Summary

FS Project Title

CDM Feasibility Study for Rice Husk-based Power Generation in the Philippine

Implementer

Japan Engineering Consultants Co.,Ltd.

1. Outline of the project

(1) Host Country and Region/City

Philippines, Municipality of San Manuel in Isabela Province

(2) Outline of the project

This FS aims to evaluate the feasibility and the profitability of the CDM project. This study plans to replace the existing petro-diesel power generation using rice husk. Isabela La Suerte Rice Mill Corporation a rice mill company has three rice mill factories located in San Manuel in the center of the Luzon.

The rice husk will be collected from 3 rice mill factories whose annual total amount is about 47,000t. 2MW power generation is planned for this project.

Currently the rice husk is not utilized. It is abandoned, or used as landfill. The proposed project will utilize the husk as a carbon neutral fuel of energy. This energy can substitute the electric supply from the diesel electric power and the public grid currently used for rice polishing. The project will also avoid the current methane emissions from the landfilled rice husk. The project participants will be the Japan Engineering Consultants Co., Ltd., the Isabela La Suerte Rice Mill Corporation, and the Tranzen Group Inc.. The start up time of the project aims at January, 2010.

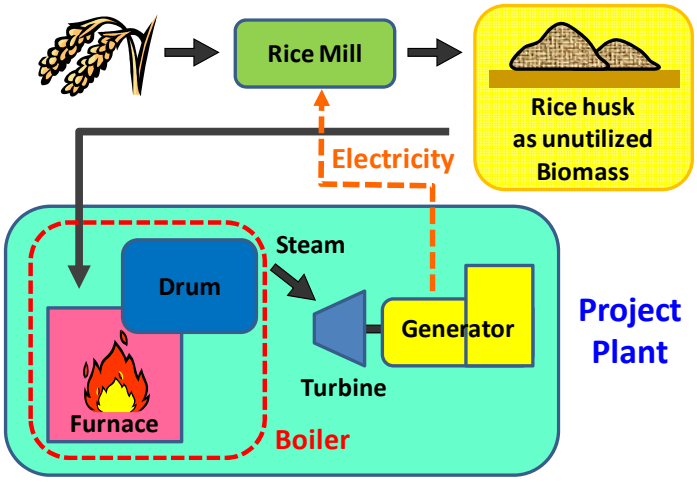

Fig.1 Concept of this project

2. The contents of this study

(1) The points of this study

(a) The conditions of approval of the CDM host country (Philippines)

- The conditions of approval (days required for approval, similar projects, etc.).
- Governmental development plan

(b) The present condition of rice mill factories

- The present condition of the rice mill process.
- The track records of rice mill operations (days of operation, hours worked, etc.).
- Use of power supply (fossil fuels' use etc.).
- The situations of husk disposal (present condition of the number of trucks used, and landfill sites, etc.).

(c) Application of baseline methodology.

- Selection of the methodology
- Definition of the project boundary
- Identification of the baseline scenario
- Calculation of the greenhouse gas emission reduction
- Planning of the monitoring methodology and the monitoring plan

(d) Analysis of the power generation system

- The conceptual design of the power generation system
- Selection of the boiler
- Selection of the steam turbine generator
- Quantity of husk used for power generation

(e) Analysis of the project business potential

- Estimation of the construction costs of the plant
- Estimation of the operation and maintenance expenses of the plant
- Estimation of the income of the project
- Determination of the benchmark for evaluation of the business potential
- Demonstration of additionality
- Financing plan

(f) The meeting for project promotion

- Project implementation structure
- Duration of the project activity/crediting period
- Project implementation schedule

(g) Evaluation of an environmental impact

-Study of the system for environment impact assessment in the Philippines
- Study of the environmental impact by the project implementation
- Other indirect influences

(h) The method and index-izing which realize the co-beneficial counter measures against global warming and against environmental pollution

(2) Organization of study implementation

(a) Tranzen Group Inc.

This company is developing and promoting the CDM projects in the Philippines. It participated in meetings with government organizations and local contractors, in this study.

(b) Isabela La Suerte Rice Mill Corporation (ILSRM)

This company owns the project site (rice mill factories). It participated in the meeting with the Sun Manuel municipality and collected required data, in this study.

(c) Pasig Agricultural Development & Industrial Supply Corporation.

