

MOEJ/GEC JCM Feasibility Study (FS) 2014 Summary of the Final Report

“Introduction of Energy-Efficient Old Corrugated Cartons Process at a Paper Factory”

**Implementing Entity: Nomura Research Institute, Ltd.
AIKAWA Iron Works Co.,Ltd**

1. Overview of the Proposed JCM Project

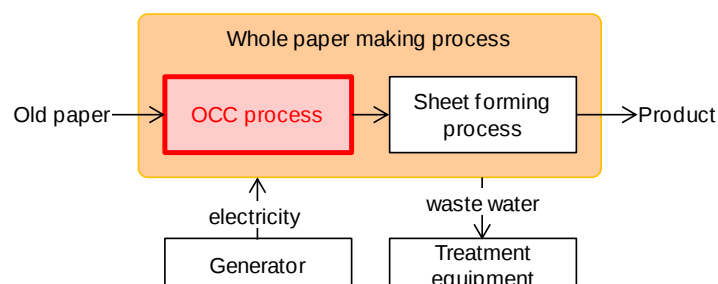
Study partners	Climate Experts (ClimeX), Ltd. worked as advisory on the methodology Suncosmo, Co. Ltd. was responsible for local logistics		
Project site	Bekasi, Indonesia		
Category of project	Energy Efficiency		
Description of project	The project introduces Japanese highly efficient system to an old corrugated cartons process (OCC) of a carton production line (1,000t/day) to be built into the plant of Fajar Paper, the nation's second largest company in the paper industry. This would achieve the unit electricity consumption reduction, approximately by 10%, thereby contributing to carbon dioxide emission reduction.		
Expected project implementer	Japan	Kanematsu Corporation	
	Host country	Fajar Paper, PT FAJAR PAPER SURYA WISESA Tbk.	
Initial investment	800,000 thousand yen	Date of groundbreaking	August, 2015
Annual maintenance cost	50,000 thousand yen	Construction period	August, 2015 – December, 2016
Willingness to investment	Investment determined	Date of project commencement	April, 2017
Financial plan of project	Fajar Paper already finalized loans totaling USD 240 million from a syndicate including HSBC and other banks, for the total expansion project of the paper plant which includes the current project.		
GHG emission reductions	14,885 tCO ₂ /year		

2. Study Contents

(1) Project development and implementation

1) Project planning

Fajar Paper (holding the second largest share of paper manufacturing in Indonesia) plans to expand production facilities for the process of corrugating medium, which is the material of corrugated board, to 1,000 tons/day. As a pre-process of corrugated board production, Fajar plants to adopt “Old Corrugated Cartons process (hereinafter referred to as “OCC process”), which is a treatment process to prepare raw material from used corrugated board.



This subsidized project aims to achieve electricity usage reduction per ton produced (by about 10 %) by introducing a Japanese high-efficient system to the OCC line, thereby contributing to CO2 reduction.

Fajar Paper is currently in the process of deciding a source to place their order, which is to be selected from candidate sources including non-Japanese OCC line manufacturers. In its comprehensive evaluation and selection, price is considered to be highly important. Therefore, it is expected that the Japanese technology will be adopted with the support of a JCM subsidized project.

2) Permits and License for the project development and implementation

2)-1 Approval on capital investment

Approval on capital investment corresponds to approvals on capital investment to be submitted to the provincial government. Since this project is an expansion of an existing plant, we applied as an extension of the existing approval on capital investment. (The application is for an extension of the approval on capital investment of Line 5, the most recent past expansion plan.)

Investment Permit Principle number 21/32 /IP/II/PMDN/2011, dated 08 April 2011, was extended to Extended Permit number 07/32/IP-PB/PMDN/2014, dated 03 March 2014, and after a few amendments were demanded, it was hitherto amended to Amendment Permit Principle Domestic Investment number 53/32/IP-PB /PMDN/2014, dated 03 October 2014.

