FY2019 Project for Ministry of the Environment Japan

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

City-to-City Collaboration Project Between
Rokan Hulu Regency and Kawasaki City
(Project to Promote Circular Economy for Palm Industry
in Riau Province Region)

Report

March 2020

Nippon Koei Co., Ltd.
Kawasaki City

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

City-to-City Collaboration Project Between Rokan Hulu Regency and Kawasaki City (Project to Promote Circular Economy for Palm Industry in Riau Province Region)

Report

Table of Contents

Page

List of Attachments

List of Tables

List of Figures

Abbreviations

Abbreviation	English
ASEAN	Association of South-East Asian Nations
BAU	Business as usual
BEMS	Building and Energy Management System
BtoB	Business to Business
CDP	Carbon Disclosure Project
CNG	Compressed Natural Gas
COP	Conference of the Parties
EFB	Empty Fruit Bunch
EPC	Engineering, Procurement and Construction
ESCO	Energy Service Company
ESDM	Ministry of Energy and Mineral Resource
ESG	Environment, Social, Governance
EV	Electric Vehicle
FFB	Fresh Fruit Bunch
FFEC-ID	PT.Fuji Furukawa E&C Indonesia
FFEC-JP	Fuji Furukawa E&C headquarter
F/S	Feasibility Study
GHG	Green House Gas
HCV	High Conservation Value
IGES	The Institute for Global Environmental Strategies
IP	Identity Preserved
IPP	Independent Power Producer
IRR	Internal Rate of Return
JaSPON	Japan Sustainable Palm Oil Network
JCM	Joint Crediting Mechanism
KIT	Kawasan Industri Tenayang
LED	Light Emitting Diode
LHV	Lower Heating Value
LPJK	Lembaga Pengembangan Jasa Konstruksi
MB	Mass Balance
MF	Mesocarp Fiber
NDC	Nationally Determined Contribution
OM	Operation & Maintenance
PBM	PT.Pasadena Biofuels Mandiri
PKS	Palm Kernel Shell
POME	Palm Oil Mill Effluent
PLN	National Electricity Company (PT Perusahaan Listrik Negara /Persero)
PPA	Power Purchase Agreement
PTPNV	PT. Perkebunan Nusantara V(PERSERO)
RAD-GRK	Regional Action Plan for Greenhouse Gas Emission Reduction
RAN-GRK	National Action Plan for Greenhouse Gas Emission Reduction
RUEN	Grand National Energy Plan 2015-2050

Abbreviation	English
R&C	Principle & Criteria
RSI	PT. Rohul Sawit Industri
RSPO	Roundtable on Sustainable Palm Oil
SC	Supply Chain
SDGs	Sustainable Development Goals
SG	Segregation
WWF	World Wide Fund for Nature

CHAPTER 1 BACKGROUND AND OBJECTIVE

1.1 BACKGROUND OF THE STUDY

In December 2015, all countries participated in United Nations Framework Convention on Climate Change 21st Conference of the Parties (COP21) which was held in Paris, France. In the COP21, Paris Agreement was adopted as a legal framework of fair and practical countermeasure 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. 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 out 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 lives in urban areas and the percentage is predicted to increase to 70% by 2050. Also, it is estimated that more than 70% of global CO2 emissions are emitted from cities as of 2006. Hence, cities have important roles for mitigation of climate change. Thus, implementation of countermeasures to climate change and greenhouse gas (GHG) emission reduction in cities are important for achievement of the goal of Paris Agreement.

In Indonesia, the Government of Indonesia established National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK), and each regional government enacted Regional Action Plan for Reducing Greenhouse Gas Emissions (RAD-GRK) in 2013. In addition, Grand National Energy Plan 2015-2050 (RUEN) formulated in January 2017, particularly considers promoting energy saving and utilization of natural gas in Indonesia as priority countermeasures. Furthermore, Indonesian Government has promised to reduce 29% of GHG emission compared to Business As Usual (BAU) according to their NDC, and in case international assistance such as JCM is introduced, their target is 41% in NDC. Therefore, Indonesia is expecting to implement JCM, which Indonesia and Japan signed, for achievement of the target in NDC.

Rokan Hulu Regency, the main target of this project, is located in Riau Province in central area of Sumatera Island. Estimated population Riau Province as of 2017 is 6.65 million (Provinsi Riau Dalam Angka 2018). While 1.09 million people live in the capital city, Pekanbaru, population of Rokan Hulu is 0.55 million (Announcement of Regent Government).

Core industry in Riau Province is palm oil and both production (7.72 million ton) and cultivation area (2.26 million ha) are the largest in Indonesia (Statistik Kelapa Sawit Indonesia 2017). Also, production and cultivation area in Rokan Hulu are the biggest in Riau Province, 1.49 million ton and 0.41 million ha, respectively. Palm oil is one of 10 key produces decided by the Ministry of Trade of Indonesia. The percentage of palm oil in export of 2017 was 12% which was larger than any other product. Production amount of palm oil in Indonesia is the largest in the world and 85% of palm oil in the world is produced in Indonesia and Malaysia. (WWF 2017)

Kawasaki is located in north-east area of Kanagawa Prefecture and a city designated by the government. As a core city in Keihin Industrial Area, Kawasaki City has experiences and knowledges of overcoming environmental pollution and there are many companies with environmental technologies in the city.

Kawasaki City has basic concept called "Zero-emission Concept" for formulation of circular economy in the region, recognize the concept as main topic for promotion of regional development. Under this concept, the city aims to develop sophisticated and environmentally friendly city.

This project promotes circular economy for palm industry in Riau Province Region by utilizing Kawasaki City's experience of promotion of Zero-emission Concept and technologies of companies in Kawasaki.

Image of zero-emission industrial park

1.2 OBJECTIVES OF THE PROJECT

"The City-to-City Collaboration Programme for Low-carbon Society" aims to implement investigations for developing a low carbon society in foreign cities by Japanese cities who have valuable knowledge and experiences. Japanese cities also collaborate with Japanese research institutes, private companies, and universities in order to conduct the surveys in an effective and efficient manner.

This project contributes to promotion of circular economy for palm industry in Riau Province Region by utilizing Kawasaki City's experience of promotion of Zero-emission Concept and technologies of companies in Kawasaki. In concrete, through the collaboration with Rokan Hulu Regency, 1) to introduce leading low technologies to utilize Empty Fruit Bunch (EFB) for power generation, and 2) to support development planning with circular economy concept in Riau Province region, are conducted.

1.3 3-YEAR PLAN

3-year plan of the city-to-city collaboration activity is as shown in Table 1-1.

In FY2019, collaboration with Rokan Hulu began, as the starting point, then it is planned to extend the collaboration to other local government. By doing this, it is aimed to realize development of circular economy in whole Riau Province Region. At the same time, formulation, implementation and scaling out of JCM model project with installation of low-carbon/zero-carbon technologies such as EFB biomass power generation system are expected in the region.

Table 1-1 3-year plan

FY	Image of city-to-city collaboration	Activities
2019	Launch of city-to-city collaboration Kawasaki — Rokan Hulu	・Sharing experiences and knowledges of Eco-town project and Zero-emission Concept ・Consideration of circular economy for palm oil industry ・Preparation of biomass power generation project using waste from palm oil production
2020	Extension of city-to-city collaboration Kawasaki — Rokan Hulu, Pekanbaru	・Implementation of JCM model project with biomass power generation ・Consideration of scaling out JCM model project with biomass power generation ・Consideration of circular economy in process for urbanization and industrialization of Pekanbaru City
2021	Deepen collaboration with multiple local governments Kawasaki — Rokan Hulu, Pekanbaru, Other local government	・Start of JCM model project with biomass power generation ・Preparation for scaling out JCM model project with biomass power generation ・Consideration to SDGs policy and climate change action plan (mitigation and adaptation) in Riau Province from the perspective of circular economy ・Implementation of JCM model project regarding urbanization and ndustrialization

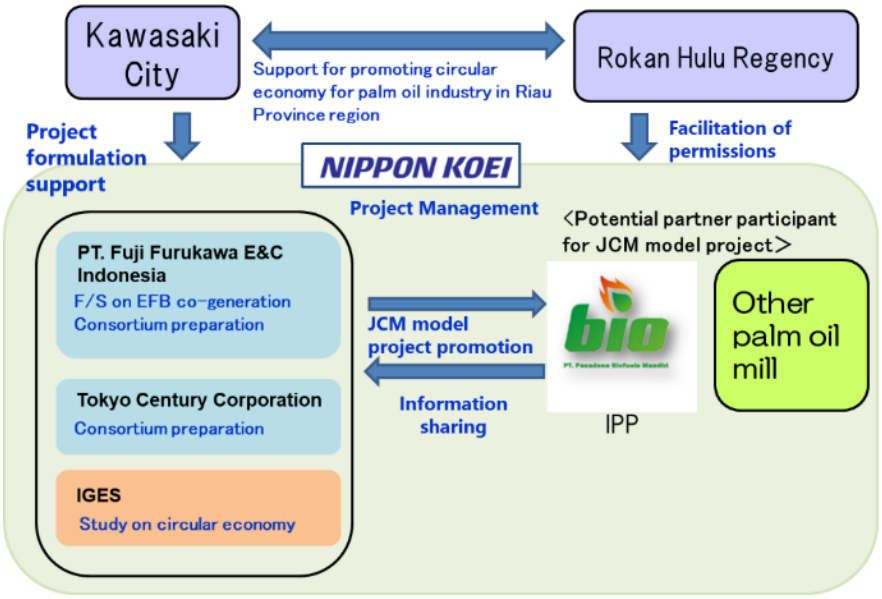
Source: Nippon Koei

1.4 IMPLEMENTATION STRUCTURE

Implementation structure of this FY is as illustrated in Figure 1-1. Kawasaki City and Rokan Hulu Regency carry out discussion of circular economy for palm oil industry. Also, under the city-to-city collaboration, PT. Fuji Furukawa E&C Indonesia (FFEC-ID) discuss JCM model project with EFB biomass power generation with local independent power producer (IPP). For the discussion, possibility to cooperate with leasing company is considered if necessary.

