SCOPING STUDY FOR SOLID WASTE MANAGEMENT IN INDONESIA

TECHNICAL REPORT

SMEC

Australian AID

Indonesia Infrastructure Initiative

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INDONESIA INFRASTRUCTURE INITIATIVE

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Any errors of fact or interpretation are solely those of the author.

DHV B.V.

Jakarta,

Cover Photo: Children sort through uncollected trash in Pluit, North Jakarta. *(Photo by Rahmad Gunawan)*

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CHAPTER 1: INTRODUCTION

1.1 GENERAL

SMEC International Pty Ltd, the managing contractor for the AusAID funded Indonesia Infrastructure Initiative (IndII) assigned DHV B.V. on 30 November 2010 to undertake a scoping study on solid waste management in Indonesia.

The solid waste management sector in Indonesia basically consists of a collection of domestic and commercial solid waste, transfer and transportation of waste, and final disposal. A 2008 JICA study revealed that an estimated 58 percent of the total Indonesian population receives public waste collection services. Although this coverage is relatively low, the operating arrangements for solid waste management go back a long time and are well embedded in village and regional structures. The legal framework for solid waste management, prepared by the Ministry of Environment, has been set out in the Waste Management Law no. 18/2008, and defines three types of waste: household waste; household like waste; and specific waste. The Waste Law also includes criminal provisions for failure to comply with waste management regulations, and provides a one year grace period for planning the closure of non-complying disposal sites and a five year grace period for the actual closure of non-complying disposal sites.

The Ministry of Public Works (MPW) is responsible for supporting the household solid waste sector. It provides framework regulations to municipalities (kota) and districts (kapupaten), who in their turn set out detailed regulations and sanctions to sub-districts (kecamatan) and villages (kelurahan) for collection, transport and disposal of waste. The provincial government is responsible for oversight of the municipal and district governments. The local governments are responsible for the provision of solid waste management services either by themselves or through contracting private service providers.

PU also takes initiatives to initiate regional solid waste management with provincial governments, involving different kota and kabupaten. Examples of regional initiatives are the Bantar Gebang Disposal Site for the Jabotabek region, and regional landfills at Bandung, Yogyakarta, Denpasar and most recently Makassar. The Makassar regional waste management initiative involves development of the Mamminasata regional sanitary waste disposal facility serving the city of Makassar as well as the districts Gowa, Maros and Takalar. Finance for the construction of this regional disposal facility is provided through a JICA loan.

AusAID finances through IndII the detailed engineering design for the facility.

The Ministry of Environment is responsible for regulating, monitoring and management of specific waste types, including toxic, hazardous and intractable wastes. Other relevant regulations include the Environment Management law no. 23/1997, the Ministerial Decree no. 45/2005 on Environmental Management, the Ministerial Decree

on recycling no. 2/2008, as well as the Decentralisation laws no. 32/2004 and Government Regulation no. 17/2007 on separation of roles and responsibilities between central, provincial and municipal governments.

1.2 STUDY OBJECTIVES ACCORDING TO TERMS OF REFERENCE

The objective of this study is to identify and elaborate options for Solid Waste Management Interventions under INDII in Indonesia. The Terms of Reference for this study suggests the following alternative options:

Collection of household waste

According to the Terms of Reference for this study, the collection system is rather fragmented. Intervening in the collection system would require close co-operation with local governments to restructure waste collection, waste scavenging and recycling mechanisms and procedures. However this sector has entrenched stakeholder interests and would be difficult to formulate a viable intervention.

Institutionalised Recycling and Transfer Stations

The establishment of transfer stations, including waste separation and recycling activities at these stations potentially yields economic benefits. This intervention could be linked to private operation of the transport of the waste to disposal.

Final Disposal Sites

The provision of improvements to final disposal sites offers a wide variety of possible interventions. These include planning and DED linked to PPTA for external funding; introduction of innovative disposal technology such waste separation, soil protection, energy generation, methane recovery and reuse; recycling and composting; final closure and downstream reuse of the site.

Household like waste

Collection of solid waste generated by hotels, restaurants, shops, markets, and commercial buildings is by and large fairly well managed by local government. Its integration into the sorting and recycling stream at final disposal site would offer some opportunities for intervention.

Industrial and Hazardous waste

With increasing development of complex industrial facilities in Indonesia, and related generation of hazardous and intractable wastes, there could be sensitive intervention opportunities in this sector. This would involve working with the Ministry of Environment, and could build on past AusAID assistance for capacity building to regional environment management agencies (Bapedalda).

Management of medical waste is the direct responsibility of the hospitals and other producers (drug store, etc)

Aim of this study

This study aims at investigating the feasibility of these interventions in more detail, and at suggesting other areas of possible intervention. This will require the following actions:

- Review the current legal and institutional framework of waste management in Indonesia
- Identify future institutional and regulatory initiatives which may be required based on recent technical and regulatory developments in the sector
- Review the impact of the solid waste law, the key compliance issues for local governments and the extent of response of local administrations to the law
- Describe current status of solid waste production and disposal in the urban setting
- Discuss institutional issues and problems in solid waste management at the local level
- Discuss common techniques for solid waste processing in Indonesia, - environmental impacts, compliance with solid waste law etc.

The solid waste program intervention options are to include both technical assistance options as well as grant program options.

1.3 PROJECT INITIATION MEETING WITH INDII

On the 10th of December 2010 DHV staff met with Mr. Jim Coucouvinis, INDII Technical Director, and with Mr. Dedi Budianto and Mr. Poppy EP Lasteri, senior staff of INDII to discuss the study details and required outputs. The following was concluded at this meeting:

1. Taking into account that the Waste Law 2008 prescribes that each city has to develop sanitary disposal facilities (TPA's) within five years, the study shall particularly focus on interventions related to transportation and final disposal aspects, and less on primary collection systems.
2. Jabotabek, Bandung, Makassar, Yogyakarta and Denpasar are developing regional TPA's in co-operation with the Ministry of Public Works. The Consultant shall look at possibilities for INDII to support the development of these regional TPA's especially related to institutional and organisational issues.
3. The Consultant was asked to investigate options to harmonise the Waste Law of 2008, prepared by the Ministry of Environment, and the national regulations on solid waste management, developed by DG Human Settlements of the Ministry of Public Works, which currently show some discrepancies.

4. The Consultant is expected to provide a solid waste sector status report, including data on volumes and percentages, and covering technical, environmental, organisational and legal / enforcement aspects, supported by specific examples.
5. The Consultant is expected to identify Technical Assistance options for Solid Waste Management Interventions under IndII in Indonesia with a time horizon of about 2.5 to 3 years, with may include physical interventions, institutional and regulatory support, design studies, advocacy and awareness campaigns. Of particular interest from an institutional point of view is improving the mode of co-operation between Central, Provincial and Local governments. Raising advocacy and public awareness relates to the current fragmented understanding of local governments of the whole waste management cycle and the need for integrated approaches.
6. The Consultant is also expected to identify alternative schemes of grant disbursement, including direct grant disbursement to Local Governments. The existing "output based aid" (OBA) which is being implemented through "Infrastructure Enhancement Grants" (IEGs, evaluation stage was conducted by PT MLD), and the Midterm Review and Verification Survey for Hibah/Grants (verification stage was conducted by PT MLD in association with DHV B.V.), can be used as an example for developing such grant schemes.
7. PPP is considered to be a less important issue in this study, since solid waste is not specifically a highly profitable sector. Management of industrial and hazardous waste shall be considered as a less important study issue as well.

CHAPTER 2: SOLID WASTE SECTOR STATUS REPORT

2.1 BASELINE DATA COLLECTION

For the purpose of this study, meetings with key staff of public organisations and international development partners were held, including Ministry of Public Works, Bappenas, Ministry of Environment, Balai Pengelolaan Sampah Regional – Jawa Barat, KfW, GtZ, EU, World Bank, NL Embassy and Asian Development Bank. Minutes of Meetings have been enclosed in annex 1. Furthermore, various reports and documents have been assessed (ref. annex 2)

2.2 SOLID WASTE PRODUCTION, TRANSPORT AND DISPOSAL

2.2.1 Waste Production

In 2008, the Department of Environmental Pollution Control of the Ministry of Environment conducted a waste questionnaire survey among 465 kota and kabupaten in 33 provinces in Indonesia covering the operational year 2006. A total of 154, or 33% of the kota and kabupaten, participated in the questionnaire (50% on Java). The participating municipalities represent about 40% of the total Indonesian population of 232 million. The current status of the Solid Waste sector in Indonesia has been compiled based on extrapolation of these data for the total population and on the baseline data summarised in annex 2.

When compared to other ASEAN countries, the level of solid waste services in Indonesia provided by the municipalities is rather low. Inadequate waste regulations and low levels of enforcement at local level, low awareness of the community, low budgets and low private participation are some of the causes for the low level of service in Municipal Waste Management. Until 2007 Indonesia did not have a national waste policy. The Waste Management Law No. 18/ 2008 has been recently enacted by the Government of Indonesia. It covers public service principles, waste minimisation and handling of domestic solid waste and specific waste, incentives and disincentives mechanism, local government responsibility, financial system, private and public sector participation and sanctions. However, the Waste Law is considered weak in terms of accommodating regional waste regulations, and promoting Integrated Waste Management principles.

The total number of staff employed in the domestic waste management sector in Indonesia is about 73,500 staff (31,900 on Java), of which 40% is employed as street sweepers, 16 percent as hand-cart operators, 28 percent as truck drivers, 4 percent of landfill operators, 7 percent as administration officers and 5 percent others. This excludes the informal sector, consisting of numerous waste scavengers.

