CDM/JI Feasibility Study Report for Year 2007

Methane Digestion and Utilisation CDM Project from swine Manure, Foodstuffs Group Co.,Laiyang City in Shandon Province

Executive Summary Report

1. Outline of the Project

1.1 Background

In China, demand for pig meat has been substantially on the increase caused by population growth as well as by improved living standard in line with socio-economic development of the country. In recent years, pig farm or pig raising business is becoming toward more professionally managed and centralized.

At present time, there are over 15,000 large-and-medium-scaled pig farms countable across the country. According to the statistics of year 2003 issued by National Department of Agriculture, there were over 4,000 farms which were raising more than 3,000 heads of pigs respectively; and they are shipping 31.33 million pigs each year now.

In such scaled pig farms, drastically improved efficiency for pig raising enables high degree of cost reduction, although counterproductive matters come to appear to result in serious environmental problems caused by accumulated amount of manure and waste water derived from farm operation. Statistics compiled by Shanghai Municipal Office identifies livestock manure as the 3rd largest (or over 30%) among the causes for environmental pollutions.

Energy consumption in China is being on a rapid increase because of accelerated economic development to such an extent that primary energy consumption, e.g., is successively growing every year: 3.0% in 1900 – 2001; 9.9% 2001 – 2002; 13.2% 2002 – 2003 respectively. Electric power consumption: 8.1% in 1990 – 2001; 11.6% 2001 – 2002; 14.3% 2002 – 2003 respectively. The rapid growth of energy use is fulfilled by fossil fuel resources including coal and petroleum causing GHG emissions.

1.2. Outline of the Host Country

1.2.1. National Land

The People's Republic of China (capitol city: Beijing), located in the eastern part of Asia, on the western coastline of the Pacific, has total land area as wide as 9.6 mil. Km^2 , the 3rd largest country next to Russia and Canada.

Her territory so widely extends to the north part of the land from the axis line (53° 30' in the north latitude) of the Hoilongjiang Rive located in the north from the Moho River; and to the south part as

far as the Sohmaangsh Island (4° in the north latitude) among the Spratly Islands; the latitude expands as long as 49; in the eastern part of the land from the merging point between the Hoilongjiang River and the Usri River (135° 05' in the east longtitude) to the Pamir Plateau (73° 40' in the east longtitude) in the west part of the land; the longtitude goes as wide as up to 60° or so.

The country's borderline on the land territory is 22,800 km long, facing Democratic People's Republic of Korea in the east; Mongolia in the north; Russia in the north-east; Kazakhstan, Kyrgyztan, Tajikistanin the north-west; Afghanistan, Pakistan, India, Nepal, Sikkim, Nepal, Bhutan in the west and south-west; Myanmar, Laos, Vietnam in the south; Korea, Japan, in the east across the Japan Sea; and facing Philippines, Brunei, Malaysia and Indonesia in south-east across the South China Sea.

The total length of the sea coastline is 18,000 km with almost flat topography, benefited by lots of good deep-sea ports non-freezing almost around the year. The eastern and southern part of China Face the Bohai Sea, the Yellow Sea, the East and South Seas respectively; total sea territory is as big as 4,730,000 km^2.