Although the guidelines for the approval on capital investment were revised in 2013, the latest version of approval reflects the revision. They are the detailed rules on the approval on capital investment and are compliance with the “Regulation of The Chairman of The Investment Coordinating Board No 5 of 2013, regarding guidelines and procedures for licensing and non-licensing investment”, which was later amended to the Regulation of The Chairman of The Investment Coordinating Board No 12.

We completed all of the applications necessary for the approval of the Capital Investment Committee of the government. The permit was issued by the Integrated Permit Service unit of the West Java Provincial government. (Refer to the attachment for the copy of the license.)

This unit has the authority to issue licenses and non-licenses such as approval on investment and issue approvals on all forms of services including fiscal and non-fiscal facilities and also investment information.

2)-2 Approval on environmental impact assessment

The Indonesian environmental impact assessment report (UKL-UPL) consists of five chapters; [I] Introduction, [II] Business and/or activity plans, [III] Environmental impact to occur, [IV] Environment management effort, and [V] Environment monitoring effort (detail to be provided on the next page), especially emphasizing the contents of Environmental Management Effort (UKL) and Environmental Monitoring Effort (UPL), which make the title of the report.

UKL-UPL is divided into two forms; one to report continuously impact which production activities at existing facilities have on the environment and one to submit the analysis projection of impact which investment on new facilities has on the environment.

The former is required to submit every 6 months. Fajar submitted the latest one in July of 2014.

The latter is required to submit extraordinarily only when a new construction is planned. Fajar prepared the report for the new construction of Line 8 and it is under review by an external consultant, as of January of 2015. It is planned to get ready for submission within half a year.

The construction cannot be done without the submission of UKL-UPL for the new construction and the ensuing license. As mentioned in the section of environmental integrity, the impact on the environment by the new construction is not much changed. So, the possibility of licensing is high. Meanwhile, UKL-UPL reports are to be submitted to the following offices.

UKL-UPL (or EIA) report is submitted to:

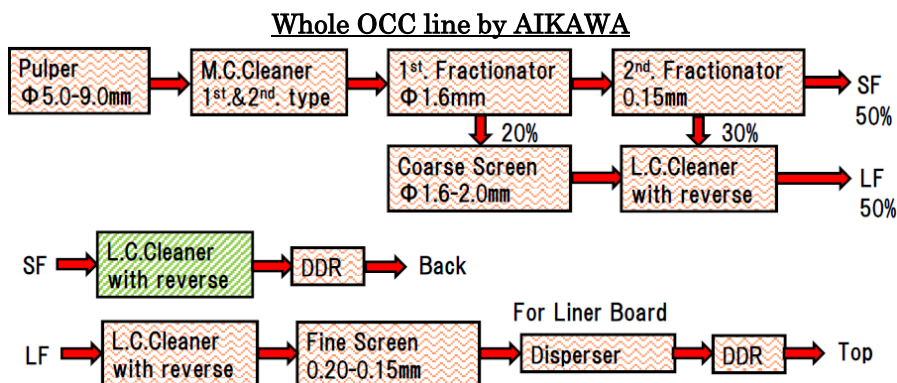
- a. Board of Environment Monitoring – Bekasi Regency
- b. Board of Environment Monitoring Region – West Java Province
- c. Environmental Ministry, Division Integrated Service – Jakarta

3) Advantage of Japanese technology

The OCC line is a process to prepare clean raw materials containing dissolved paper fibers by mixing used corrugated board into water for defiberization and removing foreign substances. Since a large amount of material (water) is used, electricity is significantly consumed to power motors.

Energy saving can be achieved by 2 technologies: 1, by system configuration, and 2, by individual system equipment.

1, Energy conservation by system configuration



• A total amount of raw materials are usually input into a rough selection screen, and then into a fractionator which separates between long fibers and short fibers. In the subsidized project, a fractionator is installed before the rough selection screen so that long fibers and short fibers are separated in advance. This reduces a throughput of the post process. Reduction of a throughput makes the capacity of equipment and motor power smaller, contributing to energy conservation.