IGES collects and organizes information of palm oil sector and supports development of circular economy and project formulation of EFB biomass power generation from the perspective of academia.

Nippon Koei, as a representative company, carries out overall management.



Source: Nippon Koei

Figure 1-1 Implementation structure

1.5 SCHEDULE

Schedule of this year is shown below.

Activity		2019						2020	
(1) Activities		**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
1	Collection of information regarding palm oil sector		▬	▬	▬	▬	▬	▬	▬
2	Study for formulation of JCM model project		▬	▬	▬	▬	▬	▬	▬
3	Examintion of direction to circular economy		▬	▬	▬	▬	▬	▬	▬
4	Meeting with Rokan Hulu Government		▬			▬			
5	Meeting for extending City-to-City Collaboration		▬			▬		▬	▬
(2) Site Study / Seminar		**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
1	Kick-off meeting@Indonesia		★						
2	Site Study @Indonesia		▬			▬			▬
3	Seminar/Workshop @Indonesia		★						★
4	City-to-City Collaboration Seminar @Japan							★	
(3) Reporting / Meetings		**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
1	Monthly Report	★	★	★	★	★	★	★	★
2	Meeting with Kawasaki City	▪▪▪	▪▪▪	▪▪▪	▪▪▪	▪▪▪	▪▪▪	▪▪▪	▪▪▪
3	Reporting meetings with MOE		★				★		★
4	Visit to Japan by local government in Riau							▬	
5	Final report							▬	▬

Source: Nippon Koei

Figure 1-2 Schedule

1.6 OVERVIEW OF ACTIVITIES

Overview of activities in FY2019 is shown in Table 1-2. In addition to the activities in the table, project team meetings with Kawasaki City and FFEC-ID and Fuji Furukawa E&C Headquarter (FFEC-JP) and meetings with Japanese entities regarding palm oil and companies in Kawasaki interested in installation of their technologies in Rokan Hulu and Pekanbaru were carried out.

Table 1-2 Overviews of activities in FY2019

Activity	Date	Overviews
1st field trip	Aug 4-10, 2019	JCM study/Information collection of palm oil sector - Meeting with RSPO - Meeting and site study at PT Rohul Sawit Industri (RSI) City-to-city Collaboration with Rokan Hulu - Kick-off Meeting with Regent Assistant and related departments - Study tour in Rokan Hulu - Mini seminar targeting regent officers and entities related palm oil production Extension of city-to-city collaboration - Courtesy visit to Pekanabaru Mayor - Meeting with Pekanbaru officers in charge - Courtesy visit to Riau Provincial Secretary
Kick-off meeting with MOE	Aug 19, 2019	Schedule and measures of this project was explained while activities in 1st field trip was reported.
2nd field trip	Nov 16-20 2019	JCM study/Information collection of palm oil sector - Meeting with PT Rohul Sawit Industri (RSI) - Meeting with entities related palm oil production City-to-city Collaboration with Rokan Hulu - Courtesy visit to Regent Secretary Extension of city-to-city collaboration - Meeting with Pekanbaru City - Meeting with Riau Province
Progress reporting meeting with MOE	Dec 24, 2019	Progress of this project was reported to MOE and schedule and corresponding to issues was discussed.
City-to-City Collaboration Seminar and Japan visit	Jan 13-18 2020	Mayor and 6 officers of Pekanbaru City visited Japan to participate in study tour in Kawasaki on 15th January and City -to-City Collaboration Seminar on 16 and 17th. Kawasaki City had a presentation regarding this project during the seminar.
3rd field trip	Feb 10-15 2020	JCM study/Information collection of palm oil sector - Meeting with PT.Primanusa Energi Lestari - Meeting with RSPO - Meeting with local consultant regarding biogas projects Extension of city-to-city collaboration - Site study tour in Pekanbaru (Industrial park, small-scale water treatment facility)

Activity	Date	Overviews
		- Courtesy visit to Pekanbaru Secretary - City-to-city Collaboration Conference between Kawasaki City and Pekanbaru City - Discussion for LOI conclusion between Pekanbaru City and Nippon Koei - Meeting with Department of Transportation of Pekanbaru City
Final reporting meeting with MOE	Feb 26 2020	While overall activities of FY 2019 were reported to MOE, check of progress in 3-year plan and discussion of future plan were implemented.

Source: Nippon Koei

Meeting with RSPO (Aug 2019)

Site tour in Rokan Hulu (Aug 2019)

Site study at palm oil mill in RSI

Courtesy Visit to Pekanbaru Mayor (Aug 2019)

Courtesy visit to Rokan Hulu Secretary (Nov 2019)

Site study tour in Pekanbaru (Feb 2020)

CHAPTER 2 INFORMATION COLLECTION OF PALM OIL SECTOR

In this project, study for JCM model project and city-to-city collaboration activities with palm oil sector, which is the core of economy of Rokan Hulu, are carried out. Nowadays, it is globally recognized that palm oil industry has been causing deforestation and biodiversity by disorderly extension of plantations and socials issues such as child labor. It is necessary to secure that this project does not adversely affect on sustainability of palm oil sector in Rokan Hulu.

This project was carried out with understanding of global and Rokan Hulu's situation of palm oil sector under cooperation with Roundtable on Sustainable Palm Oil (RSPO). Also, study and support target in this project was only palm oil companies with RSPO certificate.

2.1 GLOBAL SITUATION OF PALM OIL SECTOR

2.1.1 Impacts on the environment and society

Palm oil is vegetable oil used the most in the world and included in about 50% of processed foods in a supermarket. Also, food tray, laundry powder, detergent etc. are made from palm oil and nowadays, utilization as biomass fuel is also increasing.

While palm oil is globally being used in a variety of ways, the development of palm oil plantation has been figured out as a cause of deforestation in tropical region. Also, not only deforestation, but there are many issues caused by palm oil production such as forest fire, climate, climate change, human rights of workers. WWF figures out the 7 impacts of palm oil sector below.

Table 2-1 7 impacts of palm oil production figured out by WWF

Impact	Description
Tropical forest	Although main production countries of palm oil are located in tropical forest area, deforestation is often carried out for new planting or extension of palm plantation.
Peatland	Regions, where palm oil production is major industry (Sumatera Island and Kalimantan Island), are unique areas with wide peatland. Since peatland includes water, it is impossible to plant palm directly. Thus, it is necessary to make waterway surrounding area to remove water and to cut plants and to put fire to dry peat. Peat emits the huge amount of GHG only by being exposed to air and when fired, much more GHG is emitted to atmosphere.
Forest fire and peat fire	Forest fire and peat fire in Indonesia and Malaysia easily occur during dry season (June-October) and it is believed that the cause is fire put by humans. Dry peat is easy to be burned and it is difficult to put out the fire by rainy season comes. Burning peat is prohibited by law but illegally carried out because of its cheap cost to level the land. As a result, peat fire occurs in several areas during dry season and the emitted smoke influence on surrounding countries as haze.

Impact	Description
Wild animals	Decrease of tropical forest deprive wide animals from habitation and food, which has an adverse impact on biodiversity.
Human rights	There are cases that people living in forest or using the nature lost their residences and foods as they are not informed before development. In addition, child labor and forced labor in palm plantation are recognized as issues regarding human rights.
Issues of farmers	There are large-scale and small-scale farmers. While large plantation can use their finance for improvement of production and produce sustainable palm oil, most small farmers cannot improve their oil without money, knowledge and experience. As a result, small farmers are easier to face economic issues.
Issues caused from prohibiting palm oil use	In case of removal of palm oil from the society to avoid impacts above, manufacturers using palm oil need to utilize alternative oil. However, palm oil is more cost effective then any other oil. Also, if the production of the alternative oil increases, further deforestation could be caused.