It is estimated that a total of 38.5 million tons of solid waste is generated annually by the 232 million inhabitants in Indonesia (450 gram per person per day), of which 21.2 million tons on Java as a whole. The 26 biggest cities in Indonesia inhabit totally 40.1 million people, generating in total an estimated 14.1 million tons per year (about 1 kg per person per day). DKI Jakarta generates about 2.2 million tons per year. The municipal waste is composed of 62 percent of mainly organic waste, 14 percent plastics, 9 percent paper, 2 percent glass, 2 percent rubber and leather, 2 percent metals and 13 percent of other waste types.

An estimated 56 percent of the population, or 130.4 million people, receive municipal waste collection services. In Java 59 percent of the population is served (80.8 million in total). The highest service levels are found in the Sumapapua region (68 percent, or 14.2 million people being served). The following table provides an overview.

Table 1 - National Waste Generation and Service Data (2006)

Region	Population Million	Total Waste Generation Mtons/yr	Waste Gen per person kg/day	Population being served Million	Actual waste Collection Mtons/yr	Non collected Waste Gen Mtons/yr
Sumatera	49,3	8,7	0,48	23,4	4,13	4,57
Jawa	137,2	21,2	0,42	80,8	12,49	8,71
Balinusra	12,6	1,3	0,28	6	0,62	0,68
Kalimantan	12,9	2,3	0,49	6	1,07	1,23
Sumapapua	20,8	5	0,66	14,2	3,41	1,59
Total	232,8	38,5	0,45	130,4	21,72	16,78

2.2.2 Collection

Totally 16.7 Million tons of waste is not collected by the municipal services. This non-collected waste is management by the communities themselves in terms of collection, transportation to dump sites (11.8 Mtons / year), buried underground (1.6 Mtons per year), composted by communities or households (1.2 Mtons per year), burnt in open air (800,000 tons per year), or thrown into the rivers (500,000 tons per year). It is evident that this poses serious risks for the public health and the environment. Specifically burning of waste is still a considerable nuisance and health risk in both the urban and rural areas, including Jakarta.

2.2.3 Intermediate Collection Points (TPS)

Waste is collected by the municipalities (totally 21.7 million tons per year) mainly by small hand carts, and brought to small transfer sites, or intermediate collection points (TPS). It is estimated that a total of 59.000 of these transfer sites are scattered throughout Indonesia (23.300 in Sumatera and 11.800 on Java). These TPS basically consist of open dump areas, sometimes including 6 m3 storage containers, and sometimes foreseen by some roof and pavement facilities. These TPS are often a source of rotting organic substances, flies and other hazards, which poses public health risks. On some TPS composting activities take place, and valuables are removed by waste scavengers.

2.2.4 Transportation

In most cases waste is collected from these small transfer sites (TPS) by waste transportation trucks and transported to large dump sites and landfills in the area. It is estimated that totally 7700 waste transportation vehicles are functioning and operating in Indonesia (3600 on Java). Practically all waste vehicles are owned by the municipalities (97%), with 3% rented from private companies. Most trucks applied in Indonesia are Dump Trucks (51%) with or without hydraulic systems. Also Armroll Trucks are applied (29%), capable of loading and transporting 6, 8 or 10 m3 containers. Finally 2.5% of the waste vehicle park consists of Compactor Trucks operating in Indonesia with 6, 8, or 10 m3 capacities.

2.2.5 Disposal

The collected waste is transported to one of the estimated 537 central dumpsites (TPA) in Indonesia. Most municipalities operate their own municipal dump site within the city boundaries. It is estimated that 12 percent of the municipalities use a central dump site outside their own city area. Most dumpsites lack protection in terms of lining, soil or groundwater protection, causing direct negative impact on nearby water resources and the environment.

For instance, the Jabotabek region uses the TPA Bantar Gebang with a total area of 108 ha, receiving more than 2 million tons of waste per year. Due to limited space, the waste here is piled up very high without sufficient sanitary provisions, although a composting section at the landfill is in operation since 2004 producing about 100,000 tons of compost per year, and part of the leachate is collected and treated. The remaining lifetime of the Bantar Gebang Landfill may be until 2019 (Cleansing Department, 2010)

About 40 percent of the dumpsite has some kind of leachate monitoring, collection and treatment system, mainly through simple sand filtration technologies. Landfill gas

collected and treatment is hardly applied. This leads to an estimated 900 tons of Methane Emission per year from the solid waste dumpsites throughout Indonesia.

The land of the dumpsites is in most cases owned by the government (93 percent) and connected to an access road which is asphalted (79 percent) or at least compacted (16 percent). About 123 dumpsites have reached their maximum storage capacity and need to be closed and replaced urgently. Another 200 dumpsites still have a life span until 2015, about 160 dumpsites have a life span until 2020, and the remaining dumpsites can remain in operation until 2021 or longer.

Some of the waste dump site operators register the volumes of waste entering the dump sites. About 13.8 million tons of waste per year has been recording as being received. This is about 64 percent of all collected waste by the municipalities.

These central dump sites are favorite spots for scavengers, who come and pick waste valuables from here. It is estimated that totally 50,000 scavengers continuously operate from these dumpsites throughout Indonesia. Numerous other waste pickers operate in the waste collection circuit and from one of the 59,000 small waste transfer sites (TPS).

Separate from disposal of waste on dumpsites, a limited number of municipalities operate modest composting or incineration facilities in Indonesia. It is estimated that around 242 municipal composting facilities are in operation, processing less than 1% of the total waste volume, and 64 small incinerators, processing together less than 10,000 tons per year. These figures do not take into account home operated composting activities by individuals for private use.

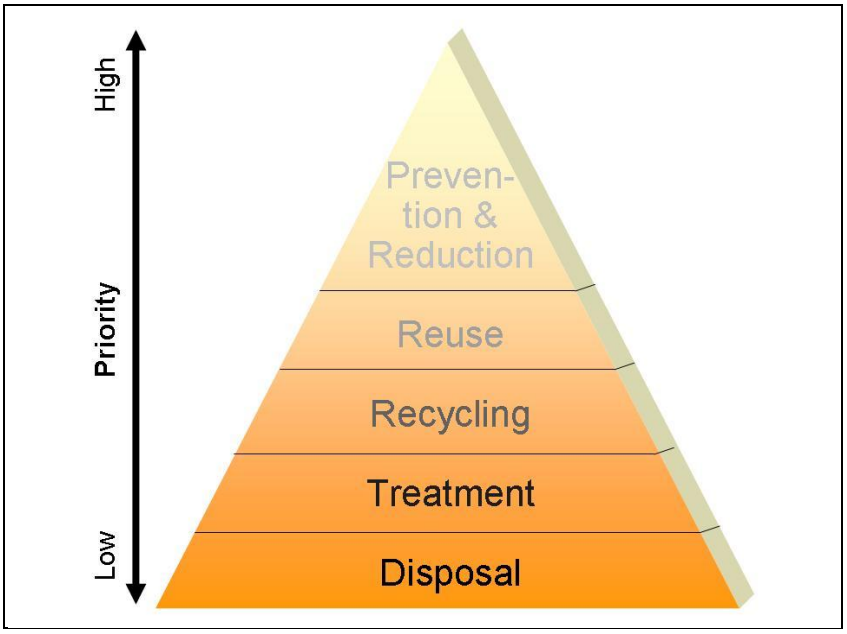
The Government in Indonesia has decided to develop regional sanitary landfills (TPST) as a means to alleviate the waste dumping practices. The sanitary landfills will be foreseen with lining, soil protection, groundwater monitoring and landfill gas processing. Since the development of Regional Sanitary Landfills is considered crucial for this study, this issue has been further elaborated in paragraph 2.3.

2.2.6 Reduction, Reuse and Recycling

Realising that there is increase in waste generation and change in waste composition, the GoI has been promoting 3R (Reduce, Reuse and Recycling) since 2007 as a means to increase material recovery and to reduce waste disposed in landfills. A new recycling policy was issued by Ministry of Environment in 2008.

The Indonesian government adopts a waste treatment priority policy, based on the following hierarchy:

Figure 1: Waste Treatment Priorities in Indonesia



Reduction, Reuse and Recycling have the highest priority in terms of policy objectives, but still need considerable efforts to become materialised. Unofficially a substantial part of the waste valuables, possibly up to 10% of the total waste flow, is already withdrawn from the municipal waste streams and recycled by scavengers from the households, at the TPS sites or dump sites (TPA). Officially a limited number of municipalities have started to adopt the above 3R policies of the national government. It is estimated that the municipalities currently recycle about 2.26% of the waste streams from the source, 2 percent from the TPS's and 1.6 percent from the TPA's. Specifically improving recycling of plastic will be crucial, since it is estimated that plastic consumption in Indonesia increases with about 3 percent per year.

In terms of waste treatment, considerable opportunities exist with regard to energy generation from organic waste. The Ministry of Energy and Mineral Resources estimated in 2008 that Indonesia has the potential of generating 50 Giga Watt of energy from Indonesia's total biomass resources, including from organic waste. Currently about 2 Mega Watt of energy is generated from organic waste through anaerobic digestion techniques. The Government's target is to increase this figure to 26 Mega Watt per year in 2013.

The waste sector in Indonesia has substantial potential in terms of climate change related emission reduction, in particular with respect to mitigation of landfill gas emissions. Specifically KfW and the World Bank are eager to address this issue.