• Cleaning to eliminate foreign substances is usually conducted in 3 stages at high concentration,

medium concentration and low concentration. In this subsidized project, the ability of the medium-concentration cleaner to eliminate foreign substances is improved. This obviates the need for a high-concentration cleaner, for which energy can be saved.

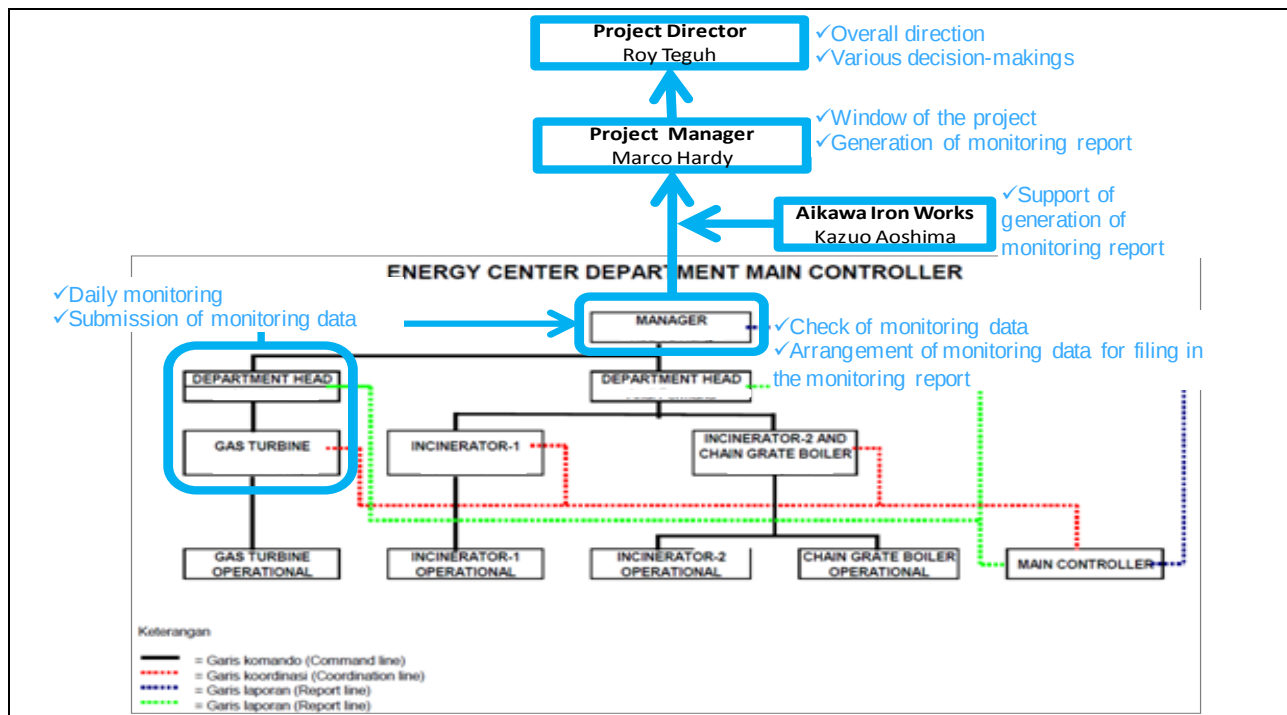
2, Energy conservation by individual system equipment

• Each system equipment has functions to eliminate foreign materials and loosen fibers well. The equipment to be introduced in this subsidized project has improved parts and structures, thereby being enabled to deliver the same performance as the conventional system, with less power than ever before.

4) MRV structure

Daily monitoring and preparation of monitoring report are done by Fajar. Much of capacity building and so on seems not necessary because Mr. Hardy, the project manager, has managed the CDM project (Project Number:6691) run by the company, generating monitoring reports for verification several times.

Also, Aikawa visited Fajar three times in half a year for after-sales services of the existing lines and checked the devices. It has a system to do follow-up regularly. So, it is planned to support for data integrity checking (deviation from the spec value, etc.) and so on timely.