Source: prepared by Nippon Koei based on information of WWE website

2.1.2 Roundtable on Sustainable Palm Oil (RSPO) and certificate system

While contribution to SDGs and ESG is becoming a mainstream globally, many companies, who produce and sell products made of palm oil, has already started to procure palm oil with RSPO certificate, which certifies sustainable palm oil. RSPO was established in 2002 with the purpose to provide opportunities for all stakeholders to discuss production of sustainable palm oil. RSPO is an international NGO, who has more than 3000 members (including 155 entities in Japan) as of August 2019, and the headquarter is based in Kuala Lumpur and representative office in Jakarta.

RSPO has a vision "to transform markets to make sustainable palm oil the norm" and developed and operates, "Principles & Criteria (P&C) certificate" for production stages, "Supply chain (SC) certificate" and "Jurisdictional certificate" (under development).

RSPO certificate logo mark

(1) RSPO's 8 principles

RSPO has 8 principles regarding production and utilization of sustainable palm oil below. When applying for RSPO certificate, an entity needs to meet criteria under each principle.

1. Commitment to transparency
2. Compliance with applicable laws and regulations
3. Commitment to long-term economic and financial viability
4. Use of appropriate best practices by growers and millers
5. Environmental responsibility and conservation of natural resources and biodiversity

6. Responsible consideration of employees, and of individuals and communities affected by growers and mills
7. Responsible development of new plantings
8. Commitment to continuous improvement in key areas of activity

(2) P&C certificate and SC certificate

The RSPO certificate is an assurance to the customer that the standard of palm oil production is sustainable. By obtaining certification every process starting from the oil palm plantation all the way through the final product, members of RSPO can use the chain of custody across all processes to trace the palm oil used in final products.

For that reason, RSPO has established two certification systems: (a) P&C Certificate for the production stage, which certifies that sustainable production is taking place according to the Principles and Criteria (P&C), and (b) SC Certificate, which certifies that a system is established to ensure that throughout every stage in the supply chain, certified palm oil is handed over without error.

The basic unit of certification for the production site includes the palm oil extraction factory (mill) and all directly managed plantation (own plantation), contracted plantations (scheme) and independent plantations (other suppliers) involved in providing palm fruit clusters. Supply chain certification is a system that certifies the production, processing, and distribution processes involved in handling products made with certified palm oil actually meet the required standards for SC certificate. The trading companies that stock certified palm oil from overseas, the corporations that process the oil, the manufactures that make these products, and every stage in the process until the final product is finished are all subject to obtain SC certificate.

In both systems, certification is performed by an accredited third-party RSPO certification body, rather than direct inspection/ certification by RSPO. The inspection results are sent to the RSPO office, and a summary is uploaded to its website and made available for public comment for thirty days. Certification is valid for a period of five years, but the state of compliance is checked on a yearly basis, and in some cases, the certification can even be invalidated within the validity period. It may seem like obtaining SC certificate itself is the goal for corporate users of palm oil, but the RSPO logo mark can only be used on products that are certified and that use certified palm oil.

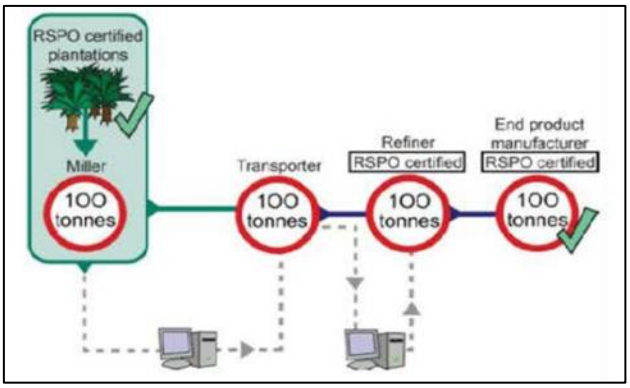
The RSPO has four supply chain models, three certification models which are mass balance (MB), segregated (SG) and Identity Preserved (IP) and also one securitization model (Book & Claim) to reflect the complexity of palm oil supply chain. The 4 supply chain models are described in Table 2-2.

The majority of companies utilize RSPO MB certificate to fulfil their commitment. While the other more stringent certification such as SG and IP are less utilized. The report by Carbon Disclosure Project (CDP) in 2019 shows the SG and IP used by companies only at around 17% and 4% respectively.

Table 2-2 RSPO supply chain models

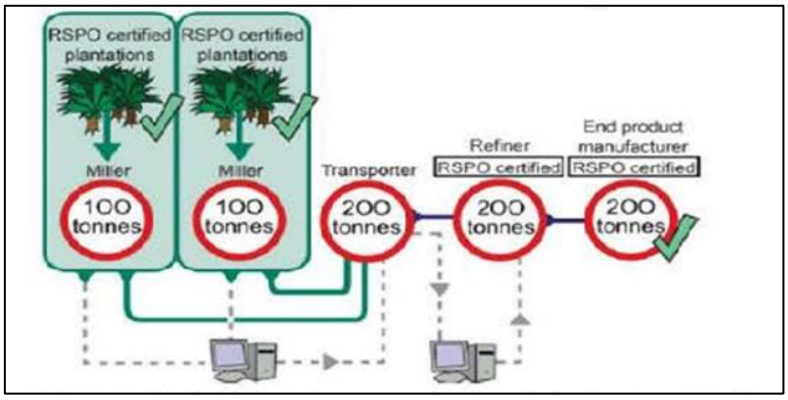
Supply chain model	Description
Identity Preserved (IP)	IP model is certificate that makes possible to identify the plantation from which certified palm oil was obtained by keeping it completely separated from other palm oils, from the palm oil production site all the way to the stage of final products manufacturing.
Segregation (SG)	SG model is a certificate for plantations that have multiple types of certification to ensure that certified palm oil is not mixed with uncertified palm oil. The only certified palm oil is provided to the manufacturer. While it is not possible to identify one single plantation of production, this model ensure that materials are produced by certified plantation.
Mass Balance (MB)	MB model is a certificate model wherein certified palm oil from certified plantation is mixed with uncertified palm oils during the distribution process. While the products do physically contain uncertified palm oil as well, this model guarantees that the palm oil was produced by certified plantations and that a certain quantity of certified palm oil is used.
Book & Claim	The book & claim is electronic and green model where there is an online transaction for certified palm oil certificate between the palm oil producer, the final product manufacturer, and the seller. This method still possible to directly support producers of certified palm oil even when procurement is not feasible because the supply chain does not yet have an established framework for certified palm oil.

Source: prepared by Nippon Koei based on information of RSPO



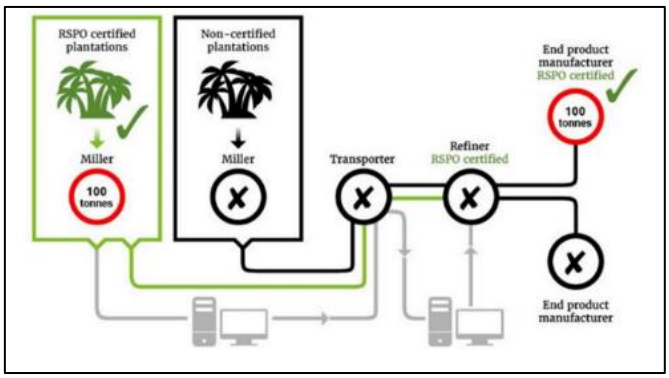
Source: RSPO

Figure 2-1 RSPO Identity Preserved (IP) model



Source: RSPO

Figure 2-2 RSPO Segrigation (SG) model



Source: RSPO

Figure 2-3 RSPO Mass Balance (MB) model

(3) Jurisdictional certificate

In the meeting with RSPO, it was confirmed that RSPO is developing jurisdictional certificate and the document for public consultation of the certificate was shared. (Attachment 1).

The motivation of RSPO to requires jurisdictional certificate is existence of small farmers who would be necessary to increase SG rather than MS. Nowadays, while small farmers produce 40% of global palm production, there is a barrier for small holders and farmers to be certified under the current system to follow RSPO P&C. Lack of smallholder organization and the costs and skills needed to meet RSPO's Principle & Criteria hamper smallholder certification. For this reason, RSPO considered developing jurisdictional certificate and securing commitments of small farmers by certifying groups including different size of farmers with leadership of regional government.

The RSPO jurisdictional approach consists of three key components below.

(a) the jurisdiction will move towards full compliance through a step-wide approach
(b) the process is facilitated by jurisdictional entity, including broad stakeholder, and strong government involvement, to ensure commitment to tackle structural issues and
(c) all producers in the jurisdiction will apply the RSPO principles and criteria including specific roles for the jurisdiction.