This company has designed and supplied the rice mill machines of ILSRM. It has collected the data about rice polishing process for PDD development.

(d) Falck Exp.Inc.

This company arranged the study in the Philippines and collected the energy related data of the site, in this study.

(3) The contents of study

1) CDM Project Policy in the Philippines

The Department of Environment and Natural Resources (DENR) of the Philippines has been selected as the CDM designated national authority (DNA). At the hearing of DENR and research of its website, the period required for approval of the CDM project in the Philippines, organization and procedure of CDM approval were investigated.

According to the latest project list (at the time of June, 2008) approved by the Philippines government, the approval letters of host country were published for 62 projects. 20 of these projects have also obtained approval of the CDM executive board (at the end of December, 2008). About 80 percent of these projects are classified into waste management. The approved project similar to this project is a 1MW rice husk power generation project which ILSRM submitted (issue of letter of the government approval: April 25, 2007).

The methodology (AMS-III.E.) of methane avoidance is applied in this project. At the meeting with DENR, DENR commented that the application of the methodology

of methane avoidance was satisfactory, when following a suitable methodology.

2) The present condition of rice mill factories

At on sites inspection, the rice mill processes in three rice mill factories (the head office factory, the 1st factory, and the 2nd factory) of ILSRM, the source of rice husk used as fuel, the operation situation, and the power supply use were all investigated. The annual amount of milled paddy in these three rice mill factories is 216,000t in total. The amount of generated rice husk is 47,400t for the annual sum total, and is equivalent to about 22% of the weight of total unhulled paddy. At the site of the head office factory, 1MW rice husk power generation plant and a 350kW diesel generator work to generate total of 1,350kW. At the 1st factory and the 2nd factory next to the head office factory, diesel electric power generation was not used.

The electric power from a public grid has been purchased. The fuel consumption of a diesel generator (350kW) and the public grid electric power usage fee, which are used at the head office factory, were also investigated in this study.

The construction of the existing 1MW rice husk power generation plant was from a loan of the Development Bank of the Philippines. It was completed in May, 2007. Operation started from August of the same year. This power generation project aims at the CDM project. The CDM approval of the Philippines government was obtained in April, 2007. It had obtained the approval of the British Government in November, 2007. However, it has not yet been registered with the CDM executive board. Although the 1MW rice husk power generation plant is in operation now. Since the acquisition of CER cannot be performed, the operation is in a deficit state. ILSRM has judged that the expense of operation of the 1MW rice husk power generation plant is less than the purchase of electric power from the public grid, and the purchase expense of new diesel generators and their fuel. ILSRM has resumed the work of the registration to the CDM executive board of this project.

This project began from the approach of ILSRM to the new reliable CDM partner and CERs buyer. In the new project, 2MW power generation is expected and is planned in consideration of the future amount of rice husk which can be used.

The condition of rice husk disposal was also investigated, at the site. As for the generated rice husk of 47,400t/year at the three rice mill factories, 23,100t/year is used in the above-mentioned 1MW power generation plant. The half of the remaining 24,300t/year is disposed of in the final landfill site which the Sun Manuel municipality specifies. Abandonment disposal of the remaining half is carried out at the neighboring sites of the river. The distances from a head office factory to the final landfill sites which Sun Manuel Municipality specifies, and the landfill sites along a river are about 5-10km. The transportation for rice husk disposal is 40-50 round trip/day by three trucks (loading capacity of 1.5t) which ILSRM owns.

3) The expected greenhouse gas emission reduction

The methodology of the existing 1MW project does not include avoidance of methane generation only by displacement of the fossil fuel. The methodology of avoidance of methane generation is also applied into this project. Moreover, it was also confirmed that the electric power consumed at the three rice mill factories are provided for by the diesel electric power generation and the electric supply from a public grid which are fossil fuel. The rice husk, abandoned along the river sites, is washed away to the lower stream at the time of rainstorms. From this fact, it was judged that the methane generation by the rice husk decay was produced in the final landfill site, which the Sun Manuel Municipality specifies. Based on these, the project boundary of this project was determined and the baseline scenario was also identified. The optimal methodology was selected and the expected greenhouse gas emission reduction was also calculated. Furthermore, the monitoring methodology and the monitoring plan were planned.

As a result, the expected greenhouse gas emission reduction through this project activity is a total of 186,756 tCO_2e for the project duration of ten years, and the annual an average of 18,675 tCO_2e/year.