In this respect, the Ministry of Public Works has proposed eleven cities to KfW, from which five cities have identified during an initial screening by KfW, namely Jambi, Malang, Surakarta, Jombang and Sidoarjo. Detailed FS on CDM aspects of SWM will be carried out in these cities and two cities (Semarang and Pekalongan) will be supported

with a site selection study for specific CDM projects. A second phase of the feasibility study will start early 2011, and will focus on opportunities to upgrade SWM-systems, recycling and composting, methane gas capture, waste to energy and certified emission reduction / CDM, and related environmental improvements (ref. Ester.Hutabarat@kfw.de)

Next to the World Bank and IFC, the Indonesia Climate Change Trust Fund (www.ICCTF.org) is a national-managed trust fund that aims to contribute to mainstreaming climate change issues in government planning and the implementation of climate change activities across Indonesia. The fund still remains about 3 M AUD, and is very much interested to take up climate change projects in the SWM sector.

2.2.7 SWM Costs and Retribution

It was estimated that for 2006 the total expenditures of waste management in Indonesia were 2,342 Billion IDR, or around 10,000 IDR (about 1 €) per person per year. The DKI Jakarta Cleansing Department for instance has a budget of 678 Billion IDR, or 2.9% of the Regional Governmental Budget for DKI Jakarta. These figures are extremely low from an international perspective.

No exact figures are available concerning the total retribution from waste generators, but it is estimated that 1,000 to 1,100 Billion IDR is collected through household billing, of which 50% from direct waste fees, 27% in combination with the water bill and 23% in combination with the electricity bill. This amount excludes the direct fees collected by non-governmental waste collectors in the individual communities.

Clearly one of the causes of low SWM service levels is the financial shortage. Before the decentralisation, the local government had received solid waste program financed by the state budget and some financial assistances from ADB Loan, IBRD Loan, JICA and JBIC. Thereafter, financial sources for municipal waste management were generated through waste collection fee, waste retribution, and local governmental budget. Since the decentralisation, solid waste program is mostly financed by local government. However, the amount of the whole contribution from local governments is still small (less than 2% of the total local budget) and can not balance the needed expenditure on waste management.

2.2.8 Private Sector Participation

Basically, Private Sector Participation (PSP) in waste sector has been initiated since 1995 when the Indonesia's Program for Pollution Control, Evaluation, and Rating (PROPER) was initiated. However, the PSP hardly takes place in the municipal waste management system, such as waste treatment or disposal, with the exception of PT. Patriot Bangkit Bekasi which operates the Bantar Gebang Landfill in Bekasi, West Java.

There are a range of community initiatives in Indonesia, such as women-owned collection cooperatives, itinerant waste scavenging improvement, neighborhood-based youth groups for collection, contract to micro-enterprises, neighborhood composting or vermin-composting facilities, and collection of user charges from each household. For such services, the community generally pays small amounts from community savings to pay for operational activities, such as salaries of (non-municipal) garbage collectors and street sweepers, providing garbage bins and containers and purchasing of carts.

To improve the awareness of proper waste handling by the general public, the Indonesian Government has announced a National Waste Day once a year, on 21 February. This day is reserved for various national waste management awareness improvement events, including information campaigns in Public Schools.

2.3 REGIONAL SANITARY LANDFILLS

The Government in Indonesia has decided to develop regional sanitary landfills as a means to alleviate the waste dumping practices. This decision was partly triggered by the spontaneous explosion and consequent landslide in 2005 at the Leuwigajah dump site. This disaster was related to the high waste piles on a non-protected dumpsite, and caused 41 mortal casualties. The sanitary landfills will be foreseen with lining, soil protection, groundwater monitoring and landfill gas processing. Some of the TPST will be foreseen with anaerobic composting and landfill gas facilities to generate energy (LFGTE), for instance the considered Regional Landfill at Ciangir. These developments fit into the wider objectives of the national government to meet goals to the Kyoto Protocol on Clean Development Mechanisms, and to increase non-petroleum energy sources.

These landfills are planned to be managed by regional integrated waste processing organisations. Currently 18 regional sanitary landfills are under consideration or preparation. None of the regional sanitary landfills is yet constructed and in operation, and different approaches exist with regard to the construction and operation mode. For instance, West Java Provincial Government has invited private parties to bid for BOT contracts for the construction of the Bogor and Bandung sanitary landfills, and to date 34 companies showed interest. The investment in the regional landfills is managed by the provincial governments, for instance the West Java Provincial Government is engaged in the regional landfills Bandung Raya and Bogor.

The following table provides an overview of the status of the development of the various regional sanitary landfills in Indonesia

Kota / Kabupaten	Name / location Landfill	Technical status of preparation	Status of development of regional SWM organizations	Donor and financial commitments	Stakeholders / municipalities involved	Major issues to be resolved for further implementation
SUMATRA						
Nanggroe Aceh Darussalam (NAD)	Blang Bintang, Kota Aceh Besar	Design completed, supported by UNDP	Proposals prepared by NL cities of Apeldoorn and Rotterdam	GoI budget allocation for 2010 - 2014 (Post Disaster), Institutional support from NL	DKP – Sanitation and Park Department of Municipality of Banda Atceh	
Medan	Deli Serdang Municipality	no design yet	Medan Waste Management	Possibly Asian Development Bank	Kota and Kab. Medan, Deli Serdang	final site selection, design, institutional development
Palembang	Not yet identified	No substantial progress yet	unknown	none	Kota and Kapubaten Palembang	final site selection, design, master planning
Bandarlampung	Not yet identified	No substantial progress yet	unknown	none	Bandar, Lampung	unknown
Padang	Not yet identified	No substantial progress yet	unknown	KfW - finance for Emission Reduction in Jambi Province	Kota and Kapubaten Padang	unknown
JAVA						
Bogor, Depok	Bogor - Nambo (100 ha)	Design to be financed by JICA	BPSR (Regional SWM Office) has been established for Jawa Barat in 2009	GoI budget allocation for 2010 - 2014; KfW intends to finance Emission Reduction in Jombang, east of Depok, JICA will support Nambo	Bogor, Depok	Land owner "Perhutani" (forestry company) does not have yet permission to change landuse into landfill
DKI Jakarta	Dumpsite Bantar Gebang remains in operationfor some years		Bantar Gebang is operated by PT. Patriot Bangkit Bekasi			
	West: TPST Duri Kosambi	No substantial progress yet	Jakarta Cleansing Department	Unclear	DKI Jakarta	Design, institutional setting
	North: TPST Marunda	No substantial progress yet	Jakarta Cleansing Department	Unclear	DKI Jakarta	Design, institutional setting
	East: TPST Ciangir	No substantial progress yet	Jakarta Cleansing Department	Unclear	DKI Jakarta	Design, institutional setting
	North: TPST ?	No substantial progress yet	Jakarta Cleansing Department	Unclear	DKI Jakarta	Design, institutional setting
Cirebon, Indramayu, Majalengka, Kuningan	Kopi luhur, land not yet secured	Province will tender SWM master plan, location and costs of landfill not yet decided	BPSR (Regional SWM Office) has been established for Jawa Barat in 2009	Provincial governments financing for site selecion	Cirebon, Indramayu, Majalengka, Kuningan	Feasibility depends on transportation. Budgets for related transportation and tipping fees not yet assured
Sukabumi (kota + Kabupaten)	Not yet identified	No substantial progress yet	BPSR (Regional SWM Office) has been established for Jawa Barat in 2009		Sukabumi (kota + Kabupaten)	

Kota / Kabupaten	Name / location Landfill	Technical status of preparation	Status of development of regional SWM organizations	Donor and financial commitments	Stakeholders / municipalities involved	Major issues to be resolved for further implementation
Purwakarta, Subang, Karawang	Not yet identified	No substantial progress yet	BPSR (Regional SWM Office) has been established for Jawa Barat in 2009		Purwakarta, Subang, Karawang	
Bandung, Cimahi, Sumedang, Garut	Leuwigajah (west Bandung) Legok Nangka (east Bandung)	DED will be prepared	Plans for Greater Bandung Waste Managemen Co-operation (GBWMC) have been drafted. Not yet implemented	GoI budget allocation for 2010 - 2014, JICA will support setting up PPP for Legok Nangka	Kota and Kapubaten Bandung, Cimahi, Sumedang, Garut	Land Acquistion is ongoing
Tegal	Maybe at Ciangir	problems with land acquisition	Central Java Provincial Waste Department	none	Kota and Kab. Tegal, Kab. Brebes	Land Acquistion has some problems
Surakarta (Solo)	Kab. Sragen	No substantial progress yet	Central Java Provincial Waste Department	KfW - finance for Emission Reduction, Maybe JICA will finance site selection, design	Kota and Kapubaten Surakarta, Kab. Sukoharjo, Kab. Sragen	
Yogyakarta	Pryungah, Kab. Brandul	Current dump site at Bantul will be extended	Yokyakarta Waste Department	Maybe co-financing from ADB	Kota Ygyakarta, Kab. Sleman, Kab. Bandul	
Magelang	Not yet identified	No substantial progress yet	Central Java Provincial Waste Department		Kota and Kapubaten Magelang	
Surabaya	Maybe at Gresik municipality	No substantial progress yet	East Java Waste Department	KfW intends to finance Emission Reduction in Sidoarjo, near Surabaya	Surabaya, Gresik, Kab. Sidoarjo	
Malang	Kota Malang	No substantial progress yet	East Java Waste Department	KfW - finance for Emission Reduction, Netherlands financed gas flaring system		
KALIMANTAN						
Banjar Masim	Banjar Baru / Banjar Municipality					
BALI						
Denpasar / Badung	Suwung					
SULAWESI						
Mekassar, Gowa, Maros, Takalar (=Mamminasata)	Patalassang Regional landfill	DED completed (INDII)	Patalassang Waste management office	Finance construction through JICA. INDII finances DED	Mekassar, Gowa, Maros, Takalar	

2.4 LEGAL AND INSTITUTIONAL FRAMEWORK

2.4.1 Waste Management Law No. 18/ 2008

The new Waste Management Law No.18/2008 was introduced in 2008. The management of waste is conducted based on the principle of responsibility, sustainability, profitability, justice, awareness, togetherness, safety, security, and economic value (Article 3). In this Law, there are some substantial policies that are directed towards shifting the pattern of traditional waste management, which has been run by various parties, to patterns that are reducing waste starting from the source (reduce at the sources and recycle resources).