1.2.2. Climate

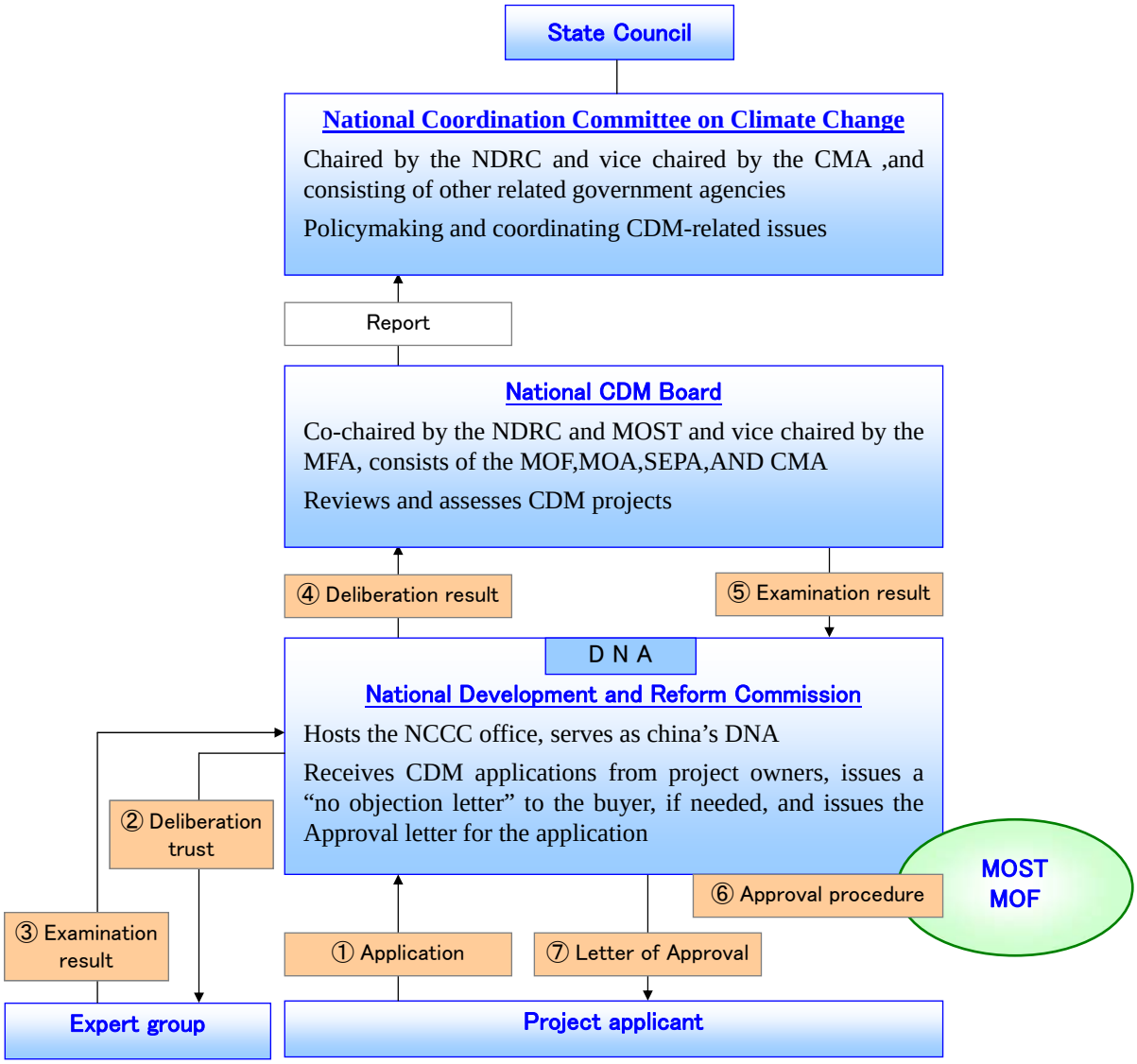
Most of the land belongs to the Temperate Zones with distinctive 4 seasons, and is divided in 6 climate zones from the north down to the south such as the Equation Zone, the Torrid (Tropical); the Sub-tropic; Warm Temperate; the Temperate; cold-Temperate respectively. Rainfalls change less and less from the south-eastern part up to the north-western part, which makes a large differences in annual rainfalls among each part of the land to such a visible extent that over 1,500mm/ year rain falls in the south-eastern coastline, compared with as little as under 200mm seen in the north-western inland area.

1.2.3. Population and Ethnic Races

The population statistics of the end of year 2005 was numbered as many as 1.3 billion and 7.56million, excluding Taiwan, Hong Kong and Macau). The birth rate was 1.240%; the mortality rate 0.651%; natural increase rate 0.589% respectively. Among the total population, ethnic majority is occupied by Han race as many as over 90%, while 55 other ethnic minorities are counted. The public language is Chinese (or Han language).