Source) Created by NRI based on internal information of Fajar

<Measuring apparatuses for monitoring>

This project uses specific consumption method calculated by converting energy reduction of the entire OCC line into CO₂. At this factory, each line has its energy monitoring room as shown below, monitoring electricity consumption of each element device of the OCC line every hour. So, it is easy to grasp reference and project energy consumptions.

Line 8 to be added will be given the similar energy monitoring room.

Energy management/reporting system “SCADA system and EXAQUNTUM report system”



<How to store monitoring records>

The energy consumption data taken around the clock 365 days of the past one year is stored both electronically and on paper. The same method will be introduced for Line 8.



5) Environmental integrity and Sustainable development in host country

As positive effects in environment through implementing this project, improvement of work safety/working environment is given. In the new OCC line, removable foreign matters will be finer even on pulper, fractionator, rough screen, and fine screen. Therefore, the amount of fine fibers floating in air originated from the process decreases. This makes wearing masks by workers non-mandatory, contributing the working environment inside the factory and health and safety of workers. The assurance of health and safety of workers not only raises the motivation of workers and productivity, but also contributes reduction of medical cost and prolongation of life expectancy of the population of the host country.

Adverse effects in environment compared to the existing equipment are not seen at present and not anticipated in the future. Waste water drained from papermaking factory contains heavy metals, etc. But, the levels are much lower than the authority standards in the existing lines. Improvement is possible, but it is unlikely that it deteriorates. However, when the production itself of the host company increases, it is possible that the amounts of various emissions increase even if various specific consumptions are improved.

As contribution to sustainable development of the host country, the following five points are given.

Firstly, the reduction of CO₂ emission of the main object of this project enables decreasing the total amount of carbon social costs of the host country.

Secondly, the improvement of health and safety of workers mentioned above leads the improvement of human capital through the prolongation of life expectancy of the host country.

Thirdly, in the existing lines, 87 out of 100 old corrugated cartons purchased become final products while 3 out of 100 are fiber wastes and 10 are other wastes. Reducing the fiber wastes from 3 to 1.7 ~ 8 leads to the less amount of wastes, higher yield, less old corrugated cartons purchased while keeping the same amount of production, and less amount of woodcutting inside and outside of the host country. The decrease of amount of woodcutting results in the net increase of forest resources stock. This means the water-retaining function and prevention of degradation of recreation function of forests of the host country. Moreover, it saves CO₂ sink at the global level. Also, since the host company burns wastes as fuel using a furnace on its compound, the decrease of the percentage of fiber wastes for fuel results in enhanced fuel efficiency and lower carbon emission factor.

Fourthly, to continue regularly giving meetings to explain the equipment for workers of the host company promotes transferring knowhow and technique of energy-saving to human resources of the host country. This allows contributing to long-term sustainable developments while human resources who have accumulated knowhow use other similar equipment inside and outside their company and transmit the knowhow to other human resources.

Fifthly, the reduction of fossil fuel consumption contributes to the reduction of air pollution, the contribution to resource security and the avoidance of electricity shortage, etc. To get the long-term energy reduction effect to initial investment known through the success of this project and to spread this technology to other businesses and other companies of the same category enable more contribution to sustainable development in Indonesia.

The 1st through 3rd points above expressly contributes to the sustainable development of the host country by improving the comprehensive wealth (new country wealth) index which is recently receiving much attention.

