

## COMPLETION REPORT

A comparative study of waste and landfill management in Jakarta-Bandung Indonesia and Fukuoka-Okinawa Japan

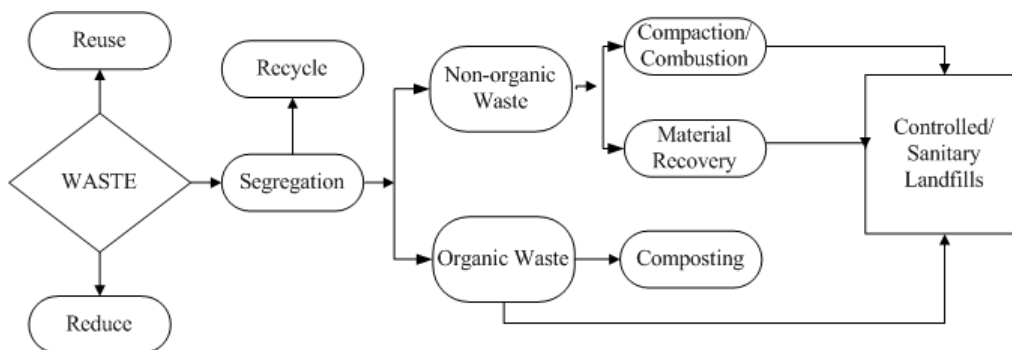
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Various considerations have influenced the methods of waste management in Indonesia (Jakarta and Bandung) as developing country and Japan (Fukuoka and Okinawa) as developed country, such as amount and type of waste produced, type of waste collection, available area, and environmental regulations practiced. Based on the comparison study, at least 3 terms of the waste management system in Japan that should be emulated by Indonesia; “Segregation”, “Recycling”, and “Landfill management”. Learn from the waste management applied in Japan, the basic concept of waste management in Indonesia must be integrated into every level of waste handling, from the source of the waste until the landfill.



### 1. Segregation

Waste in Fukuoka and Okinawa is categorized into at least four types: combustible, incombustible, bottle, and plastic bottle. While in Jakarta and Bandung, waste bins in public places is generally divided into two: organic and non-organic waste. To improve waste management in Indonesia, the government should strictly apply waste segregation in any level start from household, community, and city level followed by sanctions for those who do not implement the rules.

### 2. Recycling

As the next step, Indonesia should enhance the scale in doing waste recycle. Nowadays waste recycle has been done in household level or as small and medium business which supported by local government. While in Okinawa as comparison, there are two waste treatment plant: Naha city/Haeburu Town Administrative Association for Waste Treatment Plant and Kurahama Sanitary Facilities Association, which one of focus area is recycling the waste. Jakarta and Bandung are the proper cities for developing waste treatment/recycle plant in Indonesia as those cities are the highest waste-producing cities in Indonesia.

### 3. Landfill Management

The application of waste management in Indonesia mostly involves the use of landfills. Almost all of the landfills were originally designed as controlled landfills and sanitary landfills. In fact, all of them were operated as open dumping system. This can be concluded as there is no treatment carried out on incoming waste, inadequate leachate treatment and landfill gas emissions released to the atmosphere without any treatment. The Bantar Gebang Landfill, is a landfill that holds almost waste from Jakarta with one of business plant developed that is capturing methane gas and converting into electricity, which is in operation to generate about 10 MW electricity and expecting to generate 25 MW power by 2023.



*Landfill gas power plant-Bantar Gebang*

The fundamental difference in the use of landfills in Indonesia and Japan is related with the methane generated. In order to reduce the methane generated, Semi-aerobic landfill system (Fukuoka method) is developed by Fukuoka City. Fukuoka method offer some advantages include: purification of leachate, accelerating the landfill stabilization, reduction of methane production, resolving the odor problem, and saving the construction and operation cost.



*Seibu (Nakata) Landfill site Fukuoka*

One thing that can be considered by Indonesia government is the application of Fukuoka method without eliminating the function of capturing methane to generate electricity. Parts of Fukuoka method that can be applied are purification system for leachate, landfill construction in arranging the waste layers and the use of proper soil cover to reduce odor and health problems.

As conclusion, for the successful of waste management program, the involvement of community and government is highly required. Based on current condition in Indonesia, the government must provide a comprehensive technical regulation and guideline that regulate standards, mechanisms in waste management. One critical issue that should be considered is the government should provide reasonable budget allocation for waste management in both national and local level. Meanwhile in the household and community level, the establish compensation and penalty system should be applied. Improvement educational system regarding waste management to the youths is also needed. One of the programs implemented in Okinawa and can be applied in Indonesia in order to reduce the

waste is reducing the use of plastic bag, reducing the use of disposable products, and using reusable cutlery rather than plastic and styroform.

**Publication of the Results of Research Project:**

Verbal Presentation (Date, Venue, Name of Conference, Title of Presentation, Presenter, etc.)

Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)

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Book (Publisher and Date of the Book, Title and Author of the Book, etc.)