The road towards full compliance of all producers in a jurisdiction is challenging and time-consuming process. The RSPO introduce a step-wide approach to provide incentives for jurisdictions to progress towards this aim and recognize the commitment from the stakeholders. While on the same time, the rewards related to the sustainability performance should adhere to the requirement by RSPO.

Steps	Stage 1 – JE recognized as an official "RSPO Pilot"	Stage 2 - JE can become official RSPO member	Stage 3 - JE can trade CSPO	Stage 4– All oil from the jurisdiction can be traded as CSPO
Description	*The right mix of stakeholders are involved in a multi-stakeholder board, and roadmaps towards full compliance are formulated, including commitment from the government.*	*The JE is developing into a more mature organization and has completed several tangible results, such as jurisdiction-wide initiatives including spatial planning, and human rights policies*	*The JE has the governance structure in place to provide credible assurance. The jurisdiction implements relevant spatial planning, and other relevant jurisdiction-wide policies. The JE makes significant progress towards compliance of its producers.*	*The JE is a fully functioning governance body. All producers in the jurisdiction are compliant to the relevant RSPO standards. All additional requirements are met, including its spatial planning and human rights policies.*
Why do we need this step?	To 1) identify relevant stakeholders and secure their commitment; 2) start identifying key (legal and other) issues and 3) strategies on how to solve them; 4) start getting funding and understanding incentives	To 1) secure commitment of stakeholders as well as funding, 2) have a better understanding of key issues and solutions; 3) start building the components that would enable the JE to function properly	To 1) provide assurance to the market of its sustainability performance, 2) drive producers compliance with the RSPO P&C, 3) roll-out jurisdiction-wide (e.g. human rights and spatial planning) policies	To 1) maintain level of credible assurance and compliance, 2) support continuous improvement of producers in the jurisdiction, 3) continuously improve on its spatial planning and human rights policies and performance

Note: *The CSD requires jurisdictions to develop their own timebound plan, due to the different scale and challenges for jurisdictions*

Source: RSPO

Figure 2-4 Step-wide approach of jurisdictional approach

2.2 ROKAN HULU'S SITUATION OF PALM OIL SECTOR

In order not to adversely influence on the environment and society, this project cooperates with only palm oil entities with RSPO certificate. Entities with RSPO certificate meet 8 principles of RSPO and produce palm oil with sustainable method.

By cooperating with RSPO and Rokan Hulu Regency, information regarding companies related to palm oil production was collected.

2.2.1 Situation of RSPO certificate obtained by companies in Rokan Hulu

Situation of RSPO certificate obtained by companies in Rokan Hulu is shown in Table 2-3. There are 3 palm oil mills with RSPO certificate and 2 of the 3 are mills owned by national palm oil company, PT. Perkebunan Nusantara V (PERSERO) (PT.PN V). Also, BUMITAMA AGRI LTD, the owner company of PT Rohul Sawit Industri in Rokan Hulu, owns multiple palm oil mills in Sumatera Island and Kalimantan Island, is also large-scale company.

On the other hand, Perkumpulan Pekebun Swadaya Kelapa Sawit Rokan Hulu, on process of RSPO certificate, is one of RSPO Independent Smallholder members. Also, Tandun Village, Tapung Jaya Village and Serikat Petani Kelapa Sawit who are applying for RSPO membership, are smallholders.

Table 2-3 Situation of RSPO certificate in Rokan Hulu（As of Sep 2019）

Account Name	Mill Name	Status
BUMITAMA AGRI LTD	PT Rohul Sawit Industri	Certified
PT. Perkebunan Nusantara V (PERSERO)	Sei Intan POM	Certified
PT. Perkebunan Nusantara V (PERSERO)	Sei Rokan POM	Certified
Perkumpulan Pekebun Swadaya Kelapa Sawit Rokan Hulu	-	On process
Tandun Village (RSSF-Ongoing)	-	Applying membership
Tapung Jaya Village (RSSF-Ongoing)	-	Applying membership
Serikat Petani Kelapa Sawit (SPKS) (RSSF-Ongoing)	-	Applying membership

Source：RSPO

2.2.2 Information collection palm oil mills in Rokan Hulu

In 1st and 2nd field trip, mini seminar and meeting targeting companies related to palm oil in Rokan Hulu was held under cooperation with Rokan Hulu Regency. During the events, project team requested the participants to share information such as palm oil production and generated waste. Information collection was carried out with questionnaire prepared in this project (Attachment 2).

Information of the 3 mills with RSPO were collected.

Table 2-4 Information of palm oil mills with RSPO certificate

Mill name	EFB generation (ton)	Steam demand (ton/h)	Electricity demand (MWh/year)
A	10,573	39.5	9.1
B	3,000	18	3.2
C	5,200	27	6.0

Source: Nippon Koei

2.3 CONFIRMATION OF NO IMPACT ON DEFORESTATION

In order not to adversely influence on the environment and society, this project cooperates with only palm oil entities with RSPO certificate. Entities with RSPO certificate meet 8 principles of RSPO, which means that the companies produce palm oil with sustainable method.

Criteria in regard with deforestation, is regulated under "Principle 7: Responsible development of new plantings". Criterion 7.11 requires new plantings to be implemented under a plan to reduce pollution and emissions, including GHG, and Criterion 7.12 does new plantings not to cause deforestation or replace any area required to maintain or enhance High Conservation Value (HCV).

2.4 INFORMATION COLLECTION OF PALM OIL USE OF JAPANESE ENTITIES

While contribution to SDGs and ESG is becoming a mainstream globally, Japan Sustainable Palm Oil Network (JaSPON) was founded in April 2019 by 18 Japanese entities, with purpose of "promotion of procurement of sustainable palm oil by Japanese companies".

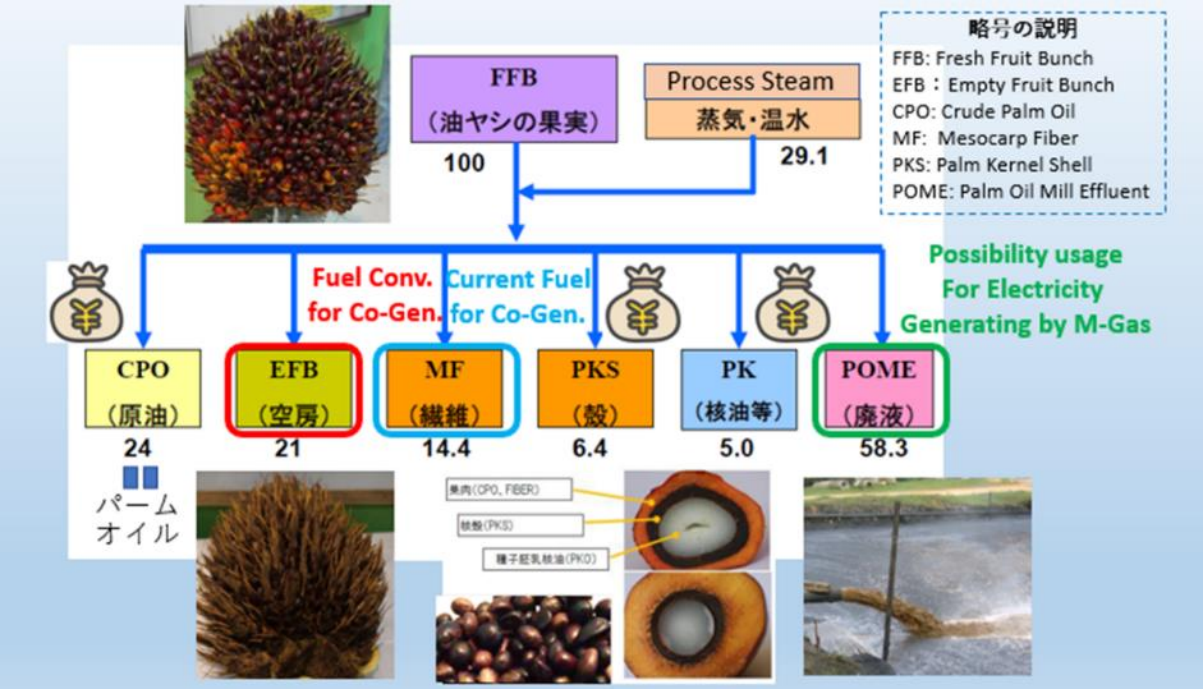
In this project, meeting with JaSPON and Kao Corporation, who is an establishment member of JaSPON, were carried out to collect information regarding activities of Japanese companies for procurement of sustainable palm oil.

Attachment 3 shows overviews of activities of Kao for procurement and entity profile of JaSPON.

CHAPTER 3 STUDY FOR FORMULATION OF JCM MODEL PROJECT

3.1 BACKGROUND

Wastes (sub-products) generated by palm oil production from Fresh Fruit Bunch (FFB) are illustrated in Fugure 3-1.



