

NEDO's Feasibility Studies with the Aim of Developing a Joint Crediting Mechanism **Country :**
Indonesia

“Investigation for developing energy saving and
heat recovering waste treatment system “

By **DOWA ECO-SYSTEM CO., LTD.**
Yachiyo Engineering Co., Ltd.

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1.List of abbreviations

PPLi : PT. Prasadha Pamunah Limbah Industri
Indonesian industrial waste treatment company

KLHK : Kementrian Limgkungan Hidup dan Kehutanan
Ministry of environmnet and forest in Indonesia

AMDAL : Analisis Mengenai Dampak Lingkungan
Environmental impact assessment

B3 : Bahan Berbahaya dan Beracun
From initial B expressing a material, harm, poisonousness by Indonesian
The B3 waste means the harmful and the toxic waste.

CDM : Clean Development Mechanism

JCM : Joint Crediting Mechanism

MRV : Measurement, Reporting and Verification

LFG : Landfill Gas

HFC : Hydrofluorocarbon

PLN: Persahaan Listrik Negara(Persero)
Power supply national enterprise

2. Project Background

We started this project for 1st Dec 2015.

We'll end up this survey by 31st May 2016 and proceed to next demonstration stage.

So , this is a intermediate report.

We show overview of our project in figure 2.

NEDO's Feasibility Studies with the Aim of Developing a Joint Crediting Mechanism Country : Indonesia Sector : Waste	
"Investigation for developing energy saving and heat recovering waste treatment system in the Republic of Indonesia"	
Company proposed : DOWA Eco-System Co., Ltd. , Yachiyo Engineering Co., Ltd.	

Survey in Summary

Investigation for developing energy saving and heat recovering waste treatment system in the Republic of Indonesia
This is the study for proceeding to demonstration stage.

Survey Items

- ①Investigation for heat recovering in PPLi
- ②Investigation for methane gas emission from landfill in PPLi
- ③Investigation for flammable wastes as substitute fuel
- ④Design of energy saving and heat recovering waste treatment system
- ⑤MRV methodology

Partner / Site

○PT Prasadha Pamunah Limbah Industry (PPLi)
 (Indonesia West Java Bogor)



Estimated Reduction amount

Reduction amount , 1,668.7-3,147.7 tons of -CO2/ year (as for the greenhouse gas reduction effect , approximately 20,000 tons of -CO2/ year)

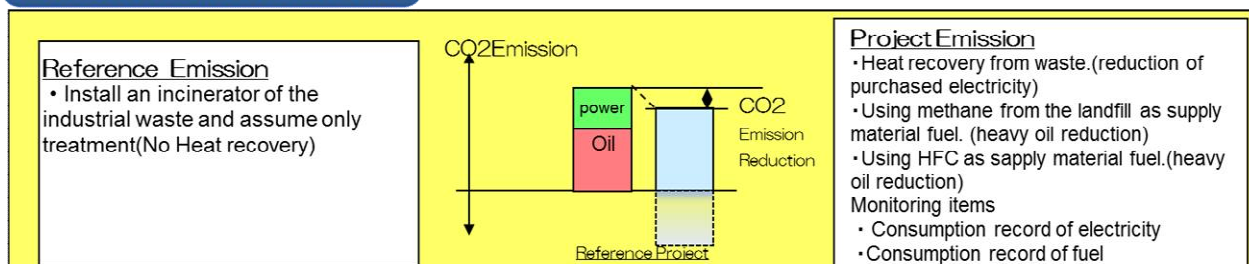


Figure 2 overview of this project

2-1. Japanese participants for the study

- DOWA ECO-SYSTEM Co., Ltd. (DES)

DES is a company dedicated to environmental management and recycling, and a wholly owned subsidiary company of **DOWA Holdings Co., Ltd.** **DOWA Eco-System** business is centered on resource recycling, waste management, soil remediation and environmental consultation.

centered on resource recycling, waste management, soil remediation and environmental consultation.