4) The study of the power generation system

In this project, the plant building, (a boiler, a steam turbine generator, transformer and equipment for distributing electricity), stockpile warehouse of rice husk, the water treatment plant, the stockpile room of incinerated ashes, etc., are installed on the site of the head office factory. The main technical elements introduced in this project are the selection of a boiler and a steam turbine generator.

5) Evaluation of business potential

In this study, the initial investment including the buying expenses of a boiler and a steam turbine generator is estimated. By the exchange rate as of October, 2008, the amount of money is estimated at 530 million yen. The incomes of this project are the profit on the sale of electric power generated at the rice husk power generation plant to ILSRM and the profit on the sale of CERs.

The economic efficiency of this project was studied in consideration of the initial investment of the project and the income, CDM registration and a CERs issuance fee, tax, operation and maintenance expense, etc. As a result, IRR (Internal Rate of Return) without CERs profit on the sale will be 9.1%, and is less than the long-term interest rate (10%) of the Philippines inland banks benchmark. On the other hand, IRR with CERs profit on the sale is 15.8%. Its profitability will go up.

6) Demonstration of additionality

This project is classified into small-scale CDM. Demonstrations of additonality need

to prove one or more barriers relevant to project implementation can be overcome. As a result, when the profit on the sale of CERs is not obtained (a CDM project is not carried out). It is deficient in the chain of investment. It is proved that economic efficiency is greatly improved by the profit on the sale of CERs.

The 1MW rice husk power generation plant currently in operation at the site of this project is operated without CDM registration of the United Nations. It was a concern that this project was considered to be BaU. Although it was private, the next comment was obtained from DOE. “Although CDM registration to the United Nations of the existing 1MW rice husk power generation project is not carried out, since the existing 1MW rice husk power generation project has obtained the CDM approval of the host country in April, 2007. It cannot be considered that this project is BaU.”, and “When CDM registration to the United Nations of the existing 1MW project is carried out, the additionality of this project is also demonstrated." If rice husk power generation projects, similar to this project have no profit on the sale of CERs, and business potentials are not feasible, new projects are considered not to be carried without CDM registration.

7) The meeting for project promotion

In this study, ILSRM, Tranzen and the Japan Engineering Consultants Co., Ltd., which will be participations, discussed how to advance this project. The main contents of discussion were the project implementation schedule, the project implementation system, the duration of the project activity / crediting period, and the financing plan.

Based on "Mining Law of the Philippines" which is habitually adapted to CDM projects in the Philippines, the ratio of fund investment of Philippines companies was determined as about 60% and the ratio of Japanese companies was determined as about 40%. However, a small number of other companies of the both countries were also able to be accepted to participate. In financing, 30% of the total cost of a project is contributed as a capital, and 70% of others are debt from a bank. The loanee was decided to be the first candidate in the "Development Bank of the Philippines" which was the loanee of the 1MW of the existing project. Moreover, negotiating with first priority from NEDO of Japan was reconfirmed as a buyer of CERs.

It was decided that the Philippines investors have to hold a stakeholder meeting and to get the host country’s approval of this project from the Philippines DNA with their responsibility. Furthermore, shifting to discussion about establishment of the SPC (joint ventured special purpose company) for project implementation after this study was confirmed.

8) Evaluation of an environmental impact

The laws about the environmental impact assessment in the host country, and the standards, etc. were researched. Based on the plant scale (2MW) of this project,

Environmental Compliance Certificate (ECC) are required by submission of Initial Environmental Examination (IEE), for the implementation. This project is classified into a generation from waste to power generation project. As the environmental impact and social influence, greenhouse gas emission reduction, waste reduction, electric power supply, job creation, consciousness of environmental preservation, etc. are all expected from this project.

9) The method and index-izing which realize the co-beneficial counter measures against global warming and against environmental pollution

The Sun Manuel Municipality with this project site, has a great needs for this waste solution project because of the shortage of their budget. By implementing this project, the rice husk of 39,270 t/year consumed as fuel at 2MW rice husk generation plant can be quantified as the pollution control effort of waste reduction. The waste of landfilling is avoided.