Substantial shifts, which are set out clearly in this Law, are:

Waste as a resources, which needs to be managed by all parties. Waste in this Law is divided into groups of household waste, household-like waste, and specific waste (articles 2 and 4).

The pattern of waste management is prevention and mitigation. Preventive measures in this Law are directed to waste reduction schemes, which are directed at the activity to limit waste generation, waste recycling, and reuse of waste (Article 20). While mitigation efforts are directed at the pattern of waste sorting, collection and transportation from the source – Temporary / Integrated Waste Disposal Site (TPS/TPST) – Final Landfill (article 22).

Waste management technologies must be environmentally friendly. This Law seeks to realise the efforts of environmentally friendly waste management, by encouraging local governments to plan the closure of landfill waste disposal systems that use the open dumping method by the latest 1 (one) year from the enactment of the Law, and closing no later than 5 (five) years from the enactment of the Law. In addition, local governments need to realise the rehabilitation of the landfill with open dumping system to become a controlled landfill or sanitary landfill (Article 44).

Waste management is a shared responsibility of all parties. Waste management efforts in this Law are directed to regulate the rights and obligations of all waste producers, ranging from community to government (starting from the Central - Province - District / Town), and also the businesses. Special efforts to encourage responsible businesses are conducted with extended producer responsibility (EPR) strategy (chapter IV).

Professional waste management is pushed based on a cooperation strategy. In the Law the waste management system is directed to ensure a well-managed environment in order to fulfill the right to a clean environment. In the framework of this, the pattern of waste management in this Law is directed to be managed professionally by enabling the professional co-operation between / across governments through the concept of regional management of the landfill, and also the governments' cooperation with business entities (Article 26 and 27).

The pattern of the waste management development is done through the mechanism of incentives and disincentives. In this Law the government seeks using incentive mechanisms for parties that conduct waste reduction, and mechanisms of disincentives for parties that do not reduce waste generation. Apart from these mechanisms, this Law starts to encourage the implementation of compensation for people affected by the negative impacts of waste management activities at the final waste processing site (article 25).

In addition to the above principles, Law No. 18 Year 2008 also has clearly identified the steps that must be taken by the Government and local governments. Such obligations are as follows:

1. The obligation to issue a number of derivative rules at the central level and local regulations as implementing rules. It is noted that a total of 11 (eleven) substances require rules that need to be set in the form of government regulation, 2 (two) substances that need to be regulated through the instrument of ministerial regulations, and 9 (nine) substances that need to be set through the instrument of local regulations. Substances that need to be stated in the derivative rules of Law 18 year 2008 are as follows:

The substance of the Implementing Rules of Law No. 18 of 2008

Type of Regulation	Number of Substance	Details Substance
Government Regulation	11	1. Procedures for Using Rights in the Waste Management 2. Procedures for Provision Waste Sorting Facility 3. Procedures of Labeling and Marking 4. Manufacturers Obligations 5. Waste Reduction 6. Types, Forms, and Procedures for Incentives and Disincentives Granting 7. Waste Management 8. Specific Waste Management 9. Waste Management Financing 10. Negative Impacts and Compensation in the Waste Management 11. Form and Procedures for Public Role
Ministerial Regulation	2	1. Regulation of Environment Minister concerning Specific Types of Waste 2. Regulation of Home Affair Minister concerning Guidelines for Cooperation and Inter-Regional Joint Venture Form

Type of Regulation	Number of Substance	Details Substance
Local regulations	9	1. Procedures for using rights in the Waste Management 2. Procedures for implementation of obligations in the Management of Household and Household like Waste 3. Types of Waste Management Permits and Procedure for Announcement / Publication 4. Waste Management Financing 5. Compensation granting by local governments in Waste Management 6. Forms and Procedures for Public Role 7. Restrictions in Waste Management 8. Waste Management Supervision 9. Implementation of Administrative Sanctions

2. The obligation to establish waste reduction targets in stages over a period of time.
3. The obligation to prepare a planning for closure of the final waste processing site (using open dumping) within a maximum of 1 year from the effectiveness of the Law, and to close such sites no later than 5 (five) years from the effectiveness of the Law.
4. The obligation to finance the implementation of waste management.
5. The obligation to facilitate the implementation of environmentally friendly technologies.
6. The obligation to facilitate the implementation of environmentally friendly product label.
7. The obligation to utilise 'reuse and recycle'.
8. The obligation to facilitate the marketing of recycled products.

In addition to Law no. 18 year 2008, the Government has also issued policies of waste management programs through the instrument of Minister of Public Works Regulation No. 21/PRT/M/2006 concerning National Policy and Strategy for the Development of Waste Management Systems (KSNP-SPP). This KNSP-SPP is published as a guide for managing, organising, and development of environmentally sound waste management, both at the central as well as local levels in accordance with local conditions. Through this regulation, the Government asserted 5 (five) policies in waste management in accordance with Law No.18 of 2008. The five policies are as follows:

- Waste reduction starts from the source to the maximum extent possible
- Increasing the active role of community and business / private sector in the management of waste

- Increasing the service coverage and quality of the management systems
- Development of institutional, regulatory and legislative setting
- Development of alternative sources of financing

Each of these policies is the basis for national strategies and action plans for waste management.

From the legal aspect, to date the Government has issued a number of rules as instruments for implementing Law no. 18 year 2008:

No.	Instruments Regulations	Substance
1.	Presidential Regulation No. 5 Year 2010 concerning RPJMN (Medium Term National Development Plan) 2010 - 2014	This Regulation states the waste management objectives are: • Increasing the amount of waste transported to 75% • Improving the performance of landfill management that is environmentally guided.
2.	Presidential Regulation no. 13 of 2010 concerning Government cooperation with the Business Entities in the Provision of Infrastructure	In article 4 of this regulation it is stated that transport facilities and disposal site are waste infrastructure for which cooperation with a Business Entity is possible.
3.	Regulation of Home Affairs Minister No. 33 year 2010 concerning Guidelines for Waste Management	This regulation sets about: 1. The necessity for the Local Government to formulate the Waste Reduction and Management Plan in the Strategic Plan and Work Plan of the SKPD (Regional Work units). 2. The waste reduction is done by the way of reducing, recycling, and / or reusing the waste. Which is carried out through: a. monitoring and supervision of the implementation of the plan to use environmentally friendly production materials b. facilitation to the community and business sector 3. The Waste handling is done by providing facilities for waste segregation, collection, transportation, treatment and final processing. 4. In the framework of waste reduction and management, local government may establish waste management institutions. It can be a BLUD (Local Public Service Agency) for waste which is equal with the working unit in the SKPD for waste management. 5. Local Government may provide incentives and disincentives to individuals, institutions and business entities.

No.	Instruments Regulations	Substance
		6. Local Government may enter into agreements with other local government or any business entity, with a specific scope within the waste management system. 7. The procedure for granting compensation
4.	Regulation of Public Work Minister No. 14 Year 2010 concerning Minimum Services Standard of Public Work field and Area Spatial	This regulation contains performance indicators and targets for waste management in 2010 – 2014, which are: 1. Availability of urban waste reduction facilities. Target: Reduced waste amount by 20% by the year 2014. 2. Availability of urban waste handling system. Target: 70% of waste transportation in 2014.

Although the regulations mentioned above have been published, local governments have not been immediately able to push efforts of waste management according to the provisions as stipulated by the Law. From the legal framework aspect the following are constraining factors for local governments:

- Derivative Government Regulations of Law No.18 Year 2008, which can be used as reference by the Local Governments for their own regulations, have not been published by the Central Government. The main regulations that are urgently needed are: the procedure for using right in the waste management; manufacturer obligations; type, form and procedure for the provision of incentives and disincentives; the financing of waste management; as well as negative impacts and compensation in waste management.
- Regulations on regional cooperation have not sufficiently clear set out mechanisms for efficient cooperation, transparency, fairness and mutual benefit, which can be implemented by the local governments, either with business entities or with other local governments.

Moreover, the regional cooperation encouragement enshrined in Law No. 18 year 2008 is also not supported by taxation policies in force in Indonesia at this time. Taxation policies, especially concerning import duties and value added tax, have not yet been the incentive instrument for the growth of regional cooperation with the private sector in the infrastructure procurement for landfill (TPA) or temporary landfill (TPST).

Two Governmental Regulations, based on the Waste Law, are expected to be completed in February 2011 (ref. MoE)

2.4.2 Related Laws

In addition to the above UU 18/2008 for solid waste management the following relatively new Laws are closely related and of importance: UU 26/2007 on Spatial Planning and UU 32/2009 on Environmental Protection and Management. Both off

these laws have criminal provisions enshrined, which may be applicable to waste management.