- 1 Waste Treatment**
Collection of mainly industrial waste and some municipal waste, and treatment of waste.
- 2 Soil & Groundwater Remediation**
Investigation and remediation of soil & groundwater contaminated by heavy metals (lead, arsenic, etc.), oils and Volatile Organic Compounds (VOCs).
- 3 Metal Recycling**
Recycle of precious metals from waste and scraps, such as factory discharge, discarded home appliances and end-of-life vehicles.
- 4 Logistics**
Transportation of waste and recyclable materials mentioned above.
- 5 Clean Technology**
Business corresponding to low-carbon societies such as biodiesel, Freon processing, the thermal recycling



Waste treatment and heat recovering plant



Soil remediation plant



KOSAKA smelting recycling furnace

Figure 2-1 Business Activities of DES

• **Yachiyo Engineering Co., Ltd. (YEC)**

YEC is now one of the largest firms of consulting engineers, planners, architects and specialists operating throughout the world.

2-2. Host country's participant for the study

• **PT Prasadha Pamunah Limbah Industri (PPLi)**

PPLi is an Indonesian company that has been in operation since 1994 providing collection, recycling, treatment and disposal services for hazardous waste and non-hazardous waste.

PPLi is 95% owned by **DOWA** and 5% by the Government of Indonesia through the Ministry of State Owned Enterprises. **PPLi** holding company, **DOWA Eco-System Co., Ltd.** is a company dedicated to environmental management and recycling, and a wholly owned subsidiary company of **DOWA Holdings Co., Ltd.** The Group was established in 1884 as a mining and metal smelting/refining company in Japan.

3. Project description

3-1. Objective of the FS

In Indonesia, we'll develop the **energy saving and heat recovering waste treatment system** in PPLi. Detail is the following.

- We collect combustion energy such as the waste as thermal energy and perform fossil fuel reduction by using energy collected.

- We utilize methane gas from the landfill as substitute fossil fuel (fossil fuel replacement) of the energy saving and heat recovering waste treatment system.

So, this method affects fossil fuel reduction and using methane gas performs reduction of the greenhouse gas by making it CO₂.

- We utilize HFC as substitute fossil fuel (fossil fuel replacement) of the energy saving and heat recovering waste treatment system.

So, this method affects fossil fuel reduction.

And the greenhouse gas emission will be reduced by the result of destructing HFC.

We show the overview of energy saving and heat recovering system as figure 3-1.

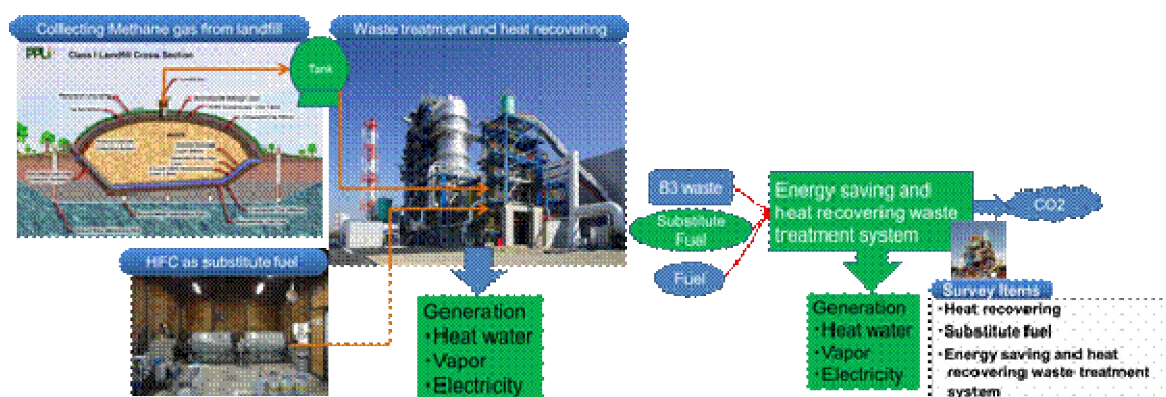


Figure 3-1. The image of “Energy saving and heat recovery waste treatment system”

Then, rough estimation of expected GHG emission reductions (unit: tCO₂/year) is as follows.

- Heat recovery : around 5-10% of generation efficiency in 1,479 - 2,958tCO₂/ year.
- Using methane gas from landfill as substitute fossil fuel: 177tCO₂/ year
- Using HFC as substitute fossil fuel : 12.7t-CO₂/year

Additional effects are follows.

- Destruction of methane : 1,074t-CO₂/ year (by old data)
- Destruction of HFC : 20,185t-CO₂/ year (HFC is 0.1% of waste gross weight)

3-2. Project location and project partner

PPLi (PT. Prasadha Pamunah Limbah Industri) is located in State of west Java Bogor (Bogor), Indonesia and performs waste treatment and the landfill, recycling (mainly paper, plastic, drums). PPLi has landfill (US-EPA conformity) in the only B3 waste in Indonesia.