3. Scheme of the project

(1) Definition of the project boundary and identification of baseline

The project boundary is defined as between the existing rice mill facility and the power generation plant built by this project. Now, some parts of rice husk, which is the biomass generated from a rice mill factories, are used for the 1MW power generation operating in the site. The remaining rice husk is disposed of at the final landfill sites, which the municipality specifies. The river side disposal is the general custom. Since the methane production from decay of the biomass at the landfill sites, is avoided by implementation of this project. The landfill sites (the final landfill sites and the river side) of rice husk are interpreted as outside of the project boundary.

Because the greenhouse gas emission from the transportation of rice husk to the landfill sites is also reduced by the implementation of this project. The transportation of rice husk to the landfill sites is also included in the project boundary. There is no increase in the distance of transportation of rice husk through this project activity. The planned construction site of the power generation plant is on the site of the rice mill factory. The transportation distance of rice husk can be disregarded. Moreover, the electric power used at the rice mill factory is provided for by the electric supply from the diesel generator which is using the light oil of fossil fuel as fuel and the unstable public grid.

The above situation is defined as the baseline scenario of this project. Rice husk disposed at the river side is passed in to the lower stream in the case of rainstorms. For this reason, the situation that the decay of rice husk has produced methane only at the final landfill sites which the municipality specifies is defined as the baseline scenario.

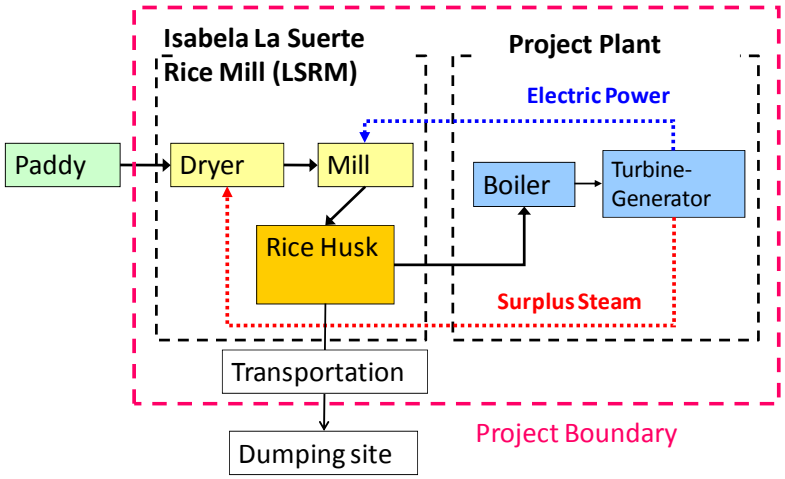

Fig.2 Project Boundary

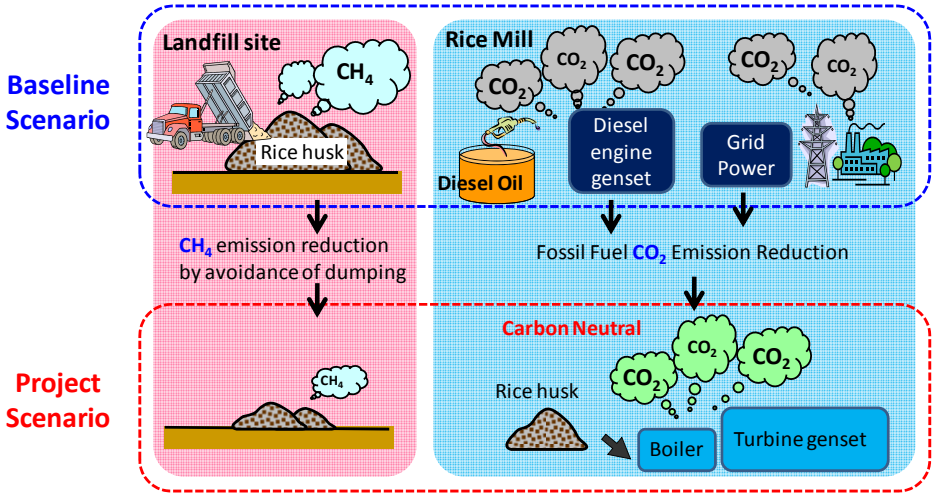

Fig.3 Baseline scenario and project scenario

The AMS-I.C. (Thermal energy for the user with or without electricity) and the AMS-Ⅲ.E. (Avoidance of methane production from decay of biomass through controlled combustion and gasification or mechanical/thermal treatment) will be applied to this project activity.