1.3. Preparedness of the Host Country for CDM Project(s)

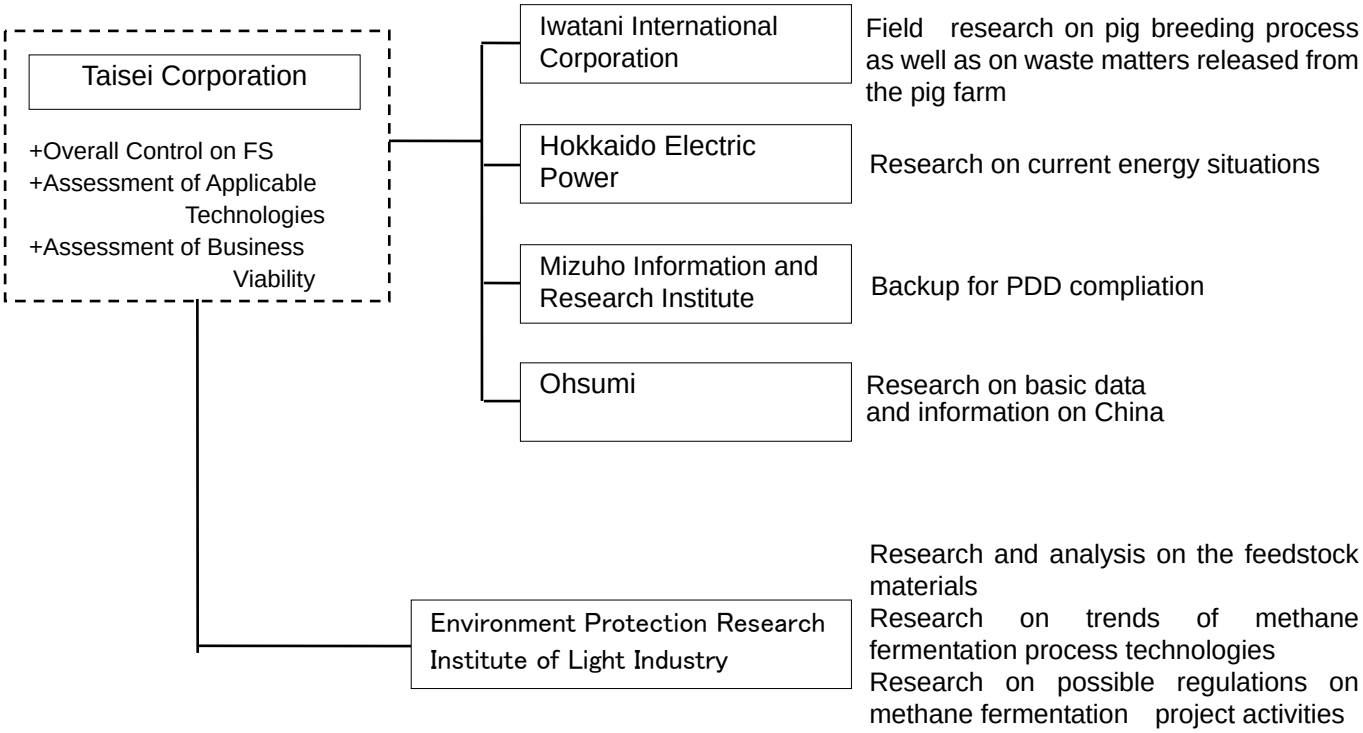
China ratified Kyoto Protocol in August, 2002, and instituted "CDM Operation Provisionary Regulations" in June, 2004, which was followed by "CDM Project Operation Regulations" in October, 2005. Under the auspice of NCCC (National Convention on Climate Change), CDM Validation Committee was formed resulting in preparedness for CDM approval system.



1.4. Key Possible Contributions for Sustainable Growth in the Host Country to be achieved by the proposed CDM Project

Biogas power generation by employing methane fermentation process with using pig manure as feedstock can help not only to mitigate major environmental problems, but to meet increasing energy demand with no serious harm or load on the environment, so that a substantial contribution may be achieved by the proposed project for a sustainable growth of the host country.

