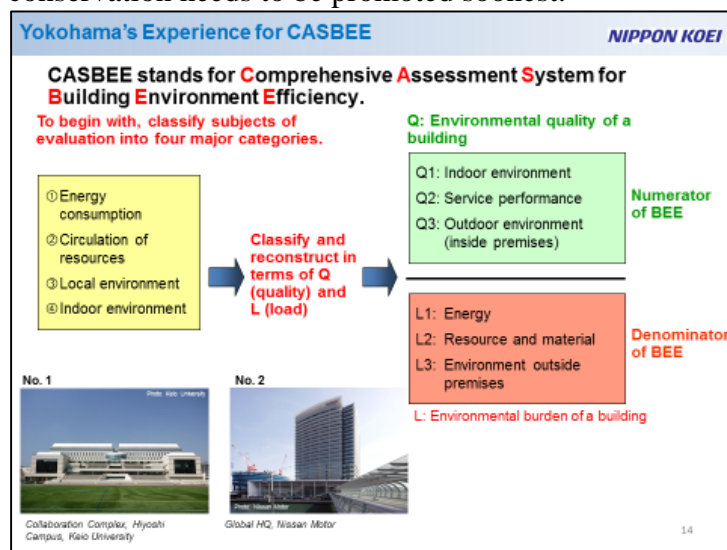
2. Matching with the needs of Batam side

(I) Reference to the project map

It is good to utilize the project map developed by this project since it is prepared to share the common understanding on the orientation of city-to-city collaboration and to mobilize outside finance. It is also important to continue updating this project maps.

(II) Green building

As above, green building initiative especially regarding energy and water conservation needs to be promoted soonest.



Source: Nippon Koei based on the presentation material of City of Yokohama

Figure6-3: Yokohama’s experience in Green Building

Green Building Concepts by GBCI				
NIPPON KOEI				
Tabel Jumlah kriteria dan tolok ukur yang ada dalam setiap kategori				
Kategori	Jumlah Kriteria			Jumlah Tolok Ukur
	Prasyarat	Kredit	Bonus	
Appropriate Site Development	2	7		26
Energy Efficiency and Conservation	2	5	2	30
Water Conservation	1	7	1	15
Material Resource and Cycle	3	5		17
Indoor Health and Comfort	1	8		22
Building and Environment Management	1	5		11
Jumlah Kriteria dan Tolok Ukur	10	41	3	121

Through the discussion with GBCI, we would like to propose following approaches.

- We want to develop
 - (i) best available solutions in terms of effect and cost
 - (ii) standardization of green building which is suitable for Batam
- For example, in Batam, we consider (1) energy efficiency and conservation and (2) water conservation are very important

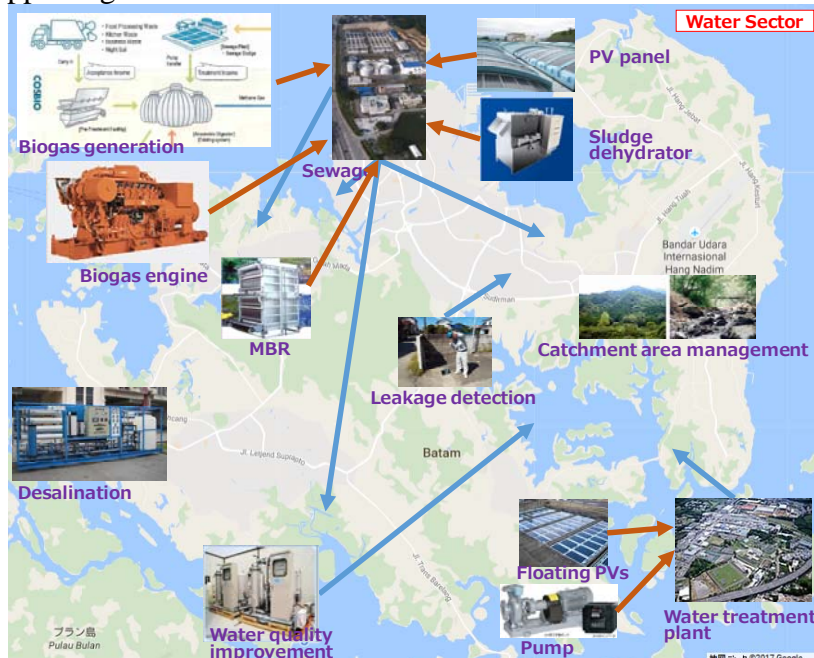
13

Source: Nippon Koei based on the document of GBCI

Figure6-4: Green building concepts of GBCI

(III) Water sector

Considering high needs from Batam side, initially the application of JCM is required to be studied. Additionally, it is required to explore the potential supporting scheme and finance other than JCM.



