Jambi City Waste-to-Energy Baseline Survey



Member of Indonesia Solid Waste Association

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List of Abbreviation

APBD	= Regional Government Budget
BLH	= Environmental Agency
BPS	= Statistics Indonesia
СВО	= Community Based Organization
DISPENDA	= Local Revenue Agency
DKPP	= Sanitation, Landscaping, and Cemetery Agency
На	= Hectare
km	= Kilometer
Lt	= Liter
m	= Meter
RT	= Household Association
ТРА	= Final Disposal Site
TPS	= Temporary Collection Point
TPS 3R	= Material Recovery Facility
TPST 3R	= Integrated Material Recovery Facility
UCLG ASPAC	= United Cities and Local Government Asia Pacific
UN ESCAP Pacific	= United Nations of Economic and Social Commission for Asia and the
UPTD	= Local Technical Implementation Unit

Introduction

This Baseline Survey Report is made upon the request of the United Cities and Local Government Asia Pacific (UCLG ASPAC), the United Nations of Economic and Social Commission for Asia and the Pacific (UN ESCAP), and Waste Concern. The aim of this report is two-fold: (i) to identify possible locations for a waste-to-energy pilot plant in Indonesia; (ii) and to analyze the characteristics of the shortlisted locations in order to determine the most suitable location.

In November 2014, UN ESCAP and UCLG ASPAC organized a national workshop in Jakarta "Pro-Poor and Sustainable Solid Waste Management in Secondary Cities and Small Towns: Prospects for the application of anaerobic digestion to treat municipal solid waste in Indonesia." As an outcome of this workshop, four of the cities among those attending the workshop were selected as the shortlisted candidates to host the waste-to-energy pilot. The selected cities were: (1) Jambi City; (2) Malang City; (3) Malang Regency; and (4) Probolinggo City. This report pertains to the baseline assessment of Jambi City, while separate reports have been prepared for the three other cities.

This baseline survey was conducted by Sustainable Waste Indonesia (SWI) from the beginning of February until the end of May 2015. Two field visits were conducted to Jambi City. The first field visit was conducted on 10 and 11 February 2015, and a second field visit was conducted from 19 to 30 March 2015. In between these two visits, a fact-finding mission by representatives from UN ESCAP, UCLG ASPAC, and Waste Concern was conducted on 3 and 4 March 2015. During the fact-finding mission, a representative from SWI joined the delegation, and together the delegation shortlisted the possible locations for the waste-to-energy project.

It should be noted at the outset that all potential locations surveyed have been proposed by the local government authorities of Jambi City. Among these, the most feasible location has been further analyzed in order to understand key aspects such as the characteristics of the incoming waste, possible end users of the energy generated, and the processing capacity of the plant.

In this context, the baseline survey was conducted in two phases as follows:

Phase One: An assessment was conducted to the proposed plant locations in order to select the most feasible site for hosting the waste-to-energy pilot. During this phase, the proposed locations were characterized with some level of detail.

Phase Two: A detailed survey was conducted to further analyze the suitability of the shortlisted location. Aspects analyzed included the waste generation rates, the physical and chemical characteristics of the waste, the density of the waste, and the potential demand of the energy generated by the plant. During this phase, waste sampling was conducted and questionnaires were prepared.

The fact-finding mission to Jambi City by ESCAP, UCLG-ASPAC and Waste Concern was conducted after the completion of Phase 1. During that mission, one of the proposed locations was shortlisted and subsequently analyzed in Phase Two of the study.

The structure of this report is as follows:

Part One consists of an overview of municipal solid waste practices in the city of Jambi. The aspects described include the local authority's budget for waste management, municipal waste collection methods, formal collection system in the city, system for transfer and transport of waste, waste treatment methods, institutional capacity and key policies, practices for waste segregation, disposal sites and its main characteristics, and the activities of the informal sector.

Part Two consists characterizes the proposed locations for hosting the project in Jambi. Among these, the shortlisted location is analyzed in further detail. Th report concludes with a set of recommendations.