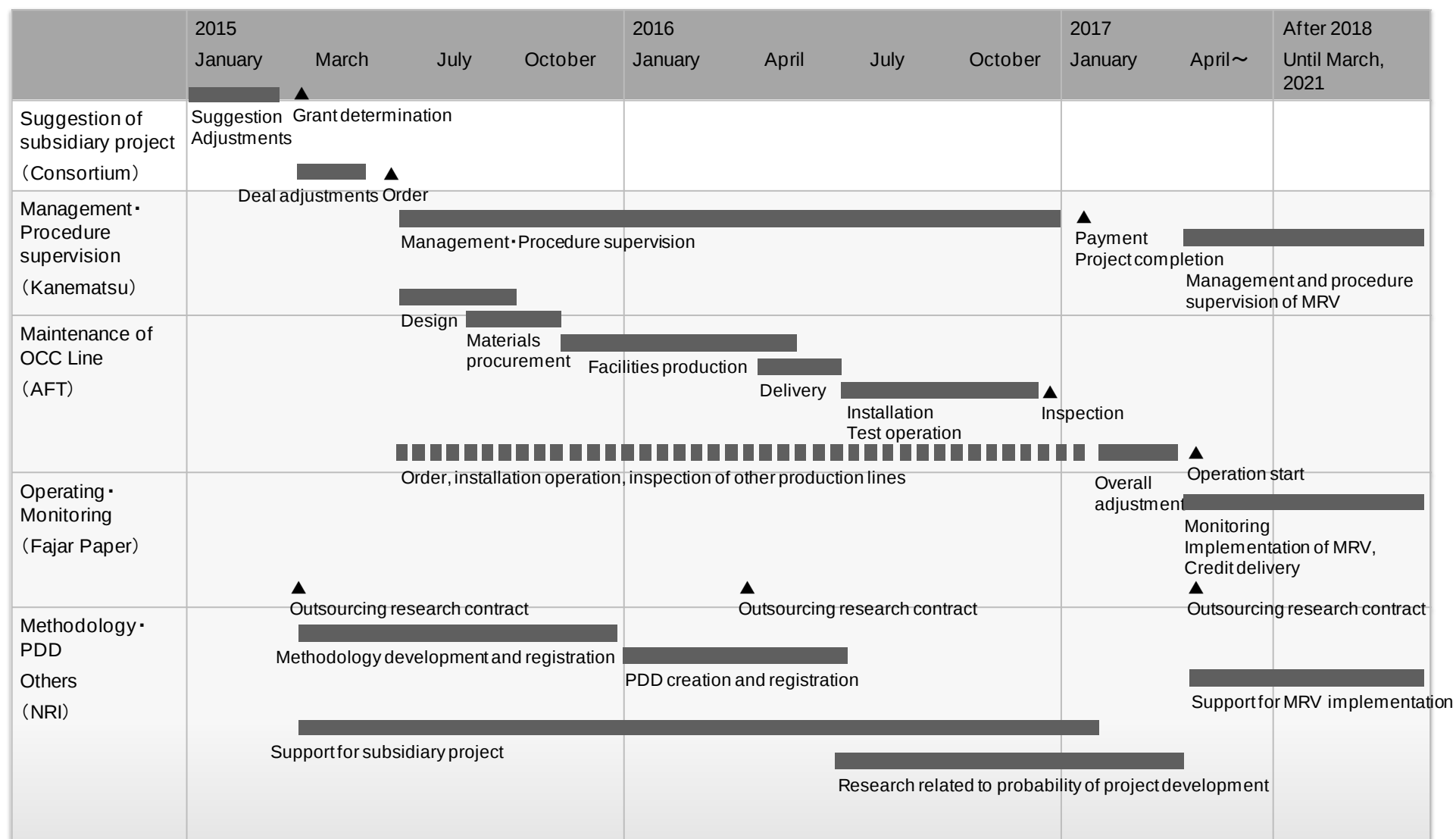
6) Toward project realization

<Proposed implementation schedule>

Here, we show the schedule (draft) relating to operation after the completion of the subsidy project and implementation of MRV, together with the researches of the introduction of the equipment and MRV for obtaining the credit under the assumption that a granting as a subsidy project is decided.

Main contents to implement and assumed timing

May, 2015	Project starts with the decision of subsidy (order placement)
September, 2015	Construction starts
February, 2016	Install Major equipment (followed by GEC intermediate inspection)
November, 2016	Construction completes
December, 2016	Test run
December, 2016	GEC final inspection
April, 2017	Monitoring starts
September, 2015	Methodology finalized
December, 2015	Apply for registration of methodology
June, 2016	Create PDD, Apply for registration as JCM project
July, 2016	Conduct Validation
April, 2017~	Credit transferred to the account of the Government of Japan

Expected project schedule

<Capacity building to the host country>

Most of the capacity building will be implemented in next phase.