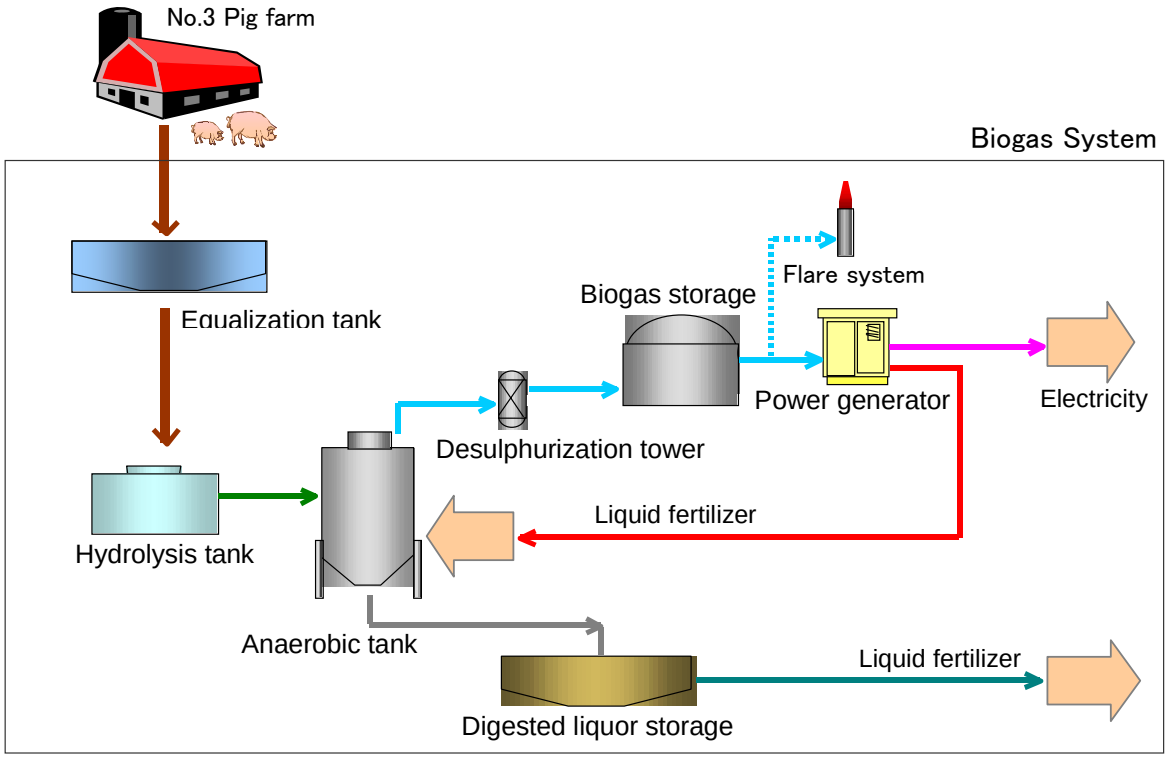
1.5. Organizational Structure for Implementation of FS