Besides these three relatively new Laws, a series of Laws and Regulations mainly relating to the fiscal, financial and authority relations between Central, Provincial and Local Government should be taken into account. These are:

- Law no. 17 / 2003 concerning the State Treasury
- Law no. 7 / 2004 concerning Water Resources
- Law no. 32 / 2004 concerning Regional Government
- Law no. 33 / 2004 concerning Fiscal Balance between Central and Regional Government
- Law no. 28 / 2009 concerning Regional Tax and Retribution
- Law no. 25 / 2009 concerning Public Services
- Government Regulation no. 23/2005 concerning Public Services Agencies Financial Management
- Government Regulation no. 1/2008 concerning Government Investment
- Government Regulation no. 41/2007 concerning Regional Government Cooperation Procedures
- Government Regulation no. 65/2005 concerning Minimum Standard Services Guidelines
- Government Regulation no. 38/2007 concerning the allocation of Authorities between Central, Provincial and Local Government
- Ministry of Home Affairs Regulation no. 61/2007 concerning Regional Public Services Agency Financial Management Guidelines.

2.4.3 Institutions

Before the implementation of decentralisation, municipal solid waste management was the responsibility of several departments and ministries such as The Ministry of Public Works, Ministry of Home Affair, Ministry of Health, Agency for Technology Assessment and Development, Board of Environmental Impact Management (BAPEDAL), and the Sub Directorate for Solid Waste Management. The involvement of many institutions in solid waste management led to overlapping responsibilities and weak implementation and enforcement of laws and regulations of solid waste management. The decentralisation in 1999 had brought about the change in national and local waste institution in Indonesia, where the central government would play a role as a regulator and the local governments would be the policy implementation agents.

The local government obtained more responsibilities in planning and implementing solid waste management in their locality. Moreover, the national waste management structure was updated in 2002 with the Presidential Decree No. 2/2002. The Ministry of Environment took over the responsibility of BAPEDAL, which was responsible for controlling environmental pollution impact.

Nowadays, there are mainly four ministries involved in waste management: the Ministry of Environment, for pollution control related to SWM; the Ministry of Public Works for the guiding and financing construction in SWM related infrastructure, such as sanitary landfills, BAPPENAS for SWM sector planning and financial planning, the Ministry of Settlement and Regional Infrastructure for providing technical guidance, promoting pilot projects, and supervising large-scale off-site sanitation systems including waste management system.

At local level, the responsibility for the new Regional Sanitary Landfills is in hands of the Provincial Governments, while the solid waste collection, and transportation is the responsibility of individual or combined municipalities. Controlling the environmental pollution impacts is in the hand of *BAPEDALDA* or Local Board of Environmental Impact Management. Other institutions active at municipal level are the Planning Agency (BAPPEDA) and the Cleansing Departments are dealing with implementation of solid waste management, such as transportation from the transfer points to the final disposal site.

The municipality hires sometime private companies in cleansing and collecting street waste in commercial areas. Some large commercial and industrial enterprises in large cities like Jakarta, Bandung and Surabaya employ the Cleansing Department and/or private contractors.

To facilitate the operations of the foreseen Regional Sanitary Landfills (TPST) the government intends to set up Regional Waste Management Organisations that will operate under Integrated Solid Waste Management Principles. For instance, the Greater Bandung Waste Management Corporation (GBWMC) project (2004, 2005) was a technical assistance package under the Western Java Environmental Management Program (WJEMP). The overall objective of the technical assistance is to support the improvement and integration of solid waste management in Greater Bandung area through the establishment of Waste Management Organisation (WMO) owned by Participating Local Governments (PLGs). This WMO, for the time being is called Greater Bandung Waste Management Corporation (GBWMC), will contribute to the realisation of three components under WJEMP, i.e. a) Overall Urban Environmental Management/OUEM; b) Solid Waste Management (SWM); and c) Community and Private Sector Participation.

An overview of the involvement at national level of different ministries in the various SWM sector policies and action plans is provided hereafter.

Policies, Strategies, Action Plans, and the Division of Tasks and Roles in Waste Management (1 of 2)

NO.	POLICY	STRATEGY			LEVEL	MINISTRY OF ENVIRONMENT	MINISTRY OF PUBLIC WORKS	MINISTRY OF FINANCE	MINISTRY OF HOME AFFAIRS	MINISTRY OF INDUSTRY	MINISTRY OF COMMERCE	MINISTRY OF HEALTH	MINISTRY OF EDUCATION	MINISTRY OF AGRICULTURE	MINISTRY OF ENERGY AND MINERAL RESOURCES	BAPPENAS	BPPT
1	Waste Reduction	A		Waste Generation Limitation													
			1.	Restrictions on waste generation through product development and / or packaging that is recyclable and biodegradable in nature with the adoption of EPR, labeling, restrictions on the use of plastic bags	Producer	②			①	①							
			2.	Decline in per capita waste generation rate	Consumer	②	②		①			③					
			3.	Development system of incentives and disincentives for waste reduction activities (with economic instruments)	Producer	②			①	①							
		B	1.	Development of waste processing at source (3R in residential areas, public places)	Consumer	①	②		③			③					
			2.	2. development of waste processing at source (3R outside the residential areas, public places)		②	①		③			③					
		C		Promotion and education campaign	Producer	②	①		①			②	②				
2	Waste Management	A		Management Improvement		①	②		③								
			1.	Increasing the coverage and quality of waste management services	Consumer	①	②		①		③						
			2.	Improving the process of waste transportation	Consumer					①	③						
		B		Development and optimization													
			1.	Development and optimization of P / S waste processing	Producer-Distributor-Consumer	①	②										
			2.	Development and optimization of industrial recycling and composting industry		②	①							①			
		C		TPA development													
			1.	Development of environmentally sound landfill (SLF/CLF & WTE/CDM)	Supervision	①	②		③								
			2.	TPA Regional development (WTE & CDM)	Supervision	①	②		③			①					
		D		Science and technology development of appropriate waste in an environmentally sound (environmentally sound technology EST)	Supervision	①	①					①					②

Legend:
① : Main
② : Support
③ : 2nd Support

Policies, Strategies, Action Plans, and the Division of Tasks and Roles in Waste Management (2 of 2)

NO.	POLICY			STRATEGY	LEVEL	MINISTRY OF ENVIRONMENT	MINISTRY OF PUBLIC WORKS	MINISTRY OF FINANCE	MINISTRY OF HOME AFFAIRS	MINISTRY OF INDUSTRY	MINISTRY OF COMMERCE	MINISTRY OF HEALTH	MINISTRY OF EDUCATION	MINISTRY OF AGRICUL-TURE	MINISTRY OF ENERGY AND MINERAL RESOURCES	BAPPENAS	BPPT
3	Waste Utilization	A	1.	Development of technology for utilization of compost and recycled products	Consumer	①	①			①				①	①		②
			2.	Optimization and utilization efficiency of compost and recycling products		②	①			①				①	①		①
		B		Development of waste utilization for energy alternatives (waste to energy / intermediate treatment facility)	Supervision	①	①								②		②
		C		Development of partnerships with business sector	Supervision	②	①	①	①	②		③		③			
4	Improving Management Capacity	A		Development of database and waste management information	Producer-Supervision	②	①		①								
		B		Development of Regulations	Producer	②	①		②								
		C		Development of Institutionals													
			1.	Institutional development and optimization	Supervision	①	②				①	①	①				
			2.	Improving the quality of human resources	Supervision	②	②						①				
			3.	Priority to improve waste management	Supervision	②	②										
		D		Waste management performance measurement	Supervision	②	①						①				
		E		Law enforcement through the optimization of the regulatory officials PPNS LH & LH	Producer-Supervision	②											
5	Development of Regional and Global Cooperation	A		International cooperation & CDM													
			1.	Overseas financing sources collecting	Supervision	①	①		②	②			①			②	
			2.	Development of technical cooperation and capacity building	Supervision	①	②										
			3.	Active role in regional and global forums in waste management	Supervision	②	②						①				
			4.	Development of waste management activities associated with climate change mitigation (CDM)	Supervision	②	①						①			①	

Legend:
① : Main
② : Support
③ : 2nd Support

2.5 POLICIES AND STRATEGIES

The Indonesia National Mid-term Development for the years 2010 – 2014, prepared by the Ministry of National Development Planning and the National Development Planning Agency BAPPENAS identified the following national strategic objectives with regard to solid waste management:

1. Development of adequate SWM regional regulations and instrument, based on the specific regional circumstances and challenges, to implement the Waste Law 2008
2. To roll out the 3R policies (Reduction, Recycling and Reuse) throughout Indonesia
3. To increase the waste collection rates and sanitary disposal
4. To streamline and improve the organisation of solid waste management in terms of collection and sanitary disposal
5. To replace local and regional waste dumping with sanitary disposal
6. To enhance capabilities and strengthen the waste management organisations
7. To increase the solid waste services levels and related budgets for solid waste management
8. To make all municipalities developing their City Sanitation Strategies, including SWM plans, to streamline local, regional and national efforts

The National Development Plan indentifies the following actions to be implemented in the SWM sector from 2010 until 2014:

- Development of City Sanitation Strategies (SWM and wastewater management)
- Strengthening municipal and regional SWM institutions to improve service levels
- Reduction of waste generation through reduction, reuse and recycling, and stimulating environmental friendly technologies
- Professionalisation of SWM through business marketing
- Improvement of Monitoring and Evaluation within the SWM Sector
- Development of Sanitary landfills at municipal level
- Strengthening coordination among local governments to enhance regional SWM approaches and development of Regional Landfills and organisations among multiple municipalities
- Development of regional waste strategies, reflecting regional challenges and needs, based on National legislation and guidelines
- Stimulating Private Sector Participation in SWM, and provision of legal assurance between public sector, operators and private sector
- Development of a tariff system / tipping fee to enable cost recovery
- Stimulating bundling / integration of SWM services (collection, transport, transfer, disposal) specifically for commercial areas