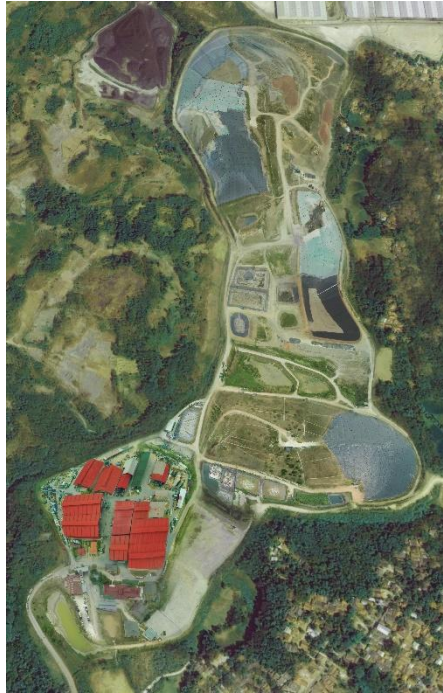


Figure 3-2-1. PPLi photograph

PPLi takes following steps other than the landfill as main waste treatment.

- Stabilization (to landfill after this process)
- Fuel blending (after processing, we provide it to the cement factory of the neighborhood as fuel)
- Throughput of the liquid processing (as for the chemical processing, the bio processing, the sludge to landfill) year is approximately 160,000t.

We show wastes treatment flow of PPLi in figure 3-2-2.

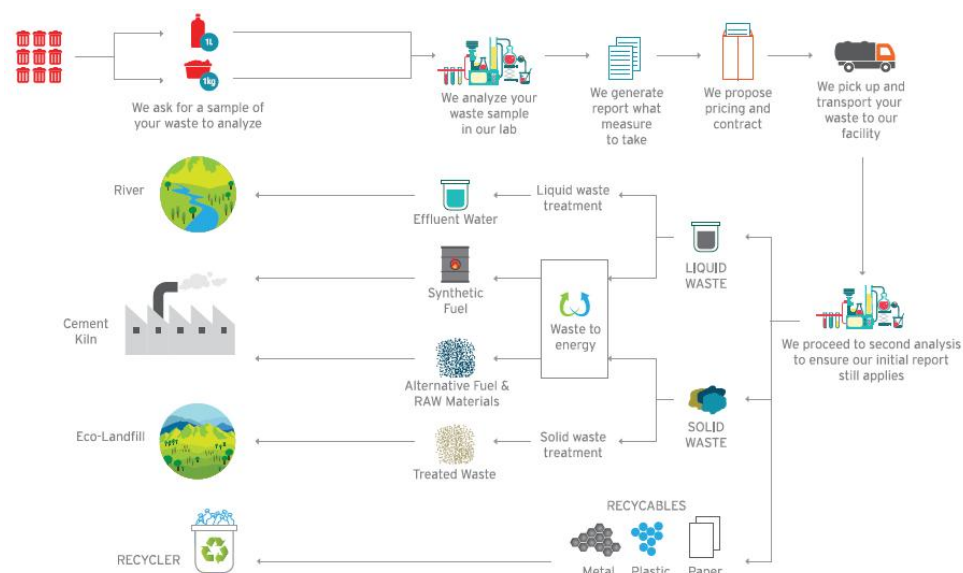


Figure 3-2-2

The quantity of waste included the organic matter is approximately 16,000t. And the waste from the food company is 3,500t. Thus, we thought that these organic wastes and residues from liquid waste treatment are maybe in a factor to produce methane gas from landfill.