Source: FFEC-ID

Figure 3-1 Wastes (sub-products) from palm oil production

Palm Kernel Shell (PKS) is imported to Japan as high-quality biomass fuel which can directly be converted from coal. Also, Mesocarp Fiber (MF) and biogas emitted from Palm Oil Mill Effluent (POME) have been utilized as renewable fuels from wastes generated from palm oil production.

However, Empty Fruit Bunch (EFB) is difficult to be utilized as a biomass fuel due to its size, hardness and contents such as chloride and potassium. As a result, EFB is left in plantation and putrefied, which frequently causes environmental issues such as soil and ground groundwater pollution, emission of methane and forest fire. Palm plantation area is overlap with peatland and forest fire and peat fire lead to huge emission of GHG and health issues of local residents due to air pollution.

Because of issues above, disposal and utilization of EFB are strongly required in areas, where palm oil production is major industry, like Rokan Hulu.

3.2 EFB BIOMASS POWER GENERTION PROJECT

While technologies to dispose EFB are required in areas of palm oil production, FFEC group and partner boiler manufacturer have technologies of EFB biomass power generation and already have installation experience.

FFEC group has an interest in implementation of similar project in Rokan Hulu and they has been discussing with local biomass power producer, PT.Pasadena Biofuels Mandiri (PBM) for project preparation since before this city-to-city collaboration project. In this project, study for JCM model project formulation with installation of this EFB biomass power generation system was carried out.

3.2.1 Overview of target palm oil mill

This study was carried out by targeting RSI, palm oil mill located in Rokan Hulu. RSI is a subsidiary of PT. Bumitama Gunajaya Agro, who owns multiple palm oil mills in Sumatera Island and Kalimantan Island. Also, RSI already has RSPO certificate. Whereas about 500,000 ton of palm oil is annually consumed for production in the mill of RSI, approximately 90,000 ton of EFB is generated.

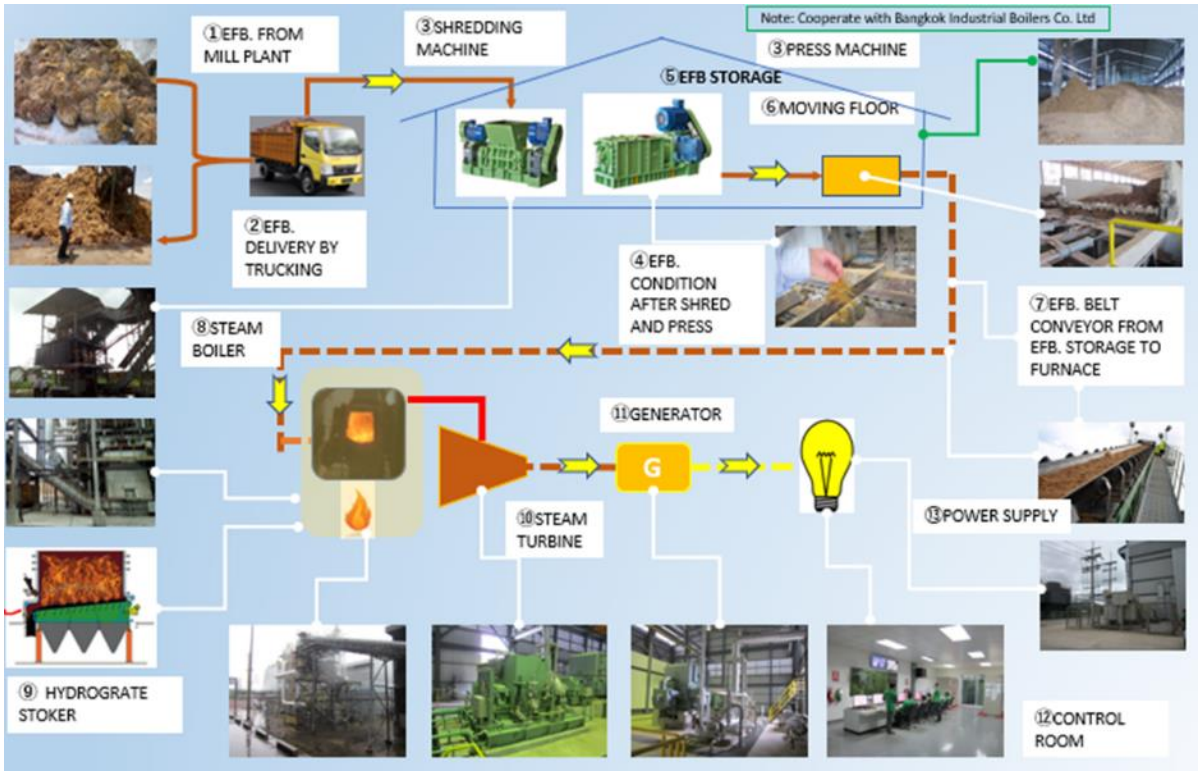
EFB piped up in the mill area of RSI

3.2.2 Overview of installed facility and consideration of specification

EFB is difficult to be utilized as a biomass fuel due to its size, hardness and contents such as chloride and potassium. Technologies of FFEC group and partner boiler manufacturer enable efficient power generation by EFB with the three advanced characteristics below.

① Pre-processing technology: appropriate shredding and drying for boiler
② Combustion technology 1: Chimney height is more than twice a conventional separation distance to decrease surface temperature of steam generation pipeline and prevent activation of chloride. As a result, the lifetime of pipeline can be extended and steam can be efficiently utilized with combination with water treatment facility.
③ Combustion technology 2: Water-cooled vibrating stoker furnace prevents clinker made by potassium.

The process of EFB biomass power generation facility proposed by FFEC-ID is as follows.



Source: FFEC-ID

Figure 3-2 Process of EFB biomass power generation

FFEC-ID studied the monthly EFB generation from RSI and reviewed the specification of the facility. From the initial information, the generated amount of EFB was appeared to be less and the monthly fluctuation was larger. The maximum generation of EFB is seen in July-December and minimum is in February. The monthly maximum amount (approximately 9,000 ton) is 1.5 times of the monthly minimum amount (approximately 6,000 ton). The annual amount is approximately 90,000 ton.

Based on the reviewed amount of EFB generation as above, capacity of the plant and potential GHG reduction amount was calculated as follows.

Table 3-1 Capacity and CO2 Emission Reduction

Items	Figure	Unit	Condition
Boiler capacity	30	ton/h	46 Bar, 420℃
Operation hour	8,016	h/year	
Moisture rate of EFB	50	%	
Calorific value (LHV)	1,850	kCal/kg	
Efficiency	19	%	@ High Season
Electricity capacity	6	MW	(Gross Capacity)
Emission Factor	0.473	tCO2/MW	
CO2 emission reduction	22,749	tCO2/year	

Source: FFEC-ID

3.2.3 Project evaluation

The result of project evaluation is shown in Figure 3-3. Although the detail is confidential and cannot be written here, payback period is 6.8 year with JCM subsidy which is improved from 12.3 years without subsidy. Also, 20-year IRR is 3.1% without subsidy and 7.0% with subsidy.