- Stimulating un-bundling (phasing) of other SWM services to facilitate private sector participation
- Realisation of specific SWM services in Post Disaster and Social Conflict regions

The National Development Plan foresees in the following related national governmental expenditures with regard to Solid Waste Management:

1. Provision of Technical Assistance (Bantek) and Technical Guidance (Bintek) for the development of City Sanitation Strategies (CSS), aiming at completion of 150 municipal CSS in 2014 (budget around 250 Billion IDR)
2. Provision of Education and Training (Diklat) for institutional strengthening of the SWM organisations: Target is 15 Diklat packages completed (budget around 35 Billion IDR)
3. Monitoring and Evaluation (Monev) of SWM sector investments and activities. Target is 150 Monev activities performed in 2014 against a budget of about 20 Billion IDR
4. in 2014: realisation of 210 municipal sanitary disposal sites in Kapubaten or Kota; realisation of 250 sanitary waste collection and transfer facilities and finally 250 cities applying fully the principles of Integrated Solid Waste Management and the RRR principles, all together against a budget of 5,500 Billion IDR
5. In 2014: realisation of Regional Sanitary Landfills, including regional organisational structures, in Bandung, Bogor and Depok City against a governmental budget of 1,200 Billion IDR
6. Development of regional SWM norms, standards, regulations and criteria (NSDK) for 30 regions in 2014, against a budget of 35 Billion IDR
7. Development of Private Sector Co-financing projects in the SWM sector for 14 facilities in 2014, against a governmental budget of 15 Billion IDR
8. Realisation of 31 SWM and drainage facilities in Post Disaster and Social Conflict locations in 2014, with an estimated budget of 150 Billion IDR

2.5.1 Required Institutional and Regulatory Initiatives

Apart from the derivative regulations, providing detailed implementation regulations for the waste management Law (as discussed in paragraph 7), the basic regulations for regional cooperation as well as private sector participation are in place.

Practical experience in setting up and running a joint regional / provincial institution for waste management, however, is lacking. This lack of experience and home-grown examples amplify ambiguities concerning regional cooperation in general and concerning waste management in particular. These ambiguities mainly concern the sharing of authority and budget (a prerogative of the local parliaments) as well as costs associated with sustainable waste management.

More than new regulatory initiatives, practical experience and functioning examples of regional cooperation in waste management are required. The Waste Law provides the Governments with authorities and obligations and provides for the possibility of community and private sector participation. The institutional options are already established in regional cooperation regulations (Ministry of Home Affairs Regulation No. 22 / 2009) and comprise the following possibilities:

- PT (firm) jointly owned by the local governments
- Central Government UPT (Unit Pelaksanaan Teknis / Implementation Unit)
- Provincial Government UPT
- Local Government Enterprise (BUMD)
- Badan Layanan Umum (BLU / Public Service Body)

The institutional form required will depend on the level of cooperation between the local governments and the section of waste management the cooperation will focus on. A clear preference at the moment is the utilisation of UPT (Provincial) and BLU, which subsequently may evolve into other institutional formats (BUMD or PT).

CHAPTER 3: SOLID WASTE SECTOR PROGRAM OPTIONS

3.1 GENERAL

In this chapter alternative solid waste program options have been identified, taking into account that IndII is interested mainly in sanitary landfill disposal components, and not in receiving proposals related to collection, transportation or transfer of waste. It would like to co-operate on the level of national or provincial level, preferably not on municipal levels. The identified projects for financing under IndII relate to Grants, Technical Assistance, or institutional strengthening.

It is considered that the IndII projects shall have maximum duration of about 3.5 years. The total packages may sum up to about 20 M AUSD, preferably including 3 or 4 larger projects and some additional minor projects.

3.2 INDII DESCRIPTION OF PROGRAM OPTIONS

The following SWM program options under IndII have been identified.

No.	Project Name	Costs AUD
1	National Solid Waste Information Management Project	600,000
2	National Solid Waste Strategy Project	800,000
3	National Solid Waste Advocacy Project	500,000
4	Malang Raya Regional Solid Waste Master Plan	1,050,000
5	Medan Regional Solid Waste Master Plan	1,400,000
6	Surakarta Regional Solid Waste Master Plan	1,250,000
7	Surabaya Regional Solid Waste Master Plan	1,400,000
8	Denpasar Regional Solid Waste Master Plan	1,250,000
9	Makassar Waste Organization Institutional Development (Road Map)	220,000
10	Malang Raya Waste Organization Institutional Development (Road Map)	200,000
11	Cirebon Waste Organization Institutional Development	220,000
12	Bogor Waste Organization Institutional Development	200,000
13	Aceh Waste Organization Institutional Development	200,000
14	Surakarta Waste Organization Institutional Development	220,000
15	Site Operation Plan for Mamminasata RST	150,000
16	Medan Energy and Emission Reduction Project	2,000,000
17	Bandar Lampu Energy and Emission Reduction Project	2,000,000
18	Depok Energy and Emission Reduction Project	2,000,000
19	Probolingo Energy and Emission Reduction Project	2,000,000
20	Mandao Energy and Emission Reduction Project	2,000,000
21	Batu Energy and Emission Reduction Project	2,000,000
22	Padang Energy and Emission Reduction Project	2,000,000
23	Pekanbaru Energy and Emission Reduction Project	2,000,000
24	Cirebon Energy and Emission Reduction Project	2,000,000
25	Surakarta Energy and Emission Reduction Project	2,000,000
26	Jambi Energy and Emission Reduction Project	2,000,000
27	Malang Energy and Emission Reduction Project	2,000,000
28	Jombang Energy and Emission Reduction Project	2,000,000
29	Sidoarjo Energy and Emission Reduction Project	2,000,000
30	Aceh Darussalam Regional Sanitary Landfill	3,500,000
31	Cirebon Regional Sanitary Landfill - DED	1,000,000
32	Cirebon Regional Sanitary Landfill	9,000,000
33	Bogor Nambo Regional Sanitary Landfill	15,000,000
34	Legok Nangka Regional Sanitary Landfill - DED	1,500,000
35	Legok Nangka Regional Sanitary Landfill	10,000,000
36	Surakarta Regional Sanitary Landfill	5,000,000
37	Yogyakarta Regional Sanitary Landfill	5,000,000
38	Makassar (Patalassang) Regional Sanitary Landfill	5,000,000
	TOTAL	**92,660,000**

Details of the identified options are provided in Annex 3 (Project Digests) with highlights detailed hereafter.

3.2.1 National Level Projects Rationale

Sound information on solid waste management at national level is very limited, hence difficult to be used as the base for progress monitoring towards MDGs achievement. The LGs provide annual information to Ministry of Environment on a voluntary basis, yet the reliability of the information in respect of waste generated, collected and disposed (by the Local Government and the community) as well the status of development of sanitary landfill, financial, regulatory and institutional aspects is questionable.

This support component is to develop a solid waste information management system at national level providing a sound basis for monitoring and setting-up support priority from the Central Government to Local Governments to achieve MDGs targets (for details please refer to Annex 3, Project Digest 1).

A solid waste strategy at national level is required to steer national developments with regards to solid waste management. It aims at setting objectives regarding collection rates, transportation, 3R, energy generation, environmental protection, regulations, and set priorities in terms of investments, organisational development, private sector involvement, and more. It is essential that the strategy is developed and agreed upon by parties concerned at national level, at least by the Ministry of Home Affairs, Bappenas, Ministry of Public Works, Ministry of Environment, and Ministry of Health.

In 2004, the Ministry of Public Works has prepared solid waste action plan. This action plan needs to be updated. Moreover, Bappenas is now exercising a Solid Waste Management Road Map and this study should be linked to it targets (for details please refer to Annex 3, Project Digest 2).

After decentralisation the responsibility for solid waste management is fully in the hands of Local Governments. The exception is when two or more LGs agree to cooperate for the joint operation of a regional TPA in which the Provincial Government will facilitate the process, and under certain conditions the Central Government will involve in providing institutional and technical guidance including financial support.

Based on experience with the support for the development of several jointly operated regional TPA, such as in Denpasar, Jabodetabek and Greater Bandung, it is obvious that the challenge for success lies more in the commitment of each LG than in the technical aspects. Specifically the key is to allocate sufficient budget for overall SWM improvement. However, commitment is difficult to achieve if understanding of overall SWM is limited. Apparently SWM should first be understood as an integrated system issue: from waste production till it is safe to be disposed to the environment – or “from cradle to grave”, and it deals beyond technical aspect; comprises also institutional and regulatory framework, social and cultural aspects, financial commitment, etc. The second issue is that SWM falls under the responsibility of several agencies in the LG (horizontal perspective) and from city top management till the community (vertical perspective). The third issue relates to the understanding that good SWM is a preventive measures and part of the public service obligation, which will decrease curative cost to be borne by individuals. Good advocacy targeted at decision makers

and a campaign to the beneficiaries prior to other activities will guarantee the sustainability of the system developed (for details please refer to Annex 3, Project Digest 3).

3.2.2 Regional Level Projects Rationale

Regional Solid Waste Master Plans

It is within the policy of the Ministry of Public Works to encourage Local Governments on having a Regional Sanitary Landfill, which is jointly operated by the involved LGs. It increases efficiency as operational costs per ton of waste treated will be lower compared to several small landfills receiving the same amount of waste. A regional landfill also may attract the private sector, especially for those who have the idea to convert the collected waste into valuable material.