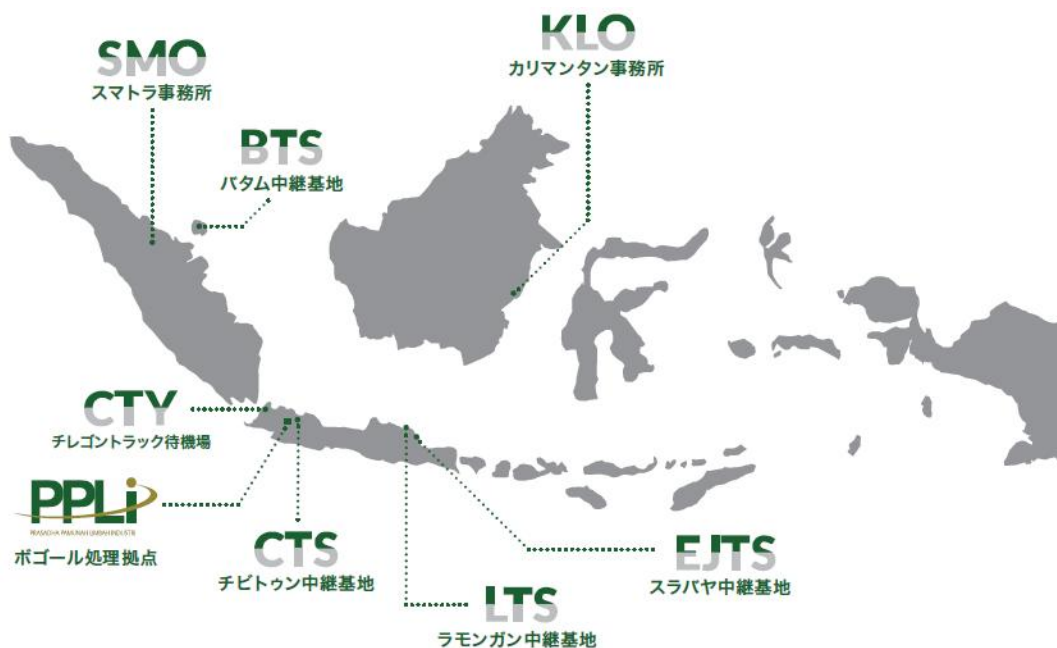


Figure 3-2-3. PPLi transportation base and the office location in Indonesia

We develop a transportation base and an office throughout Indonesia for collecting B3 waste by cargo of B3 waste from the various places in Indonesia. The hazardous waste is collected to PPLi from the whole land of Indonesia.

3-3.The investigation contents

We have five investigation contents.

As follows ;

3-3-1.Using energy form waste treatment

The purpose of this investigation is compared with the method and the cost of each scenario.
Each scenario is shown as follows.

- Recovering heat water from waste treatment facility
- Recovering vapor from waste treatment facility
- Recovering electricity from waste treatment facility and using only in PPLi
- Recovering electricity from waste treatment facility and selling electricity to PLN

3-3-2.Investigation for the methanne gas form landfill in PPLi

This investigation result is used for deciding the capacity and the equipment of the facility collecting methne gas from landfill and feeding to waste treatment system.

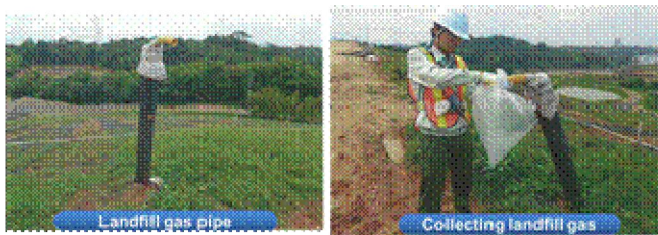


Figure 3-3-2 Mesurement of methan gas form landfill

3-3-3.Investigation for flammable wastes as substitute fossil fuel

Now we calculate the caloric value of B3 wastes from historical data.

If other wastes such as not available for anyone are found by this investigation , we can recalculate the caloric value of total waste feeded to the waste treatment system.

So, waste treatment system is changed by this investigation result.

3-3-4.Investigation for energy saving and heat recovering waste treatment system

This investigation targets are as follows ;

- The permission of a waste treatment facility construction
- Waste treatment system
- Methane gas collecting system

Other investigation result affects these targets.

3-3-5.Developing of the MRV methodology

We think that it is necessary to examine three patterns.

We show these patterns as follows.