2. Outline of the Project

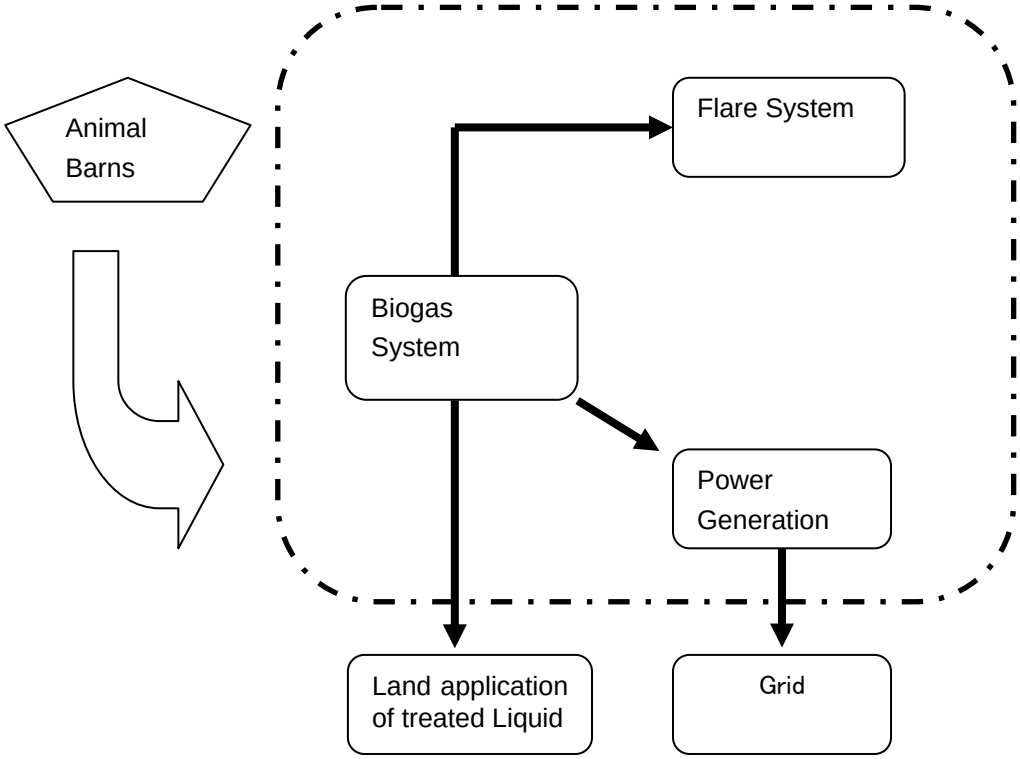
2.1. System Flow

The objective of this project is to generate electric power by applying methane fermentation process And to sell extra electricity to the external grid, while by co-generation system producing heat energy to warm methane fermentation tank. The project will be implemented on the pig farm site owned by Foodstuff Group Co., Ltd. in Laiyang City, Shangdong Province, People's Republic of China.



Project Boundary

In the Baseline, there will be included direct emissions of methane (CH_4) as well as of N_2O, released in the process of pig manure treatment; although CO_2 emission out of digested organic wastes will be excluded. Meanwhile during the execution of project activities, direct emission of N_2O from manure treatment process, unburned matters, leakage from piping, and methane emission from aerobic treatment process will be counted-in, but CO_2 emission released from digested organic wastes.



2.3 Methodology and Baseline Scenario

2.3.1 Selection of Methodology

At the time of the project proposal, since the scale of the project was rather small, and the approved methodology AM0006 “GHG Emission Reduction via Livestock Manure Treatment System” was still on pending, methane fermentation process was being reviewed under small-scale methodology Ⅲ-D. Afterwards at the 24th CDM committee’s meeting, a new category type Ⅲ was agreed to be triggered, meanwhile for an tentative measures, an applicable term was added to the effect that the maximum ceiling of the reduced amount of emissions should be set no more than 25,000 tons during the specified year”.

During the process of the project reviews, the methodology ACM0010 “Integrated Methodology for GHG Reduction of Emissions Derived From Livestock Manure Treatment” approved on 29th September, 2006, has been selected because it was found practically viable to secure the reduction amount no less than 25,000 tons during the specified year in the project.

2.3.2 Identification of Baseline Scenario

The methodology for proper selection of the Baseline scenario shall be adopted by the following steps:

Step Ⅰ：Define alternative scenarios to the proposed CDM project activity

Step Ⅱ：Barriers analysis

Step Ⅲ：Investment analysis

Step Ⅳ：Baseline revision at renewal of crediting period

（1）Step Ⅰ: Define alternative scenarios to the proposed CDM project activity

A substitute scenario must be properly identified to be realistically employable enough both for the project participants and for any other project developers engaged in livestock manure treatment projects as specified below:

Scenario1: Treating manure mixed with urine in anaerobic lagoon

Scenario2 : This particular project inapplicable for registration as CDM project

Scenario3: Mixing manure and urine for anaerobic fermentation to produce biogas to be disposed by flare burning

Scenario4 : Mixing manure with urine for intensive water treatment then to be discharged into river

Scenario5 : Treating urine in anaerobic lagoon, while manure is dehydrated to be used for organic fertilizer

In China, for enforcing anti-pollution regulations aimed at livestock industry, National Environment Protection Agency institutes “Control and Management Methods on Pollutants derived from Livestock Farms”, “Standards on Pollutants Emissions derived released from Livestock Farms and Industry”, and “Technical Standards on Pollution Protection for Livestock Farms” .

On 4.3 of “Technical Standards on Pollution Protection for Livestock Farms”, newly-built, re-modeled, and enlarged pig farms are prohibited to emit manure mixed with urine; therefore, this particular system will not construe Baseline scenario.