Regional sanitary landfill development has been initiated in several big cities, such as Denpasar and the surrounding cities, Kabupaten and city in Yogyakarta province, Metropolitan Bandung in West Java province, Mamminasata in South Sulawesi province, Malang Raya in East Java province, and others.

Denpasar, Metropolitan Bandung and Yogyakarta have set-up the regional cooperation some years ago, while Mamminasata is in the process of establishing the joint cooperation institution. Malang Raya has recently just signed an agreement between the concerned Local Governments.

De facto TPA Supit Urang, located within the administrative boundary of Kota Malang and Kabupaten Malang, is being used by those local governments. KfW is at present preparing a feasibility study for an emission reduction program. Given that agreement for cooperation has been established, a master plan is required to describe the various investment and operational aspects of the regional landfill. IndII can support the preparation of the master plan to provide a good example of setting-up a Regional Sanitary Landfill for other cities in Indonesia (for details please refer to Annex 3, Project Digest 4). The above approach basically is applicable to all regional landfills and has a high replication possibility.

Institutional Development of Regional Solid Waste Management Organisation

In order to operate the regional sanitary landfills adequately, a joint waste management organisation shall be developed and be prepared to take up its role with regard to management and operations against the provided mandate. Typically the provincial government will set-up a temporary body (called UPTD) whose members comprise of provincial and participating cities' staffs. The initial task of this body is to prepare the regulatory framework required, management structure of the permanent body and job description of the managers. The form of the body and progress of

establishing such a joint cooperation may vary for each regional landfill site, but the milestones are just the same.

Since setting-up a regional solid waste management is relatively new in Indonesia (as there are not many examples), it is required to prepare a road map for institutional development. IndII has supported the preparation of DED for Mamminasata Regional Landfill. Actual construction of the Regional Landfill is in an advanced stage of preparation with financing secured via a JICA loan. It is imperative to provide support for the non-technical part and establish the required legal basis and management structure; thus assuring the sustainability of the system. IndII's support will synergise the works of JICA (for details please refer to Annex 3, Project Digest 5 and 6 (Malang Raya)). The above approach basically is applicable to all regional landfills and has a high replication possibility.

Operation of Regional Sanitary Landfill

With assistance from JICA a Special Assistance for Project Formation (SAPROF) study titled "The Study on Implementation of Integrated Spatial Plan for the Mamminasata Metropolitan Area", was completed in July 2006. Further on, IndII funded the DED limited to 100 Ha site reserved for the landfill site in Panaikang village within Gowa regency. The IndII financed DED has been finalised in 2010.

Construction of the landfill site is commencing and in the near future operators will start the operation but a clear operation manual, in this case the Site Operation Plan (SOP) is not yet available. A clear SOP will guide the responsible institution, managing the regional landfill site (from operators in the field up the managers) to do the operation correctly including documenting and reporting the daily performance (technical as well financial aspects) which result can be used as an input for further DED of the remaining site as well the basis for training material development (for details please refer to Annex 3, Project Digest 7).

Climate Emission Reduction

Indonesia has a large potential for landfill gas emission reduction and energy generation from solid waste. This largely relates to the high organic faction in solid waste, and the current practice of waste dumping without further sanitary facilities. As an alternative, for instance, anaerobic digestion can be applied. This is a bacteriological process that produces methane (CH_4) and carbon dioxide (CO_2) from organic wastes. The methane can be utilised for energy generation, and the CO_2 can be captured, and for instance stored in geological safe formations. These gases would also be generated under natural waste decomposition circumstances, be it that they would otherwise be emitted directly to the atmosphere. It will contribute to the national target to reduce emission of CO_2 into the atmosphere.

As part of IndII's overarching objective to strengthen the policy and institutional framework for infrastructure reform and development, this initiative will support achievement of the objective by providing practical examples and lessons learned for incorporation in the development of the institution and regulatory framework (for details please refer to Annex 3, Project Digest 8). The approach defined can be applied to a large number of TPA as an incentive scheme to improve waste management.

Physical Works Co-Financing

A limited number of regional landfills are being implemented, often due to lack of financial resources. This project aims at co-funding the construction of sanitary landfills, based on availability of main finance and based on appropriate legal and institutional arrangements. The co-funding portion can relate to specific landfill components, such as office and on-surface facilities, composting facility, recycling facility, specific landfill cells, etc., all of which are classified as "fixed infrastructure" (for details please refer to Annex 3, Project Digest 9). The approach defined can be applied to a larger number of TPA as an incentive scheme to improve waste management.

3.3 PROPOSED CRITERIA FOR SELECTION OF PROGRAM OPTIONS

The objective of the SWM Program financed under IndII shall be to provide a structural contribution to the development of the SWM sector in Indonesia. The identification of the SWM options shall ideally be steered by a set of criteria that provide a strong basis for successful implementation. In this respect the following criteria are proposed:

- Meeting national Priority
- Stakeholder Commitment/Co-financing promised
- Preparation studies completed
- Potential for IndII Visibility

An initial scoring of the projects proposed above against these criteria is presented hereafter.

			Prioritization Criteria					
No.	Project Name	Costs AUD	Meeting National Priority	Stakeholder Commitment	Co-financing promised	Studies completed	INDII Visibility	FINAL SCORE
1	National Solid Waste Information Management Project	600,000	3	5	3	2	5	18
2	National Solid Waste Strategy Project	800,000	3	5	3	2	5	18
3	National Solid Waste Advocacy Project	500,000	3	5	2	3	5	18
4	Malang Raya Regional Solid Waste Master Plan	1,050,000	3	2	2	2	2	11
5	Medan Regional Solid Waste Master Plan	1,400,000	3	2	2	2	2	11
6	Surakarta Regional Solid Waste Master Plan	1,250,000	3	2	2	2	2	11
7	Surabaya Regional Solid Waste Master Plan	1,400,000	3	2	4	2	2	13
8	Denpasar Regional Solid Waste Master Plan	1,250,000	3	2	2	2	5	14
9	Makassar Waste Organization Institutional Development (Road Map)	220,000	4	5	5	4	4	22
10	Malang Raya Waste Organization Institutional Development (Road Map)	200,000	3	3	2	3	3	14
11	Cirebon Waste Organization Institutional Development	220,000	3	3	2	3	3	14
12	Bogor Waste Organization Institutional Development	200,000	4	2	2	5	5	18
13	Aceh Waste Organization Institutional Development	200,000	3	5	5	5	4	22
14	Surakarta Waste Organization Institutional Development	220,000	3	2	2	2	2	11
15	Site Operation Plan for Mamminasata RST	150,000	5	3	5	3	3	19
16	Medan Energy and Emission Reduction Project	2,000,000	4	2	2	2	2	12
17	Bandar Lampung Energy and Emission Reduction Project	2,000,000	2	2	2	2	2	10
18	Depok Energy and Emission Reduction Project	2,000,000	4	2	2	2	2	12
19	Probolingo Energy and Emission Reduction Project	2,000,000	2	2	2	2	2	10
20	Manado Energy and Emission Reduction Project	2,000,000	2	2	2	2	2	10
21	Batu Energy and Emission Reduction Project	2,000,000	2	2	2	2	2	10
22	Padang Energy and Emission Reduction Project	2,000,000	2	2	2	2	2	10
23	Pekanbaru Energy and Emission Reduction Project	2,000,000	2	2	2	2	2	10
24	Cirebon Energy and Emission Reduction Project	2,000,000	2	3	3	2	5	15
25	Surakarta Energy and Emission Reduction Project	2,000,000	3	2	2	2	2	11
26	Jambi Energy and Emission Reduction Project	2,000,000	3	2	2	2	2	11
27	Malang Energy and Emission Reduction Project	2,000,000	3	2	2	2	2	11
28	Jombang Energy and Emission Reduction Project	2,000,000	3	4	4	2	2	15
29	Sidoarjo Energy and Emission Reduction Project	2,000,000	3	2	2	2	2	11
30	Aceh Darussalam Regional Sanitary Landfill	3,500,000	3	5	5	5	1	19
31	Cirebon Regional Sanitary Landfill - DED	1,000,000	5	5	2	5	2	19
32	Cirebon Regional Sanitary Landfill	9,000,000	4	5	2	5	2	18
33	Bogor Nambo Regional Sanitary Landfill	15,000,000	4	5	5	5	5	24
34	Legok Nangka Regional Sanitary Landfill - DED	1,500,000	5	5	5	5	5	25
35	Legok Nangka Regional Sanitary Landfill	10,000,000	4	5	5	5	5	24
36	Surakarta Regional Sanitary Landfill	5,000,000	2	2	2	2	2	10
37	Yogyakarta Regional Sanitary Landfill	5,000,000	2	2	2	2	2	10
38	Makassar (Patalassang) Regional Sanitary Landfill	5,000,000	4	4	5	5	4	22
	TOTAL	**92,660,000**						

Based on this scoring the Consultant has identified the following initial priority projects under IndII finance.