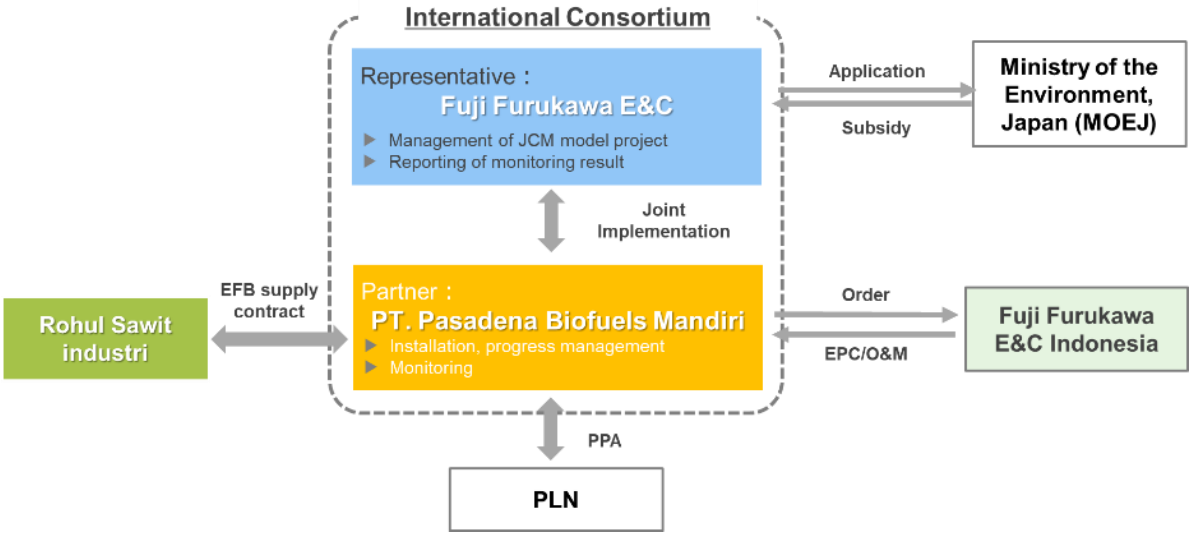
Sell rate (USC/KWH)				8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60
E&C	Note: These Cost is not included VAT 10%			YEAR																						
	Age	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
	Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041			
Revenue (Kilo USD)	35,514 MWH x 0.086 USD/KWH			3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054	3,054			
Operation Hours (Hr)	8,016 Hours / Year			8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016	8,016			
Electricity Power (MWH)	35,514 MWH			35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514	35,514			
Cost (Kilo USD)																										
Financial Service (Kilo USD)	5% x (Construction Cost / 20 Y + 3 Y Operation Cost)		1,086	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55			
Financial Service (USC/KWH)				0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15			
Construction (Kilo USD)	Construction Cost (Gross Cost - JCM Support = 26,613 KUSD - 6,940 USD): ROI Construction (Year)->	6.3	19,213	961	961	961	961	961	961	961	961	961	961	961	961	961	961	961	961	961	961	961	961			
Construction (USC/KWH)			6.3	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70			
Operation (Kilo USD)				905	905	905	905	905	905	905	905	905	905	905	905	905	905	905	905	905	905	905	905			
Operation (USC/KWH)				2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55			
Utility (WTP -WWTP)	Note; Just for reference; 0.06USD/Ton (Chemi.) bases.		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19			
Maintenance	Note; Just for reference; 3% from Maine Facilities Equip. bases.		521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	521	523	521			
M-Power & MNG	Note; Just for reference; 50% from Japanese bases.		365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365	365			
Operating Profit		(Kilo USD)		1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134	1,134			
		(Percentage)		37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%	37%			
		(USC/KWH)		3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19	3.19			
																							Page-6			
Corporate Tax (25% of Operating Profit)			25%	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284	284			
Free Cash Flow (Operating Profit + Depreciation -Corporate Tax)			△ 19,213	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811	1,811			
IRR				-90.6%	-64.2%	-43.9%	-30.1%	-20.8%	-14.2%	-9.4%	-5.9%	-3.2%	-1.1%	0.6%	1.9%	3.0%	3.9%	4.7%	5.3%	5.8%	6.3%	6.7%	7.0%			

Source: FFEC-ID

Figure 3-3 Project Evaluation

3.2.4 Study on international consortium

Implementation structure of JCM model project with EFB biomass power generation is illustrated in Figure 3-4. FFEC-JP is a representative entity and formulate international consortium with power producer, PBM. FFEC-ID is responsible EPC. EFB is procured from RSI and the generated electricity is sold to PLN.

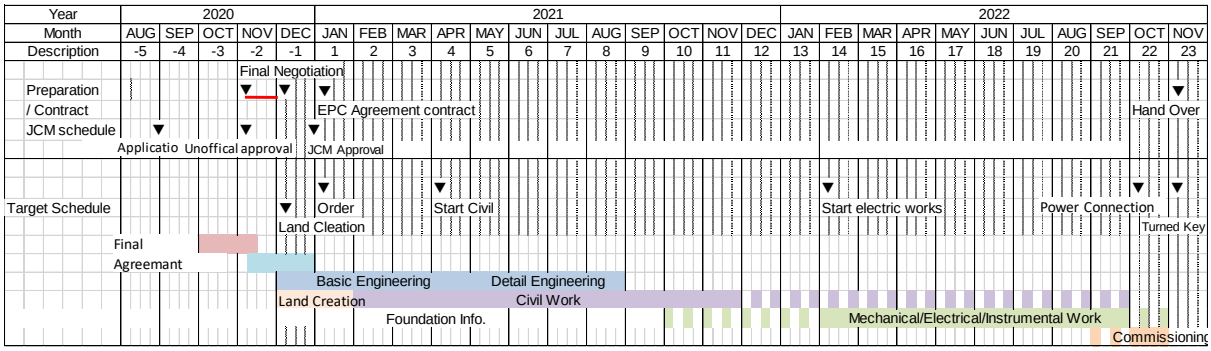


Source: prepared by Nippon Koei based on information of FFEC-ID

Figure 3-4 Implementation structure of EFB biomass power generation project

3.2.5 Implementation schedule

Construction schedule was considered with assumption of that JCM application is carried out at the middle of 2020 and EPC can begin in January 2021. In this case, the facility will be handed over at the end of 2022.



Source: FFEC-ID

Figure 3-5 Schedule of EFB biomass power generation project

3.2.6 Scale-out potential of EFB biomass power generation project

Indonesia is the country to produce palm oil the most in the world and more than 90% of palm oil is produced in 5 provinces (Riau, Central Kalimantan, North Sumatera, South Sumatera and East Kalimantan). To confirm scale-out potential, effects of the case that EFB biomass power generation system is disseminated in the 5 provinces, was estimated. As a result of the estimation, power generation of approximately 1,200 MW and annual CO2 emission reduction of 4.5 million ton could be expected.

Year	North Sumatra		South Sumatra		Riau		Central Kalimantan		East Kalimantan		Unit
2017	18.2%	4.14	13.6%	3.10	33.9%	7.72	22.9%	5.21	11.4%	2.59	Mill. Ton
2016	19.0%	3.98	14.0%	2.93	35.4%	7.43	20.3%	4.26	11.3%	2.36	Mill. Ton

Generated Electricity	**Power Plant Capacity**	**CO2 Emission reduction**
Approx. 9,600 (GWh)	Approx. 1,200 (MW)	Approx. 4,500,000 (tCO2/year)

Source: FFEC-ID

Figure 3-6 Scale-out potential of EFB biomass power generation

3.3 PERMISSIONS REQUIRED FOR PROJECT IMPLEMENTATION

As study on implementation of EFB biomass generation project, required permissions for IPP and license for EPC contractor were confirmed.

3.3.1 Permissions of IPP

Required permissions for implementation of EFB biomass power generation project were checked and listed in table below.

Table 3-2 Approvals and documentation process of IPP

Required permission/document	Signer of document
Recommendation on UKL-UPL for the EFB Biomass Power Plant	Head of Department of the Environment, local Government (Rokan Hulu Regency)
Decree of Governor on Environmental Permit	Governor of Local Government
Technical recommendations for Surface Water Capture and Utilization	Head of Department under ESDM, Local government
Decree of Governor on Surface Water Capture and Utilization	Governor of Local Government
Power Purchase Agreement (PPA)	PT.PLN
Temporary Electricity Supply Business License	ESDM
Letter of Determination of Biomass Energy Management for Power Plant	Director of Bioenergy, Department of Renewable Energy and Energy Conservation, ESDM

Source: Nippon Koei

3.3.2 Foreign capital regulation related to EPC business

Foreign capital regulation related to EPC business are Law Now 2 of 2017 (UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 2 TAHUN 2017), national construction service association (*Lembaga Pengembangan Jasa Konstruksi, LPJK*) Regulation No 3 of 2017 (PERATUAN NOMOR 3 TAHUN 2017).

These regulation mentions foreign EPC companies are required B1 licence for all related activities of power generation plant construction, while B2 license for electrical works only. These licenses will be granted considering the net capital amount and work experiences.

FFEC-ID acquired B2 license before these regulations are set, and it is valid up to 2021. FFEC-ID needs to apply for B1 license in order to be responsible for all EPC work for the business.

There have been discussions that these regulations are too strict and needed to be lifted or relaxed, however there is no clear message from Indonesian Government to ease the regulations as of Jan 2020. Under the current regulations, it is required for FFEC-ID to increase its net capital at large scale to acquire the B1 license.

3.4 CONCLUSION ON FEASIBILITY STUDY

Regarding EFB biomass power generation project as studied above, FFEC-JP concluded that it cannot be the representative participant for the JCM model project. In case another Japanese company becomes the representative participant and FFEC-ID works as EPC, it is concluded the decision to increase net capital contains a high risk on the management of the company under the current regulation discussed in 3.3.2. Thus, FFEC group gave up to implement EFB biomass power generation project as a JCM model project.

CHAPTER 4 CITY-TO-CITY COLLABORATION ACTIVITIES

Kawasaki City has contributed to the sustainability and low-carbonization of the palm oil production sector by implementing the following activities in Riau Province region, especially Rokan Hulu Regency.

4.1 INFORMATION SHARING ON CIRCULAR ECONOMY IN KAWASAKI CITY

The knowledges and experiences that Kawasaki City has promoted circular economy in the region through eco-town projects were shared with local governments in Riau Province as follows. Details are in Chapter 5.