Source: Nippon Koei

Figure6-5: Project Map: Green Water (Re)

(IV) Support of Industrial Park

Batam side requires the implementation of symbolic project and expects the pilot project with large scale industrial parks in Batam. It is also noted that the large industrial parks can be good partner organization for development of JCM Model Project.



Source: Nippon Koei

Figure6-6: Project Map: Green Industry

3. Priority in potential collaboration with Industrial Parks
 - (I) JCM projects with B to B concept

When infrastructure project is developed with JCM, Batam island is so big that the target should be limited and pilot project approach should work better. “Industrial park” is good as a unit to implement JCM projects in the perspective of the scale, and B to B approach would be more smooth to formulate JCM projects, and industrial parks are better in financial terms compared with the individual companies.

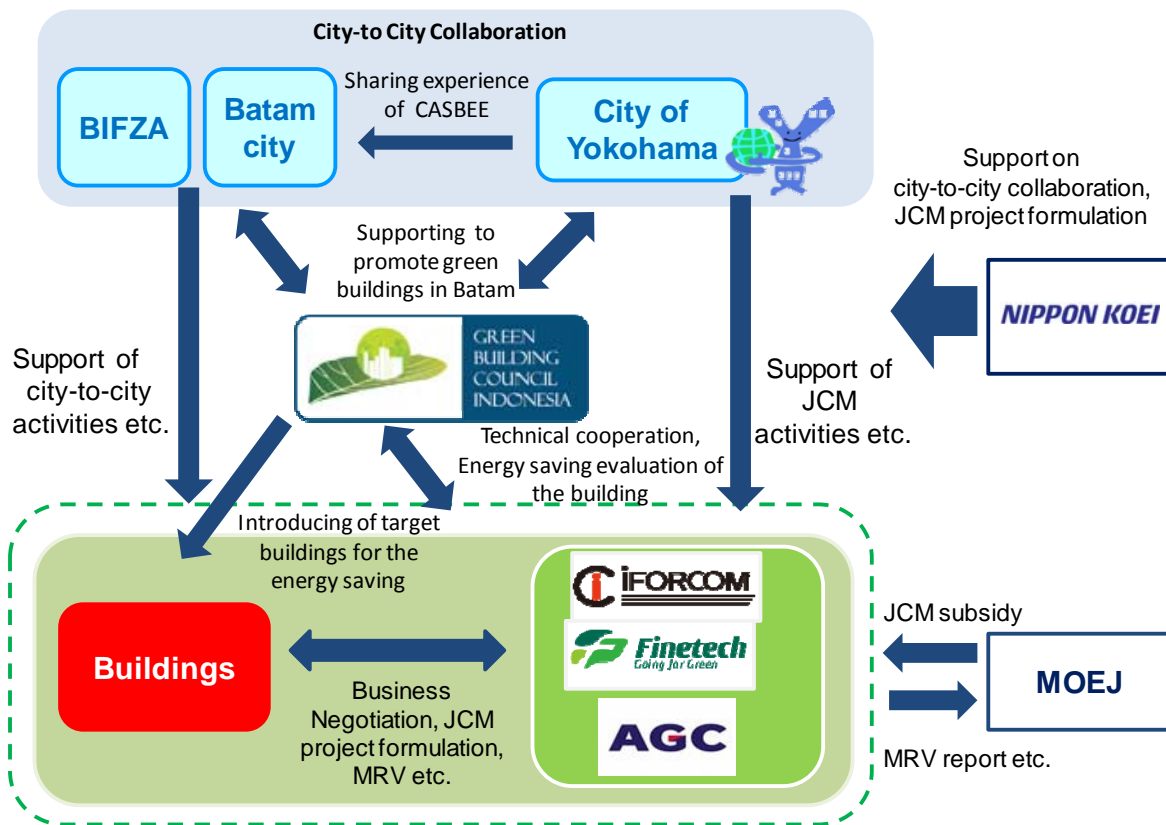
4. Project development considering the characteristic of city-to-city collaboration
 - (I) JCM projects with B to G concept

Besides the discussion above, it is needed to explore the potential of B to G project to maximize the merit of city-to-city collaboration. Especially, JCM project for Hang Nadim airport is highly prioritized to be successful so that other B to G projects can be promoted.

Finally, implementation structure for potential F/S is shown below. By cooperation with Green Building Council Indonesia (GBCI), a NGO which promotes green building concepts in Indonesia, it is enabled to establish green building promotion system such as local regulations. It is finally to standardize the green building concepts for each building type in

Batam island.

GBCI employs 6 criteria (site development, energy saving, water conservation, construction material, internal environment, and environmental management) to assess buildings, and among 6 criteria, energy and water conservation is the most important. The project members already agree to propose two F/S regarding this theme to localize GBCI's initiative in Batam.



Source: Nippon Koei

Figure6-7: Concept of F/S in FY2017: Standardization of Green Building