- About energy collected from waste treatment related with investigation 3-3-1 and 3-3-4
- About methane collection related with investigation 3-3-2 and 3-3-4
- About flammable wastes as substitute fossil fuel such as the HFC related with 3-3-3 and 3-3-4

We show the image of CO2 reduction as figure 3-3-5

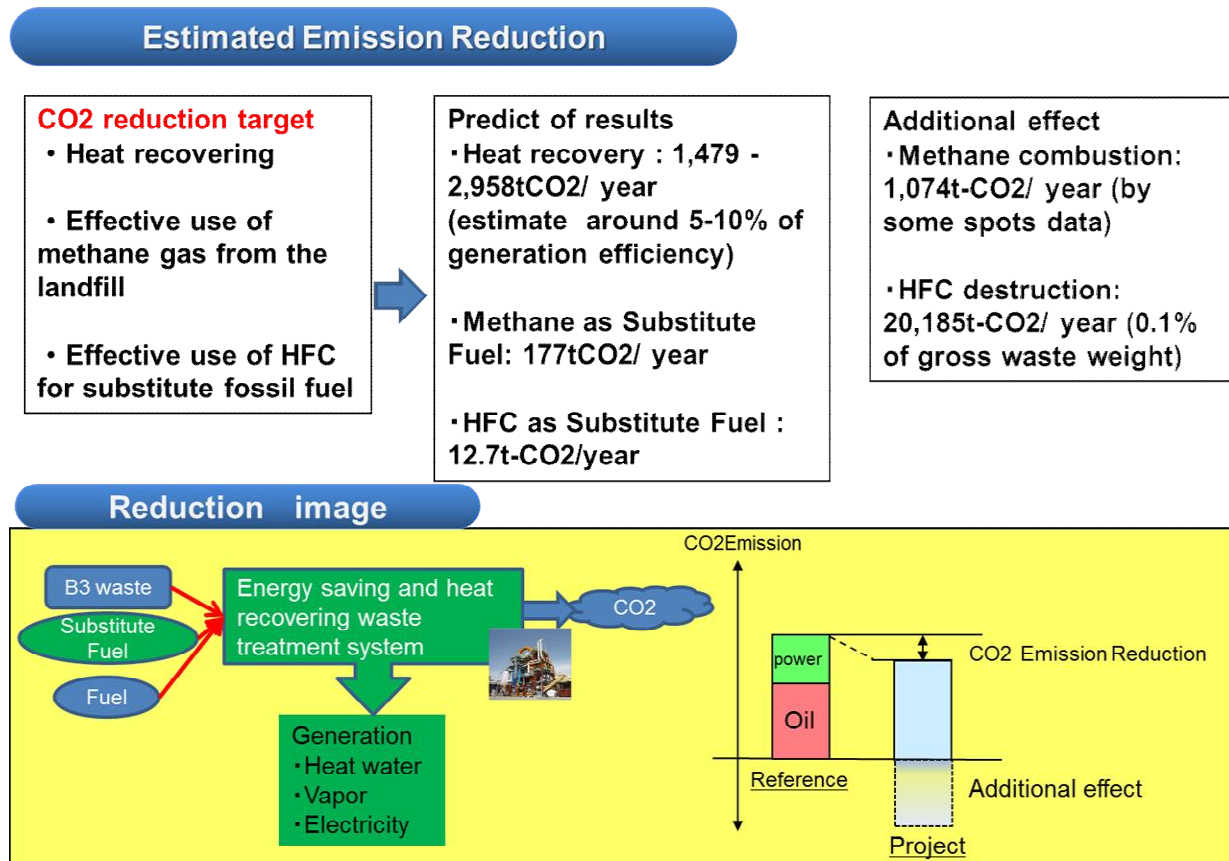


Figure 3-3-5 CO2 reduction image

4. Agenda of this survey

Survey items	2015／2016					
	Dec	Jan	Feb	Mar	Apr	May
1. <Using energy from waste treatment> 1-1. The regulation of selling electricity 1-2. The condition of infrastructure 1-3. Reporting						
	→			→		
	→			→		
			→			→
2. <Methane gas from landfill in PPLi> 2-1. Measurement of methane gas 2-2. Reporting						
		→				→
			→			→
3. <Substitute fuel as fossil fuel> 3-1. Investigate for HFC 3-2. Investigate for flammable wastes 3-3. Reporting						
	→					→
	→					→
		→				→
4. <Waste treatment system> 4-1. Permission of construction 4-2. Designing of waste treatment facility 4-3. Finance scheme and outcome 4-4. Reporting						
	→			→		
	→					→
				→		→
			→			→
5. <MRV methodology> 5-1. Heat recovering 5-2. Using methane gas from landfill 5-3. Using HFC as substitute fossil fuel 5-4. Developing MRV methodology 5-5. Inspection of methodology						
		→			→	
		→			→	
		→			→	
			→		→	
			→			→
6. Field work in Indonesia		○	○	○	○	○

5. Formation of this survey