One of the most important Capacity Buildings is the way of optimizing energy consumptions. Amount of credit depends on the optimization, so KNOWHOW implementation from AIKAWA to Fajar in daily after service is expected in monitoring phase.

Secondly, MRV Capacity Buildings should be also implemented in next phases. Even though Fajar have capability of monitoring themselves, modifying methodology and reference, PDD making and gathering default data, communication with other stack-holder should be supported, because Fajar is a business entity who should pursuit profit, and it is difficult to do all of them by themselves for the return of subsidy. (If the JCM credit could be sold, the situation might be changed.)

At last, the expansion of this emission reduction concept or JCM concept in Paper/Pulp sector is important. Our final purpose is the emission reduction in whole Paper/Pulp sector, so, in addition to creating No.2, No.3 ...projects with other local companies, we need to PR the concept and merit to stack-holder in Paper/Pulp sector.

<Current conditions and Next Steps>

In this research, we have assessed the feasibility of the implementation of the JCM project, together with the local partner Fajar Paper and Aikawa, the manufacturer of the OCC line. At present, with whom to place an order for the OCC line is not decided, but we received a positive answer from Fajar Paper concerning the implementation of the JCM subsidy project. On the other hand, because of the overall preparation schedule of the line (#8) which Fajar Paper is working on, it became necessary to judge whether to implement the JCM subsidy project the JCM early.

So, we propose for the second public offering of subsidy project 2014, while keeping implementing this research. The implementation plan of the JCM project is as mentioned previously. The following items are to be carried out within the fiscal year 2014.

Schedule of the remaining fiscal year 2014 (immediate future)

:Submission of the proposal for the second public offering of the subsidy project 2014



“Examination/Adoption”



(When adopted)

•**After adopted ~ February**

Study/arrangement relating to the international consortium contract

Study/arrangement relating to the implementation plan of the subsidy project

Study/arrangement of specifications relating to contract research on MRV (other than the subsidy project)

Other study/arrangement relating to transaction, system, etc.

•**Within March**

Conclusion of the international consortium, granting decision

Contract conclusion of contract research relating to MRV (other than the subsidy project)

The line addition by Fajar Paper is a decision they have made. Although coordination is under way, on the assumption that Aikawa OCC line is to be introduced using the JCM subsidy project, we assume the following issues and solutions from the perspective of realization of the subsidy project.

<International consortium contract>

Since this is a subsidy project 2014, an international consortium contract must be concluded within this fiscal year. At present, the contract has not concluded.

We have given a sample of an international consortium contract to Fajar Paper early December of 2014,

to get it concluded within this fiscal year. It is studying/arranging the contents with the chair company, Kanematsu.

Because the contract is to be concluded in a short-time, no matter whether the proposal is adopted or not, we aim at concluding the contract within this fiscal year by keeping on arranging the contents of the contract in parallel, after the proposal of the second public offering.

<Implementation plan of the subsidy project>

The OCC line is a part of the line expansion plan of Fajar Paper, so changes/revisions of the plan schedule are inevitable due to various factors. On the other hand, the subsidy project prescribes restrictions (requirements) relating to the implementation period of the project, etc.

Therefore, we study in detail the implementation plan of the subsidy project so as to complete it smoothly, while keeping consistency with the overall line expansion plan.

(2) JCM methodology development

1) Eligibility criteria

This was prescribed, considering ① having higher environmental quality than the regular technology to be introduced, ② being a site/technology which enables MRV and able to obtain data required by the methodology, ③ that Japanese technologies are preferentially chosen (spec-in), and so on.