The object of the AMS-I.C. is renewable energy technology that supplies thermal energy to homes and other users as alternative of fossil fuel. The power generation system using the biomass is also contained in this category. Moreover, AMS-Ⅲ.E. is a methodology which avoids the methane generation from the decay of biomass through controlled combustion etc.

In this project, "power generation" will be carried out through “controlled combustion" of rice husk from rice mill factories. The decay and methane generation from rice husk at the final landfill sites now are avoided by the project activity now. Since the power generation capacity of this project is 2MW, and is less than 15MW, this project is classified into a small-scale CDM project. This project corresponds to the

above-mentioned applicable condition. The methodology of this project can be used to a small-scale methodology AMS-I.C. and AMS-Ⅲ.E.

1) GHG emission reduction by alternative fossil fuel

The amount of baseline emission during year is calculated by the following formula.

$BEy = BE_{power, fuel, y} + BE_{power, grid, y}$

BE_y : Amount of baseline emission from the electric power alternated through the project activity in the year "y"

$BE_{power, fuel,y}$: Amount of baseline emission from the electric power using fossil fuel at the rice mill factories alternated through the project activity in the year "y"

$BE_{power, grid,y}$: Amount of baseline emission from the public grid electric supply alternated through the project activity in the year "y"

The amount of baseline emission from the electric power using fossil fuel at the rice mill factories alternated through the project activity during year is calculated by the following formula.

$BE_{power, fuel,y} = Q_{y, diesel} \times EF_{diesel}$

Q_y : Annual consumption of light oil

EF_{diesel} : CO2 emission factor of light oil

＝ **3,101 tCO_2e/year**

The amount of baseline emission from public grid electric supply is calculated by multiplying the electric energy from the public grid alternated through the project activity by the emission factor of the grid.

$BE_{power, grid, y} = EG_y * EF_{y, grid}$

EG_y : Electric energy from the public grid alternated through the project activity

$EF_{y, grid}$: Emission factor of the grid

The emission coefficient of combined margin which unifies the operating margin and the building margin, and was used for the grid emission factor, base on the procedure specified to AMS-I.D. and was used as a tool to calculate the emission factor for an electricity system.

The calculated emission factor of the grid is the following.

$\mathbf{EF_{y,\,grid}} = EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$

$= 0.672 \times 0.5 + 0.381 \times 0.5$ **= 0.526 tCO2e/MWh**

In 2010, when this project will be started, the electricity demand of the three rice mill factories is estimated at a total of 3,500kW. The annual operation is based on the 300 days for 24 hours. Since the electricity demand of the head office factory used as the project site and the 2nd factory are estimated at 3,100kW, these factories are supplied from 2,000kW (2MW) generated in this project and 1,000kW (1MW) generated in the existing plant.

Electric power required at the head office factory and the 2nd factory is provided for with the electric supply from 350kW of diesel electric power generation currently used at the head office factory and electric supply from the public grid. For this reason, this project activity can be alternated with 2,000kW which is united with 350kW from the diesel generation and 1,650kW from the grid.

Therefore, the amount of baseline emission from public grid electric power is as follows.

$\mathbf{BE_{power,\,grid,\,y}} = 1650 \times 24 \times 300 \times 0.526 =$ **6,249 tCO_2e/year**

The amount of GHG emission reduction deducts the amount of project emission and leakage from the amount of baseline emission Therefore, the amount of GHG emission reduction by displacement of fossil fuel at the rice mill factories and displacement of the power supply from public grid base on the AMS-I.C. is as follows.

BEy =3,101 + 6,249＝**9,350 tCO_2e/year**

2) GHG emission reduction by avoidance of the methane generation

Rice husk, which is not used for the existing 1MW power generation, is disposed to the final landfill sites, which the municipality specifies, and to the river side. Rice husk disposed at the river side is passed in the lower stream in the case of rainstorms. From this reason, it was defined the methane by the decay of rice husk at the final landfill sites which the municipality specifies is only produced. And the baseline emission was calculated based on the AMS-Ⅲ.E.