(1) Information provided by Kawasaki City in the first field trip
(to Rokan Hulu Regency, Pekanbaru City and Riau Province)

- Recovery from environmental problems (water and air pollution) in Kawasaki City
- Zero emission concept
- Material recycling in Kawasaki Eco Town
- City-to-city collaboration project by Kawasaki City (City-to-city collaboration with Yangon City)

(2) Site study at facilities in Kawasaki during Japan visit by Pekanbaru City

- Kawasaki Eco Gurashi Mirai-kan (recycling facility, mega solar, EV garbage truck storage station)
- J Bio food Recycle (food waste disposal facility)

(3) Information provided by Kawasaki and companies in Kawasaki during Japan visit by Pekanbaru City

- Smart City initiatives in Kawasaki
- Explanation of wastewater treatment technology and introduction experiences (Japanese company: T)

(4) Information provided by Kawasaki City during the third field trip (to Pekanbaru City)

- Contribution to SDGs
- Low CO_2 of Kawasaki brand
- Material recycling in Kawasaki Eco Town
- Kawasaki Zero-emission Industrial Park

4.2 EXAMINATION OF COOPERATION POLICY

When the above information was provided, how to utilize in Riau was also considered.

4.2.1 Collaboration with Rokan Hulu Regency

As one of the major regions of the palm oil industry in Indonesia. Rokan Hulu Regency has problems of treating wastes from palm oil production including EFB, which leads to environmental problems. Based on this background, as a collaboration direction with Rokan Hulu Regency, "formulation of circular economy in palm oil sector" using the knowledges and experiences of Kawasaki City was proposed and Rokan Hulu Regency has almost agreed the theme.

In addition, when explained about RSPO's jurisdictional certificate, Rokan Hulu Regency showed their interest in acquisition of the certificate. Thus, Kawasaki City support activities for the certificate under city-to-city collaboration as well. It is expected that the acquisition of this certificate will lead to stable sales of palm oil produced in Rokan Hulu Regency. In the meantime, it will also result to economic stability in Rokan Hulu Regency, which is centred on the palm oil industry.

4.2.2 Collaboration with Pekanbaru City

When discussing the possibility of collaboration between Pekanbaru City and Kawasaki City, Smart City, wastewater treatment, waste management, industrial park development, and transportation were raised as potential themes. The applicability of Kawasaki's experiences and knowledges to each theme was studied.

Table 4-1 Applicability examination of Kawasaki's experiences and knowledges

Candidate collaboration themes	Applicable experience and knowledge of Kawasaki City and companies in Kawasaki
Smart City	- BEMS and Smart EV bus introduced by "smart community project in Kawasaki Station area"
Wastewater treatment	- Introduction of wastewater treatment technology by companies in Kawasaki - River Purification by Regulation: Historical History of Tama River
Waste management	- Material recycling in Kawasaki Eco Town - Waste treatment and recycling facilities
Industrial park	- Contribution to circular economy based on the Zero-emission Industrial Park in coastal zone
Transportation (LED streetlights, Transportation between old and new city center)	- LED streetlights: Introduction of streetlights with ESCO scheme, such as "Project for installation of LED road lights and park lights with ESCO" - Transportation between new and old city center: There is no applicable experiences. (Currently, introducing a new bus transport system and constructing a railway to improve traffic between the city of Kawasaki and the coastal area has been considered.)

Source: Nippon Koei

CHAPTER 5 SEMINAR AND PRESENATION

5.1 MINI SEMINAR IN ROKAN HULU (AUG 2019)

Date&Time	8th August, 2019 10:30-12:00
Venue	Meeting room, Office of Rokan Hulu Regency
Participants (Number)	Rokan Hulu Regency (9), 22 Palm sector companies in Rokan Hulu (28), Kawasaki City (1), Nippon Koei (5), PT. Fuji Furukawa E&C Indonesia (FFEC-ID) (2)

Mini seminar was held for Rokan Hulu Regency and palm oil mills in Rokan Hulu. Presentations on city-to-city collaboration by Nippon Koei, outline of Kawasaki City and its collaboration by Kawasaki City, and EFB biomass power generation technology by FFEC-ID were made (Attachment 4). Comments from the participants were summarized as follows.

Table 5-1 Comments from Participants

Participant	Comments
Staff, Palm Mill	By the initiative of Ministry of Energy and Mineral Resources, pilot project on 1MW power generation by biogas derived from POME has been implemented, while another pilot project on biogas derived from EFB is suspended.
Staff, Palm Mill	EFB contains K and Mg, which can be applied as fertilizer. Thus, the utilization of EFB for power generation is effective for the mills without plantation, while the mill with plantation may need to bear the additional cost for fertilizer purchase.
Staff, Rokan Hulu Regency	EFB contains oil and application of EFB as fertilizer is not legally permitted since it may harm the ecosystem as hazardous waste (B3). However, law enforcement is not yet done.
Staff, Palm Mill	In other area, I understand that burning EFB in the palm oil mill as fuel is not permitted. Clarification of regulation is important since it may affect the decision of palm industries.

Source: Nippon Koei

Presentation by Kawasaki City

Group Photo

5.2 INVITATION TO JAPAN (JAN 2020, KAWASAKI AND TOKYO)

For the "seminar on city-to-city collaboration for zero-carbon society", organized by MOEJ and IGES in Tokyo, seven participants including the mayor were invited from Pekanbaru City. Name and position of participants are as follows.

Table 5-2 List of participants, invitation to Japan

Name	Position
Firdaus (Mr.)	Mayor
Mohammado Noer (Mr.)	Secretary
MohammadoAzwan (Mr.)	Assistant
Indra Pomi Nasution (Mr.)	Head, Department of Public Works and Housing
Ahmad (Mr.)	Head, Regional Development Planning Agency
Akmal Khairi (Mr.)	Head, Division of Cooperation and executive works
Susant Heri (Mr.)	President Director of PT SPP (Department of State-own Enterprises)

Source: Nippon Koei

Participants from Rokan Hulu Regency were also invited, however, no participants could come since they were busy.

5.2.1 Site visit and city-to-city collaboration meeting in Kawasaki (Jan 2020)

On 15th January 2020, site visit and city-to-city collaboration meeting was held.

In the site visit, the participants visited Ukishima waste disposal center and J Bio Food Recycle (Biogas power generation) with the explanation from the staff of each facility on waste treatment, mega-solar PV plant, electric waste collection vehicle.

In city-to-city collaboration meeting in Kawasaki, in accordance with the interest of Pekanbaru side, Environment Protection Bureau of Kawasaki City introduced its approach to smart city, Japanese company T explained its technology on wastewater treatment and example in Indonesia. Nippon Koei made a presentation on the idea and the steps toward the collaboration with Kawasaki City.

Table 5-3 Site visit and city-to-city collaboration meeting in Kawasaki

Time	Activity
9:30	Departure from hotel
10:00-12:00	Ukishima waste disposal center （Waste incineration plant, mega-solar PV plant, EV station for waste collection vehicle）
12:30-13:30	Lunch
14:00-15:30	J Bio Food Recycle
16:00-18:00	City-to-city collaboration meeting - Smart City (Kawasaki City) - Wastewater treatment technology (Company T) - City-to-city collaboration (Nippon Koei)
18:30	Arrival at hotel

Source: Nippon Koei

Ukishima waste disposal center

J Bio Food

City-to-city collaboration meeting

City-to-city collaboration meeting

5.2.2 Seminar on city-to-city collaboration (Jan, 2020)

"Seminar on city-to-city collaboration for zero-carbon society" organized by MOEJ and IGES was held on 16th and 17th Januray, 2020 in Tokyo. Seven participants from Pekanbaru City,

Kawasaki City, and Nippon Koei participated in the seminar. Agenda of the seminar is as follows.

Table 5-4 Agenda of seminar on city-to-city collaboration

Date	Activities
16th Jan (Thu)	AM: Closed seminar-1 Exchanging information on zero-carbon project development PM: Site visit: Shinagawa Incineration Plant and Tokyo gas Science Museum Reception
17th Jan (Fri)	AM : Closed seminar-2 Exchange views on zero-carbon and sustainable urban development PM: Open seminar Seminar on city-to-city collaboration for zero-carbon society

Source: IGES

In the closed seminar in the morning of 16th on "Exchanging information on zero-carbon project development", participants from Japanese side presented the city-to-city collaboration activities in this fiscal year. For this project, Kawasaki City made a presentation on the activities and progress. (Attachment 5)

Presentation by Kawasaki City


Group Photo

5.3 CITY-TO-CITY COLLABORATION CONFERENCE BETWEEN KAWASAKI AND PEKANBARU (FEB 2020, PEKANBARU CITY)

Date&Time	13th February, 2020 10:00-12:30
Venue	Meeting Room, Previous office of Pekanbaru City
Participants (Number)	Pekanbaru City (25) Kawasaki City (2), Nippon Koei (4)

On 13th February 2020, the city-to-city collaboration conference between Pekanbaru City and Kawasaki City was held. From Pekanbaru side, represented by Ms Shabrina, Assistant II of the city government, 25 staffs attended the seminar from Cooperation Office, Department of Transport, Bappeda, Department of Public Work and Housing, PT SPP (public company to manage the industrial park) etc. From each department in charge, following presentations on potential collaboration topics were made, namely, smart city, industrial park development, transport and wastewater treatment. From Kawasaki side, the general information and city-to-city collaboration of Kawasaki City, and zero-emission industrial park were presented by Mr Suzuki and Mr Tsuji or Kawasaki City (Attachment 6).