Part One mostly consists of secondary data, whereas Part Two combines primary and secondary data. The primary data was collected during the field visit by SWI team. The structure of this report followed the guidelines provided by UN ESCAP, Waste Concern and UCLG.

Part I – Context and Background

1. Municipal Solid Waste Practices in Jambi City

1.1 City Profile

Jambi City, the capital city of Jambi Province, has an area of 205.40 km², with a total population of 681,616 inhabitants (Adipura Book, 2014). The city comprises of 9 districts, with the density ranging between 865 person/km² at the lowest, in Danau Teluk District, to 7,979 person/km² at the highest in Lelutung District. The city is borders the surrounding Muaro Jambi Regency (Figure 1).

Areas of Jambi City, especially the area near the Batanghari River, are located in lowlands. These areas are the most exposed area to floods, which can result in water levels 2m above ground level. In response to the risk of flooding, many inhabitants have built their house on stilts.

The economy of Jambi City is dominated by the trading sector, followed by the restaurants and hotel industry, treatment industries, logistics, communications and services. Other industries that contribute to Jambi City's economy include the building, electricity, gas, drinking water, finance, agriculture and mining industries. Based on the BPS 2013 data, the main sources of employment are in the wholesale and retail trade, restaurants and hotels (32%) and in community, social and personal services (33%).

The waste generation of Jambi City is 362.5 tons of waste per day, with an average waste generation per capital of 0.53 kg/cap/day. Generally, the waste management system applies a conventional method which relies on the collection, transportation and disposal of waste. On the other hand, the introduction of waste treatment facilities as well participatory initiatives at community level have recently started to develop in the city. A summary of the main characteristics of the city is provided in the table below:

No	Information	Data		
1	Population	681,616 inhabitants		
2	Area	205.40 km ²		
3	Daily waste generation	362.5 tons/day		
4	Waste generation rate	0.53 kg/cap/day		
5	Waste collection rate (waste transported to the landfill)	72.41%		
6	Institution responsible for waste management	Sanitation, Landscaping, and Cemetery Agency		
7	Coverage area of waste management services	100%		
8	Final Disposal site	Talang Gulo (15 km from the city centre) apply the semi-controlled system		

Table 1 City Profile (Sources: Adipura Book (2013-2014) and SWI Team (2015)



Local Authority's Budget Allocation for Waste Management

In Jambi City, the two key local authorities involved in the management of waste related activities are the Environmental Agency or *Badan Lingkungan Hidup* (BLH) and the City Cleansing Agency (Sanitation, Landscaping, and Cemetery Agency) or *Dinas Kebersihan, Pertamanan dan Pemakaman* (DKPP).

As occurs in other provinces in Indonesia, all budget allocation plans (expenditures and revenues) are out in the *Anggaran Pendapatan Belanja Daerah* (APBD), the Regional Government Budget. One of the items in APBD is the direct expenditure for waste management development programs. These programs include workshops for the development of waste management policies; the procurement for tools and equipment for waste handling; the development of waste management technologies; the improvement of community involvement programs; operational improvement and maintenance of supporting tools and equipment; and operational improvement and maintenance of the landfill site.

The total local authority budget allocation for waste management includes salaries for permanent and contractual-based employees, expenditures for services and products (this includes computer services, operational and maintenance of the administrative costs), vehicles. business trips, and expenditures for capital/investment such as tools and buildings. In 2013, the total budget for waste management at the local authority reached 1.05 percent, equivalent to 12,108,992,400 IDR. From the total regional expenditure in 2013, the allocated amount was worth 1,151,565,666,248.19 IDR. The amount of 155,547,600 IDR was allocated for BLH and 11,953,374,800 IDR was allocated for DKPP. The city projection for direct expenditure in the year 2015 is of 33,103,840,804 IDR. Please refer to Table 2 for further details on this.

Table 2 Local Au	uthority's Budget	Allocation for Waste	Management in Jambi City
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No	Institution	Budget Allocation For Waste Management Program	Proportion to Regional
		2013 (IDR)	Expenditure
1	Environmental Agency	155.547.600.00	

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