The amount of baseline emission from the decay of rice husk in the year “y” is calculated by the following formula.

$$BE_y = BE_{CH4,SWDS,y}$$

BE_y : Baseline emission of methane production from the decay of rice husk in the year “y”

$BE_{CH4, SWDS,y}$: CO2 equivalent GHG emission reduction calculated from the amount of methane production at the final landfill sites

$BE_{CH4, SWDS,y}$ is calculated using "Tool to determine methane emissions avoided from dumping waste at a solid waste landfill site".

$$BE_{CH4,SWDS,y} = \varphi \cdot (1-f) \cdot GWP_{CH4} \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^{y} \sum_{j} W_{j,x} \cdot DOC_j \cdot e^{-k_j \cdot (y-x)} \cdot \left(1 - e^{-k_j}\right)$$

φ	: Correction coefficient of the model for the uncertainty of the computational model (IPCC default is 0.9)
f	: Recovery, flare combustion and capacity factor of methane at landfill site in the present (=0)
GWP_{CH4}	: Global warming potential for methane (IPCC default is 21)
OX	: Oxidation factor (IPCC default is 0)
F	: Fraction of CH4 in landfill gas (IPCC default is 0.5)
DOC_f	: Fraction degradable organic carbon (IPCC default is 0.77)
MCF	: Methane correction factor (IPCC default is 0.4)
$W_{j,x}$	: Amount of dumping waste in the year “x” (= 21,650t/year)
DOC_j	: Degradable organic carbon of Waste j (IPCC default is 0.5)
kj	: Decay coefficient Waste j (IPCC default is 0.035)
j	: Kind of waste (IPCC default is Wood)
x	: Object year in the credit period (2010 to 2019)
y	: Year by which methane production is calculated

The amount of emission reduction of this project is calculated based on the amount of the combustion improver of fossil fuel in the power generation plant, the increase in fossil fuel use by the difference of the transportation distance of rice husk to the power generation plant in the baseline scenario from the distance of the transportation to the landfill sites in the project scenario and the increase in fossil fuel used by the tucking of the incineration residue discharged from project activities to the landfill site and to other users.

Combustion improver of fossil fuel is not used in the power generation plant of this project. Moreover, since the incineration residue of rice husk is transferred free as soil conditioner to surrounding farms, use of the fossil fuel for transporting it is to be expected. Since hauling becomes unnecessary to the landfill site of rice husk, it is judged that there is no increase in the amount of the project emission reduction. Furthermore, since the power plant planned construction site and the rice husk storage warehouse are at the same site, the distance of transporting of rice husk to the power plant can be mostly disregarded.

The amount of GHG emission reduction is an amount which deducted the amount of project reduction and leakage from the amount of baseline reduction. Therefore, the amount of GHG emission reduction by avoidance of the methane production calculated based on the AMS-Ⅲ.E. is as follows.

Table-1 GHG emission reduction by avoidance of the methane generation

Operating year	Baseline emission by avoidance of methane generation (tCO2e)	Project emission by combustion of auxiliary fuel (tCO2e)	Project emission by additional distance of transportation (tCO2e)	Leakage (tCO2e)	GHG emission reductions by avoidance of methane generation (tCO2e)
2010	1,876	0	0	0	1,876
2011	3,688	0	0	0	3,688
2012	5,438	0	0	0	5,438
2013	7,128	0	0	0	7,128
2014	8,759	0	0	0	8,759
2015	10,334	0	0	0	10,334
2016	11,855	0	0	0	11,855
2017	13,324	0	0	0	13,324
2018	14,742	0	0	0	14,742
2019	16,112	0	0	0	16,112
Total	93,256	0	0	0	93,256

Leakage must be taken into consideration, when energy generation equipment is transported from other activities, or when the existing equipment is transported to other activities. In this project, since the power generation plant becomes independent of other activities and is newly established, leakage is not taken into consideration.

(2) Monitoring plan

In this project, parameters required for verification of the amount of emission reduction are monitored based on the AMS-I.C. and the AMS-Ⅲ.E. Monitoring is based on the direct measurement for the amount of rice husk combustion and generated electricity in each part of the plant and dynamo, etc. In the monitoring plan, the method of measuring those values by instrumentation apparatus is adopted. The items which should be monitored in this project are shown below.