Requirement	Reason for the requirement
It shall be equipped with a monitoring system that allows measuring electricity consumption of an OCC line periodically.	To assure the reliability of monitoring
The energy efficiency of an OCC line shall be 140kWh/ton of paper or less.	The industry average is 140kWh/ton of paper. The requirement higher than the average can be a differentiation factor.
Engineers can periodically (once every three months as least) do maintenance/replacement and instruction for improvements of machines.	Old corrugated cartons which are material are not uniform in quality, so the machines wear greatly, requiring appropriate maintenance. Aikawa has a base there and its engineer visits once every three month for maintenance. It can be a differentiation factor from other companies.
The fiber yield shall be 87% or higher.	The fiber yield of 87% or higher is the industry average. To set the lowest line to 87% can exclude manufacturers from Taiwan and China which sell equipment cheap but low quality. The water consumption of OCC lines of 10tons/ton of paper or less is the industry average.
The water consumption of an OCC line shall be 10tons/ton of paper or less.	It is reasonable to set the numerical value, taking into considerations data dispersion when calculating the reference amount of emission based on past data. For that purpose, it is necessary to have a certain amount of data. That is why this requirement is set.
The object companies shall have more than 2 lines which have been operated for more than 1 year and the kind of products of those lines is the same as that of the new line.	It is reasonable to set the numerical value, taking into considerations data dispersion when calculating the reference amount of emission based on past data. For that purpose, it is necessary to have a certain amount of data. That is why this requirement is set.

2) Calculation of GHG emissions (including reference and project emissions)

<Reference scenario setting>

In this methodology, we decided to obtain BAU and the reference based on the past record of lines of Fajar. The appropriateness of using past data is on the assumption that it is natural for companies to select systems with the same operational technology and proven performances.

Since it is regarded as prerequisite that the same product item is made, PM5 and PM7 can be the objects of BAU and reference. For this research, the weighted average of PM5 and PM7 is considered to be BAU and we decided to take PM5 which is good in energy-efficiency from the perspective of serviceability as the reference object of specific energy consumption.

Although it is possible to subtract the standard deviation from the average (minus 1σ), etc. as a concept of serviceability assurance, here, we judge that the principle of serviceability is assured because we took the average of PM5 and PM7 as BAU and taking PM5 with a good energy-efficiency from the perspective of serviceability as reference.

The difference between the specific energy consumption spec value and actual data from operation is ascribed to yield. Although almost all of causes to stop papermaking processes are paper jamming and run-out of paper, the OCC line keeps running even while paper is not made after the papermaking process has stopped. Thus, the energy consumption of the OCC line does not change even when the amount of production goes below the expectation due to yield. As a result, the specific energy consumption per product of the OCC line becomes lower than the spec value.

<Project emissions>

In this methodology, the project amount of production and electricity consumption are obtained by actual measurements after monitoring.

<Quantification of GHG emissions and their reductions>

Line 8 is supposed to produce 490,000t yearly. The CO₂ reduction prospect is 14,885t CO₂ yearly, as a result of estimation of reduction based on the specific consumption spec value of Line 8' OCC line.

3) Data and parameters fixed *ex ante*

Fajar has a private electric generator using gas turbines. It does not supply enough electricity to the existing lines. So it buys grid electricity. Therefore, the grid emission factor of the area where Fajar is located is used because it is considered that the entire electricity to use will be bought from the grid when Line 8 is built.

The grid emission factor of each area is already given by the National CDM which is the Indonesian DNA. We will use it.

電力系統地域	公表年	排出係数 (ton CO ₂ eq. / MWh)
ジャワ・マドゥラ・バリ (ジャマラ)	2010	0.73
スマトラ	2007	0.539
	2008	0.577
	2009	0.717
	2010	0.749
西カリマンタン	2009	0.738
	2010	0.733
南および中カリマンタン	2009	1.345
	2010	0.96
東カリマンタン	2009	1.2
	2010	0.861
コタモバグ、ミナハサ	2009	0.378
	2010	0.332
南、西スラウェシ	2009	0.397
	2010	0.605
パタン	2008	0.625
	2009	0.625
	2010	0.549

Source) National Committee on Clean Development Mechanism