

# **Clean Development Mechanism Feasibility Study**

**-Research for the reduction of methane release from Malaysian palm oil mill lagoon  
and its countermeasures-**

## **Summary**

**2002.2**

**EX CORPORATION**

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### Summary

Japan's target for the reduction of the Green House Gas emission is 6% at 2008 to 2012 from the level of 1990, as Kyoto Protocol adopted COP3,1997. And it seems hard to achieve the goal only with domestic effort. So, investigation of flexible scheme such as Clean Development Mechanism (CDM) support achieving the goal are essential for Japan.

Quite large amount of methane released from anaerobic pond (lagoon) during wastewater treatment of Palm Oil Mill Effluent (POME), wastewater discharged from one of the production of one of the Malaysian specialty product, palm oil.

Objective of this study is to study the feasibility as the CDM project of reducing methane emission from Malaysian palm oil industry with energy recovery.

Subjects of this study are listed below;

1. Estimation of total amount of methane released from Malaysian palm oil industry
2. Accumulation of information about Malaysian policy on POME treatment.
3. Investigation for alternative technology for POME treatment
4. Assessment of alternative plan as CDM project

Research work including both field work of methane measurement from palm oil mill and inquiry around palm oil industry carried out by combined team between Japan and Malaysia. Main member is as follows;

(Japan)

Prof. Dr. Yoshihito Shirai (Kyushu Institute of Technology)

Mr. Shinichi Suzuki (EX COOPERATION)

Mr. Kazuhiro Morinaga (Sumitomo Heavy Industries,Ltd.)

Dr. Minato Wakisaka (Kyushu Institute of Technology)

(Malaysia)

Dr. Mohd Ali Hassan (University Putra Malaysia)

Mr. Shahrakbah Yacob ( University Putra Malaysia)

Mr. Sim Kean Hong ( University Putra Malaysia)

After field work, Steering committee for this project organized both from Japan and

Malaysia and ask for their opinion.

Members of steering committee for this project are listed below;

Prof. Hidefumi Imura (Graduate School of Nagoya University, Japan)

Dr. Nadzri Yahaya (Ministry of Science, Technology and the Environment, Malaysia)

Mr. Mohd. Zahit Ali (Ministry of Science, Technology and the Environment, Malaysia)

Mr. Lethumana Ramatha (Ministry of Science, Technology and the Environment, Malaysia)

Mr. Thiyagarajan Velumail (Ministry of Energy, Communications and Multimedia, Malaysia)

Dr. Ir. Ma Ah Ngan (Malaysian Palm Oil Board)

Mr. Subash Sunderaj (FELDA PALM INDUSTRIES)

Mr. B.G.Yeoh (SIRIM)

Prof. Dr. Mohd. Ismail. Abdul Karim (University Putra Malaysia)

Dr. Azni Hj. Idris P.M.C (University Putra Malaysia)

As conclusion, following points was revealed first time from this research.

1. From the measurement of palm oil mill wastewater treatment system, methane content released from the anaerobic pond system (lagoons) was 45% and that from the open digesting tank was 35%. These data obtained was significantly smaller than 65% methane content reported based on lab-scale experiments. These data obtained have quite big impact on setting baseline for GHG emission.
2. Based on this data, 0.36 million ton per annum methane release from lagoon, and 0.33 million ton from open digesting tank, were estimated at 2020. These are equivalent to 7.2 million ton-CO<sub>2</sub> / year from lagoon, and 6.6 million ton-CO<sub>2</sub> / year from open digesting tank.
3. In the future, increasing trend for methane release from palm oil industry predicted in accordance with increasing production of palm oil. Adopting the scenario as palm oil mill wastewater treatment system changing to open digesting tank system as business as usual, in the case Japan invest installment cost for power generation from methane, it would be profitable when the price of carbon credit more than 6US\$/t-CO<sub>2</sub> , even excluding the income from selling electricity.

4. Organizing steering committee including the member from the Malaysian government, Industry, and University, and asked Malaysian principals to CDM. CDM project matches Malaysian policy encouraging power generation from biomass. So, establishment of close cooperation between Japan and Malaysia could be achieved.

The Measured value obtained is worthwhile giving information from actual palm oil mill different from the reported value from lab-scale experiment so far. But the time allowed for research was quite limited this time, so further accumulation of data is necessary to improve the accuracy of the data. Because the methane content measured this time was significantly smaller than that reported so far, careful consideration required to establish the baseline for GHG emission.

Another biggest harvest through this research is acquisition of strong relationship with Malaysian collaborative organization from governmental section, private company, and university. Especially, Kyushu Institute of Technology (Fukuoka, Japan) and University Putra Malaysia has signed a scientific interchange agreement and already decided to start pilot-scale research of power generation from methane at palm oil mill. FELDA PALM INDUSTRIES, the national holding company, kindly expressed cooperation for this project.

We aimed to offer one of the best solution for GHG emission strategy for Japan continuing this research thoroughly using this research environment and opportunity.