Other Baseline scenarios meet the regulations, and enable us to move forward to Step Ⅱ.

（2）Step Ⅱ： Barriers analysis

After analyzing possible barriers involved in terms of applicable technologies, investment, and customs and institutions, there are not any barriers identified in the Scenarios 2, 3, 4, and 5respectivly. This leads to Step Ⅲ as 4 Scenarios still remain to be reviewed.

（3）Step Ⅲ：Investment analysis

Scenario 2 : This project, inapplicable for CDM registration, will require huge amount of investment for constructing the plant, which makes it practically hard to achieve fair return on investment only by way of the sale of electricity and liquid fertilizer.

Scenario 3: Effects of environmental measures will be made, but incurred investment will not

recovered due to no income gain expected, so that the project cannot be implemented.

Scenario 4 : Effects of environmental measures are possible; however, equipment investment as well as expensive operational cost never justifies implementation of the project because of no income gain to be seen.

Scenario 5 : It may not cost high to construct an anaerobic lagoon for urine treatment and with no operational expenses incurred; and dried manure can be sold for cash income as organic fertilizer.

After analyzing the investment options, Scenario 5 has been proven to be most economically viable one, leading to be chosen as the Baseline scenario.

（4）StepⅣ：Baseline revision at renewal of crediting period

At the time of renewal of CERs validity period, the project participants should make proper identification of the Baseline scenario based on any changes of factors to be brought out between two CER periods such as the number of livestock heads, stakeholder countries, and rules and regulations to control livestock business industry. The assessment of the newly identified Baseline scenario shall be done by DOE (Designated Operational Entity) proceeding with validation reviews.

2.4 Verification of Additionality

In this methodology, the Baseline adopted for identifying the Baseline scenario differs itself from this project which will not be registered as CDM, and therefore, it can be construed that this project has an additionality.

2.5 Calculation of GHG Emissions Reduction

2.5.1 Calculation of Baseline Emissions

Total amount of CO_2 emission/year *(BE_y)* in the Baseline is calculated:

$$BE_y = BE_{CH4,y} + BE_{N2O,y} + BE_{elec/heat,y}$$

=11,501 t-CO2e/y + 17,710.4 t-CO2e/y + 1,708 t-CO2e/y

= 30,919.4 t-CO2e/y

BE_y : Baseline emission in year y,in tCO2e/year

$BE_{CH4,y}$: Baseline methane emission in year y,in tCO2e/year

$BE_{N2O,y}$: Baseline N2O emission in year y,in tCO2e/year

$BE_{elec/heat,y}$: Baseline CO2 emission from electricity and/or heat used in the baseline,in tCO2e/year

2.5.2 Calculation of Project Emissions

Amount of GHG emissions in implementing the project is calculated :

$$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{N2O,y} + PE_{PL,y} + PE_{flare,y} + PE_{elec/heat}$$

= 2,594.2 t-CO2e/y + 0 + 0 + 0 + 551.4 t-CO2e/y + 0

= 3,145.6 t-CO2e/y

$PE_{AD,y}$: Leakage from AWMS systems that capture's methane in tCO2e/yr

$PE_{Aer,y}$: Methane emission from AWMS that aerobically treats the manure in tCO2e/yr

$PE_{N2O,y}$: Nitrous oxide emission from project manure waste management system in tCO2e/yr

$PE_{PL,y}$: Physical leakage of emission from biogas network to flare the captured methane or supply to the facility where it is used for heat and/or electricity generation in tCO2e/yr

$PE_{flare,y}$: Project emissions from flaring of the residual gas stream in tCO2e/yr

$PE_{elec/heat}$: Project emissions from use of heat and/or electricity in the project case in tCO2e/yr

2.5.3 Leakage

Leakage may include release of N_2O from spreading liquid fertilizer, although it can be offset by the same amount of N_2O emission from spreading organic manure-derived fertilizer. This construes that no leakage will take place.