- Qproduct, y : Annual quantity of rice husk production
- Qconsump, y : Annual consumption of rice husk (quantity of combustion in the project plant).
- Qash_product, y : Annual quantity of incineration ash production
- Qash_dump, y : Annual quantity of incineration ash dumping
- Qsteam : Quantity of steam
- Psteam : Pressure of steamy
- Tsteam : Temperature of steam
- EGy : Annual electric power generation

・H : Operation time
・CTy : Amount of conveyance by truck
・Regulations of the relation of project activity

It is necessary to specify the rice husk amount of consumption per unit production of electricity as beforehand from equipment specification etc. The electric energy which will be actually generated should be compared with electric energy calculated from the amount of rice husk consumption and a unit production of electricity.

(3) GHG emission reduction through this project

The expected GHG emission reduction through this project unites the GHG emission reduction by the alternative of fossil fuel use and grid power supply, and the GHG emission reduction by avoidance of the methane production, and is as follows.

Tale2. GHG emission reduction through this project

Operating year	GHG emission reductions by displacement of fossil fuel utilization and grid power (tCO2e)	GHG emission reductions by avoidance of methane generation (tCO2e)	Total emission reductions (tCO2e)
2010	9,350	1,876	11,226
2011	9,350	3,688	13,038
2012	9,350	5,438	14,788
2013	9,350	7,128	16,478
2014	9,350	8,759	18,109
2015	9,350	10,334	19,684
2016	9,350	11,855	21,205
2017	9,350	13,324	22,674
2018	9,350	14,742	24,092
2019	9,350	16,112	25,462
Total	93,500	93,256	186,756

The GHG emission reduction is expected to be 186,756 tCO2e as the ten-year sum total of project period and 18,675 tCO2e / year as one year of average.

(4) Duration of the project activity / crediting period

The start of a project: January, 2010 (plan)
The period of project implementation: Ten years
(excluding for the period of construction) January, 2010 - December, 2019

In the plan of project implementation, SPC is established at the beginning of the 2009

fiscal year, and the CDM approval procedure is continued. Construction will be started in June, 2009. The target of commencement of commercial operation is in January, 2010.

(5) Environmental impacts and other indirect influence

According to project scales (plant scale, power generation capacity, area, etc.), the procedure concerning a group classification and a required environmental impact are defined. According to the standard of the procedure concerning the environmental impact indicated to "REVISED PROCEDURAL MANUAL FOR DENR ADMINISTRATIVE ORDER NO.30 SERIES OF 2003" (DAO 03-30), this project is classified into a waste power generation project. Demand standards differ as follows according to power generation capacity.

- Power generation capacity≧50MW
  → Submission of EIS　Receipt of ECC
- 1MW≦power generation capacity ≦50MW
  → Submission of IEE　Receipt of ECC
- Power generation capacity≦1MW
  → Submission of PDR　Receipt of CNC

The planed power generation capacity of this project is 2MW. Submission of IEE is needed. If the applications are satisfactory, ECC will be published in about two months after application.

(6) Stakeholders' comments

The comments of the Sun Manuel Municipality are as follows.

If environmental standards etc. are observed, an enterprise like this project will be welcomed. The municipality expects this project will lead also to the improvement in the brand of rice. The disposal of waste, including rice husk etc. is insufficient because of the shortage of their budget, and the restriction of the local government's authority, etc. This project plan is very good for the improvement of the waste and for the electric power supply.

In the Philippines, the INTERIM GUIDELINES ON THE CONDUCT OF STAKEHOLDERS' CONSULTATION UNDER DAO (2005-17) are made. The guidance about holding of an explanation meeting to stakeholders is shown in the guidelines. In the guidelines, it is indicated that the record of stakeholder comment collection needs documents, such as a participant list, a minutes, and an opinion summary at a minimum.

Based on the guidelines, in order to make the neighboring people understand the contents of the CDM project, the data for explanation which includes the explanation of

the structure of a CDM project, global warming, and greenhouse gas, etc. will be made. The neighboring people explanation meeting will be held after the SPC is established.