In the transport sector, Department of Transport of Pekanbaru City was aware of the JCM model project in Semarang to introduce CNG buses, and showed a strong interest in doing the same. Replying to this, Nippon Koei introduced the potential that the bio-CNG reformed from POME could be utilized for the public bus in Pekanbaru city.

In addition, the proposal from Nippon Koei to Pekanbaru City to be zero-carbon city in 2050 was positively accepted by Pekanbaru side. It was generally agreed that this idea will be clearly mentioned in the Letter of Intent between (1) Pekanbaru City and Kawasaki City and (2) Pekanbaru City and Nippon Koei which are to be signed later.

Presentation by Kawasaki City

Group Photo

CHAPTER 6 FUTURE PLANS

6.1 JCM MODEL PROJECTS FOR FY2020

As studied in Chapter 3, FFEC-ID concluded that the EFB power plant project is not feasible enough for FFEC-JP to be the representative project participant. This is because of the two aspects, namely the financial feasibility and the future tightening of the operation of foreign companies as the contractor of civil works.

On the other hand, it was confirmed that in Riau Province region where the palm industry accumulates, the issue of waste from the palm industry such as EFB and POME is large. After we explained the results of this year's study and asked for cooperation, some Japanese companies have shown interest in the EFB power generation business and POME-derived biogas reforming business together with Kawasaki-related companies and we would like to conduct F/S in FY2020 in order to implement JCM model project in and after FY2021.

6.2 STRATEGY FOR CITY-TO-CITY COLLABORTAION PROJECT IN FY2020

The strategy of the city-to-city collaboration project in FY2020 is as follows.

In Rokan Hulu Regency, city-to-city collaboration activities will be conducted while watching the result of the election of regent to be held in September 2020, and JCM F/S will target EFB power generation and POME-derived biogas reforming project.

On the other hand, seven high-rank officials including the mayor of Pekanbaru city visited Japan and deepen discussions for future collaboration. Taking advantage of this opportunity, in the next fiscal year, the technology transfer on Kawasaki City's consideration process for zero carbon city in 2050 as city-to-city collaboration activity, and gasification of transport (especially buses) and introduction of LED streetlights as JCM model project formulation activities.

Details related to the above are shown below.

6.2.1 City-to-city collaboration project in FY2020

<u>Rokan Hulu Regency</u>

With Rokan Hulu Regency, discussions in the first half of the fiscal year were smooth, but since November, when preparations for invitation to Japan have begun, communication has become more difficult. Even though the regent himself has been nominated once, in the end no staff could come to Japan. Some say that this might be affected by the regent’s election to be held in September 2020, thus we are considering restarting policy-level consultations next year after the election and the next regency government is settled. On the other hand, we would like to proceed in the formulation of JCM projects that can be pursued through B to B and are not affected by politics. However, in order to maximize and secure the amount of EFB collection,

it is necessary to have many mills participate in it, and for that purpose, we believe that cooperation from the regency government is indispensable.

The regent's election is scheduled for September 2020, and the potential change of the regent may have a significant impact on the policy of the regency. Thus, in the first half of next fiscal year, we will focus on the formulation of B to B projects and resume policy discussions in the latter half.

Through the study in this fiscal year, the palm industry is confirmed to be the most important industry, and Riau Province and its department of environment stated that the treatment of waste (whether it is industrial waste/B3 or not) is also legally gray. Therefore, we believe that we should continue to promote the circular economy of the palm industry, such as EFB and POME, through the city-to-city collaboration project that started this year, and continue our approach to obtain a regional RSPO certificate.

Pekanbaru City

This year, the mayor and six other high-rank officials of Pekanbaru City came to Japan to take the opportunity to be invited to Japan to deepen their understanding of the city-to-city collaboration project, Kawasaki City, and the JCM. Taking advantage of this opportunity, the activities need to be continued in the next fiscal year.

In a presentation given during the final site trip to the city, Apple and other global companies explained that they had already achieved 100% renewable energy and that decarbonization of the supply chain is an urgent issue. At present, the city of Pekanbaru is decarbonizing the developing Tenayang Industrial Park (KIT) to compete with other industrial parks in Indonesia and ASEAN in 10 to 20 years and continue to attract industrial enterprises. He explained that it was essential to make a plan for the realization of the project and agreed.

Currently, the other party is considering a declaration of 2050 Zero Carbon City, and it is expected that technology transfer from Kawasaki City, which is also proceeding with the preparation study of the declaration, is expected. I think it is effective to give a plan.

6.2.2 JCM project formulation

Rokan Hulu Regency

(1) EFB biomass power generation project

In consultation with a local IPP, a partner of Japanese company A which is constructing an EFB power plant in Aceh, mentioned that the IPP has been consulted by Indonesian palm oil company P which is in charge of the Riau Province, to discuss EFB power generation. In addition, it was confirmed that one of the palm oil mill facilities pointed by the Indonesian company P is located in Rokan Hulu Regency.

The technology adopted by Company A prefers the larger EFB collection scale in economic sense compared to the technology of FFEC group studied this year. Thus, it is desirable to use

an approach to collect EFB from many mills, as in the case of the JCM model project adopted in Aceh.

As a Kawasaki-related company for this project, the possibility of adopting a steam turbine in Japanese company J is to be studied.

(2) POME biogas reformation project

A local consultant specializing in biogas provided information that Indonesian company P has a plan to install a biogas generation facility at its nine palm oil mills by 2023. Currently, Japanese companies T and D are promoting technologies to convert biogas into bio-CNG in Indonesia, so we discussed and agreed to cooperate with these companies next year.

The Japanese company T mentioned above is a Kawasaki-related company. Regarding the use of reformed biogas, the business possibilities are as follows.

Table 6-1 Utilization of Bio-CNG

Reformation of Gas	Utilization
Collection biogas and desulfurization	Use in the existing boiler Power generation with biogas engine (expensive)
Collection biogas, desulfurization and purification	Use in the existing boiler Power generation with conventional gas engine (cheap) Use in CNG vehicle Use for cooking in small tank

Source: Nippon Koei

Pekanbaru City

Pekanbaru City expressed interest in industrial parks, transportation, water and sewage for the collaboration. After the field survey this year and the discussion during the invitation to Japan, the industrial park is currently under construction, and ADB is in the process of bidding on urban sewage facilities and they cannot be the candidate for the JCM model projects in FY2021. However, there is a good possibility that these candidate projects have a big potential for GHG emission reduction in the future, and we would like to continue following up these projects.
On the other hand, the following two project candidates have been identified for the transportation sector. In each case, public procurement is expected, so it is expected that bidding will be required, and it is necessary to consider whether there is a feasible measure based on that.

・Gasification of the transport（especially, buses）

Department of Transport, Pekanbaru City has information that *Trans Semarang*, a public bus company of Semarang City converted their buses from diesel to gas utilizing JCM model project scheme, and they showed their willingness to conduct the similar activities.

It is required to consider the public tender process and MRV of GHG emission reduction, we would like to study further referring to the good practice of Semarang Project.

If the reformation technology from biogas to bio-CNG can be applied to the transportation sector, compared with the case in Semarang or diesel to CNG, diesel to bio-CNG will further reduce the emission up to zero emission. This approach should be adopted in Riau Province, where the potential of biogas is large due to the accumulation of palm oil industries.

Japanese company T and D to be joining the project in FY2020 have an experience applying bio-CNG derived from POME to CNG trucks.

・Installation of LED streetlights

Department of Transport, Pekanbaru City is planning to change streetlights into LED with smart control in line with the strong request by the mayor.

The existing conventional streetlights (fluorescent light) are mostly not equipped with electricity meters, and unit price of such electricity is much higher than the usage monitored with meters. Besides, the cost of O&M is very high as well since only site check is available for burned out lights.

To fulfil the request of the city to reduce the cost, not only doing price competition against cheap Chinese products, but to show the life cycle cost by the reduction of O&M cost and proposal of ESCO scheme.

Since Kawasaki City applies 10 years ESCO scheme for the development of LED streetlight, it is possible to conduct hearing to the concerned office in Kawasaki City to share the precious experience with Pekanbaru City, thus this project match well with City-to-City Collaboration Project scheme.

Source: Kawasaki City Website http://www.city.kawasaki.jp/530/page/0000101360.html

Figure 6-1　ESCO project on Changing Streetlights into LED