Amount of GHG Emissions Reduction

$$ER_y = BE_y - PE_y - LE_y$$

$$= 30{,}919.4\text{t-CO2/y} - 3{,}145.5\ \text{t-CO2/y} - 0$$

$$= 27{,}773.9\ \text{t-CO2/y}$$

3 Economic Viability of the Project

In reviewing economic viability of the project, Project-IRR (Internal Rate of Return) analysis has been executed based on NPV (Net Present Value) of the projected cash flows generated from the project, compared with the initial investment amount to be outlaid for the startup of the project.

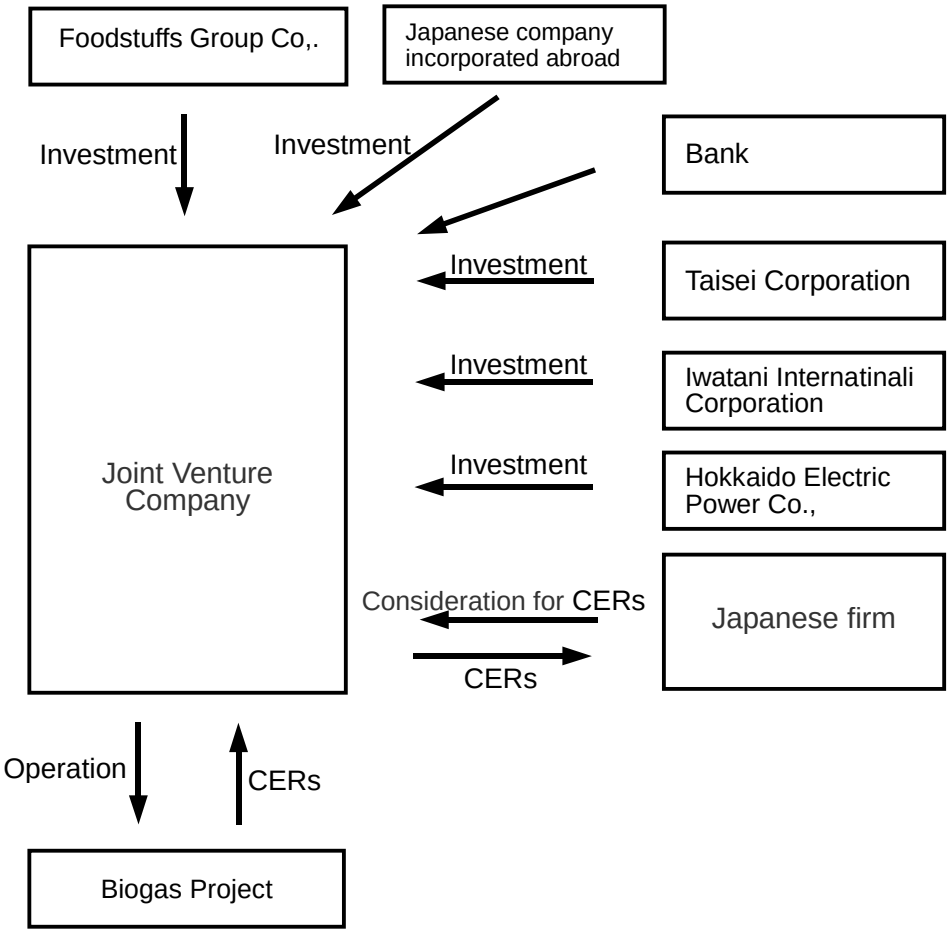
While there might remain some unforeseeable contingencies in reviewing project viability, IRR has been eventually calculated by way of fixing premised factors set by various conditions collected.

In case of 100% equity investment in the project, no financial cost will be incurred at all; and even partial debt finance (assumed interest: 6%) is employed, IRR will never fail to come 12.43%, far over financial cost, to prove itself high ROI (Return On Investment).

4 Project Implementation

4.3 Organizational Structure for Implementing the Project

In executing the project, an SPC (Special Purpose Company) will be incorporated by Foodstuff Group Co., Ltd. and by Japanese stakeholder companies; and the SPC company will own the project plant. Plant operation works as well as clerical office works are planned to be assigned to Foodstuffs Group Co.,. Since the Chinese stakeholder company is supposed to have over 50% equities in forming joint stock(or venture) company involving CDM project, investment scheme is now under study, including an option of possible investment(s) by Japanese companies incorporated in China. A brief project scheme is shown below:



4.4 Project Time Schedule