(7) Project implementation structure

- Equity participant : Isabela La Suerte Rice Mill Corporatio, Tranzen Group Inc. Japan Engineering Consultants Co.,Ltd.
- PDD maker : Japan Engineering Consultants Co.,Ltd.
- A technical donor : Japan Engineering Consultants Co.,Ltd.
- CER buyer: New Energy and Industrial Technology Development Organization (NEDO) (the first candidate)

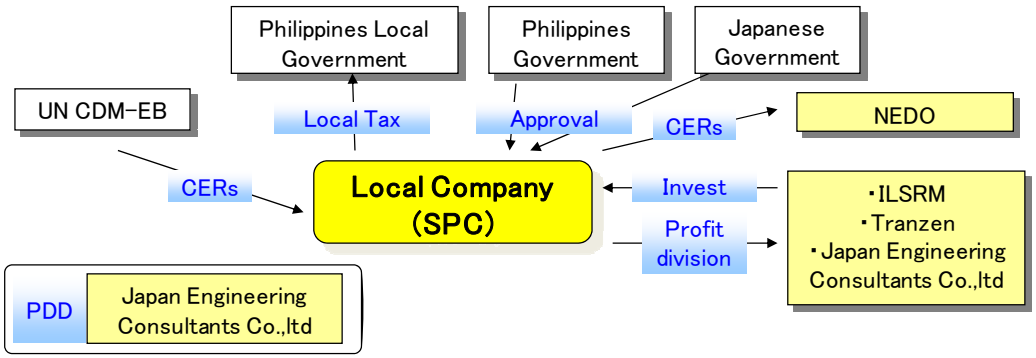

Fig.-4 CDM project implementation structure

(8) Financing

The SPC (joint corporation: special-purpose company) of this project is aimed to carry out the borrowing of the 370 million yen which is 70% of project initial investment of the remainder except the capital from the "Development Bank of the Philippines." The payment period currently planned is five years.

(9) Economic efficiency analysis and demonstration of additionality

This project is classified into small-scale CDM. Because demonstration of additionality needs to prove one or more barriers, among an investment barrier, a technological barrier, a common practice barrier, and other barriers relevant to project implementation. Since the existing 1MW generation plant is working, it is difficult to prove the existence of the technological barrier and the common practice barrier. Therefore, the investment analysis was carried out for the proof of the investment barrier in this study.

Since the existing 1MW generation project cannot take profitability into account, it is deficient in the attraction of investment. Implementation of this project, similar to the existing 1MW generation project, is difficult without measurement. In the economical efficiency analysis of this project, IRR without CERs profit on the sale is estimated as

9.1%, on the other hand, IRR with CERs profit on the sale of 15 U.S. dollars/CO_2t is estimated as 15.8%.

- IRR without CERs profit on the sale = 9.1% (eight years: recovery of investment)
- IRR with CERs profit on the sale = 15.8% (six years: recovery of investment)

The benchmark of the investment for this project is determined to be more than IRR10%, based on the government bond interest rates for ten years in the Philippines (about 7.5%), and the long-term interest rate (about 10%) of the Development Bank of the Philippines. Since IRR (9.1%) without CERs profit on the sale is less than the benchmark. The feasibility of this project is judged to be low when this project is not a CDM project. As mentioned above, since it is proved that an investment barrier exists, the additionality of this project is proved.

As mentioned above, in order to prove that there is an investment barrier, the additionality of this project is demonstrated.

(10) Feasibility and problems of this project

1) Technology

Some parts of the introductory technology are dependant on overseas technology, but the existing plant is working. There is also an accumulation of working skills. The feasibility of this project is judged to be high.

2) Financial situation

A global monetary crisis may affect financing of the equity participants of the Philippines. Japanese equity participants are uneasy about the risk of exchange fluctuation.

3) The period needed for CDM registration

There is an uneasiness felt by the protraction of the examination procedure of the CDM executive board until it results in CDM registration. It is necessary to carry out smoothly the formalities concerning the CDM registration, such as the exchange of information, etc. looking at the track record of Validator, etc.

4) The trend of the 2nd commitment period

Depending on the trend in 2013 and afterwards, there is an uneasiness felt by the fall of the CERs profit on the sales.

4. Realization of co-benefit in the Philippines

This project is a power generation project using rice husk which is an agricultural waste. The amount of rice husk generation as waste is reduced by the effective use of rice husk disposed of through the project activity. Through the project activities, dumping of rice husk as waste is avoided. 39,270t/year of rice husk can be consumed as fuel in the 2MW rice husk power generation plant. The amount of waste reduction can be quantified as a pollution control effort.

This project has mentioned the effects of the declining water quality because of the bad smell cased and the burning of rice husk in the fields as are partially being carried out. Moreover, the air pollution prevention effect by reduction (use reduction of a fossil fuel) of the power generation shares by the fossil fuel by biomass energy power generation, etc. This may also be able to indirectly improve pollution, such as air pollution.