No.	Project Name	Costs AUD	FINAL SCORE
34	Legok Nangka Regional Sanitary Landfill - DED	1,500,000	25
33	Bogor Nambo Regional Sanitary Landfill	15,000,000	24
35	Legok Nangka Regional Sanitary Landfill	10,000,000	24
13	Aceh Waste Organization Institutional Development	200,000	22
9	Makassar Waste Organization Institutional Development (Road Map)	220,000	22
38	Makassar (Patalassang) Regional Sanitary Landfill	5,000,000	22
30	Aceh Darussalam Regional Sanitary Landfill	3,500,000	19
31	Cirebon Regional Sanitary Landfill - DED	1,000,000	19
15	Site Operation Plan for Mamminasata RST	150,000	19
1	National Solid Waste Information Management Project	600,000	18
2	National Solid Waste Strategy Project	800,000	18
3	National Solid Waste Advocacy Project	500,000	18
12	Bogor Waste Organization Institutional Development	200,000	18
32	Cirebon Regional Sanitary Landfill	9,000,000	18
24	Cirebon Energy and Emission Reduction Project	2,000,000	15
28	Jombang Energy and Emission Reduction Project	2,000,000	15
8	Denpasar Regional Solid Waste Master Plan	1,250,000	14
10	Malang Raya Waste Organization Institutional Development (Road Map)	200,000	14
11	Cirebon Waste Organization Institutional Development	220,000	14
	TOTAL	**53,340,000**	

The activities in Banda Aceh are noted to be financed by MDF (viaUNDP), GOI and the Province of NAD. These are scheduled to be finalised by June 2012. Given the continued involvement of UNDP since 2005, additional inputs are considered less opportune at the moment.

The most pressing need is in Makassar, where construction of the Regional TPA is intended to start, but no Waste Management Organisation is established yet. For the proper functioning of this regional TPA, development of the organisation and the Site Operation Plan is a must.

CHAPTER 4: CONCLUSIONS

Upon evaluation and approval of this list by IndII, the Consultant recommends initiating detailed discussions with the Ministry of Planning, and related subject ministries to confirm the priority and the initial design of these projects. This would also require additional meetings with the regional and local beneficiaries and with the international donor community to streamline the above project ideas fully with their projects and programs.

Finally it will be required to prepare detailed Sub-Project Preparation Documents, loan or grant agreements, and the preparation of detailed Terms of References for each of the priority projects. The Project Digests, as presented in Annex 3 are a starting point for this detailing. Annex 3 also provides an initial timetable for the identified and prioritised sub-projects. The Consultants for the current identification assignment would be more then willing to assist IndII with these follow-up activities.

Jakarta, 14 March 2011

Jeroen Kool, Project Manager, Jeroen.kool@dhv.com

Bob Sinarko, Senior Advisor, bob.sinarko@dhv.com

ANNEXES

ANNEXE 1: BASELINE INFORMATION

- Greater Bandung Solid Waste Management Project, 2003 – 2005
- Bali Denpasar IDEP Small Scale Waste Management 2009
- SOLID WASTE MANAGEMENT, MASTER PLAN – REPORT, POST-TSUNAMI BANDA ACEH REPUBLIC OF INDONESIA, JUNE 2007
- Article - Tangerang Sanitary Landfill, Sept 2010
- Jabotabek SWM 2005
- Makassar Landfill Gas project, 2007
- UJANG SOLIHIN SIDIK , comments of Waste Law 2007
- ISSDP, Solid Waste Management 2007 (Andrik Mols)
- Composting Unit Yogyakarta, 2005
- Sanitation Country Profile, 2004
- UNEP SWM Guideline 2005
- World Bank SWM Guideline

National Mid-Term Development Plan 2010 – 2014

Directorate of Housing and Settlement, BAPPENAS

National priorities are:

1. Bureaucracy and Organisational reforms
2. Education
3. Health
4. Poverty Management
5. Food Security
6. Infrastructure
7. Investment and business atmosphere
8. Energy
9. Environment and disaster management
10. Underdevelopment, Frontier and post-conflict areas
11. culture, creativity and technology innovations

Priority Development Sectors:

1. Socio-cultural and religion
2. Economy
3. Science and Technology
4. Means and Infrastructure
5. Politics
6. Defense and Security
7. Law and State Apparatus
8. Regional and spatial planning
9. Natural Resources and Environment

Housing and Settlement priorities relate to no 3: Health, and No. 6 Infrastructure

Health:

- Increasing drinking water services
- Increasing basic sanitation, covering 75 percent of the population by 2014

- Decreasing slump areas
- Increase life expectancy
- Reaching Millennium Development Goals in 2015

Infrastructure:

- Housing for people: increase of 685.000 low-cost houses

Solid Waste Management

Specific development issues related to Solid Waste Management are:

- Inadequate regulation instruments to support SWM. The current Waste Law 2008 does not provide adequate directions
- Current SWM does not focus on reduction of waste generation
- The 3R approach (Reduce, Reuse, Recycle) has not yet been applied in practice
- Small amounts are collected and transported to landfills
- Landfills are not will managed due to complicated situations among management institutions
- Many dumpsites and landfills are not sanitary
- Land availability for landfills is scarce
- Waste management organisations are not working professionally, without asset management, and without business plans
- Human capabilities are low
- Limited financial means
- SW planning is limited: most cities do not have SWM plans (City Sanitation Strategies), resulting in lack of synergy between government and community
- SWM only relies on limited public funds. No private partnerships or private investment exists

SWM Strategy and Policy Directions

Active participation of private sector is promoted through public-private partnerships, in particular for the:

- Reduction of waste generation through reduction, reuse and recycling, and stimulating environmental friendly technologies

- Professionalisation of SWM through business marketing to private sector
- Strengthening SWM institutions to improve level of services
- Provision of legal assurance between public sector, operators and private sector
- Strengthening coordination among local governments to enhance regional SWM approaches
- Development of a tariff system / tipping fee to enable cost recovery
- Stimulating bundling / integration of SWM services (collection, transport, transfer, disposal) specifically for commercial areas
- Stimulating un-bundling (phasing) of SWM services to facilitate private sector participation

Action Plan of Sector Priority

Development of Funding sources and investment schemes, management of SWM infrastructure development:

1. Technical Assistance (Bantek); Technical Guidance (Bintek), and development of City Sanitation Strategies: Target 2014: 150 Bantek, Bintek and CSS on SWM(~250 Billion IDR)
2. Education and Training (Diklat): Target 2014: 15 diklat packages (~35 Billion IDR)
3. Monitoring and Evaluation (monev): Target 2014: 150 monev activities on SWM (~20 Billion IDR)
4. Final disposal sites (TPA) improvement in 210 districts (kapubaten) or cities (Kota) buy 2014
5. 250 new solid waste collection facilities (units) in 2014
6. 250 locations applying integrated solid waste management (ISWM) and 3R in 2014 (4+5+6: 5500 Billion IDR)

Infrastructure Investment Improvement through PPP:

1. Integrated urban SWM in Bandung and surrounding area; in Bogor and in Depok city: target 2014: 2 plants through PU (1200 Billion IDR)
2. Development of Norms, Standards, Regulations and Criteria (NSDK): totally 30 for SWM in 2014 (35 Billion IDR)
3. Development of funding sources and investment schemes for private sector involvement: 15 facilities by 2014 (15 Billion IDR)
4. Post-disaster and social conflict locations: 31 SWM and drainage packages (~150 Billion IDR)

Minutes of Meeting

Ministry of Public Works / PU

Kati Andraini,

Solid Waste Management

Date of meeting: 20 December 2010

Status Regional Landfills in Indonesia December 2010

Kota/Kabupaten	Name/location Landfill	Design	Construction	Organisation
SUMATRA				
Nanggroe Aceh Darussalam (NAD)	Blang Bintang	Yes, UNDP	Planned to start 2011, UNDP / PU	No
Medan	Deli Serdang Municipality	No	No	No
Palembang	Not yet identified	No	No	No
Bandar Lampung	Not yet	No	No	No
Padang	Not yet	No	No	No
JAVA				
JABOTABEK	Bogor, Nambo (100 ha)	Yes	Started / land permit to be obtained	No
Cirebon	Kopi Luhur, land not yet secured	No	No	No
Semarang	Not yet	No	No	No
Bandung	Legok Nangka , to cover eastern part of Bandung	Yes / WB	No	Drafted, not yet implemented
Tegal	Not yet	No	No	No
Surakarta (Solo)	Not yet	No	No	No
Yogyakarta	Yogyakarta	Yes / ADB	No	No

Kota/Kabupaten	Name/location Landfill	Design	Construction	Organisation
Surabaya	Maybe at Gresik municipality	No	No	No
Malang	Malang	No	No	No
KALIMANTAN				
Banjarmasin	Banjar Baru / Kabupaten Banjar	No	No	No
BALI				
Denpasar / Badung	Suwung	No	No	No
SULAWESI				
Makassar	Makassar	Yes	Started / JICA, IndII	No

Priorities in terms of institutional support

- Full cost recovery for SWM operations is difficult, not feasible at this moment
- Tariff systems need to be developed for all operations. Currently lack of monitoring enforcement and lack of willingness to pay due to low level of services,
- Provincial Government is allowed to co-finance operations
- Central Government is only allowed to co-finance construction works

Suggested IndII projects:

1. Regional SWM plans for cities / regional landfills
2. National tariff master plan
3. Institutional support to regional landfills

Minutes of Meeting

BAPPENAS (Ministry of Planning)

Nugroho Tri Utomo, Director Housing and Settlements, BAPENNAS

Aldy K Mardikanto, junior staff, Directorate of Housing and Settlements

Nur Aisyah Nasution, junior staff, Directorate of Housing and Settlements

Date of meeting: 20 December 2010

- Bappenas is responsible for settlement planning, policy formulation and Action Planning
- Bappenas also stimulated CDM
- PU is responsible for construction works
- MoE is responsible for RRR and health aspects
- MoE prepared Waste Law 2007, but did not consider PU considerations enough during preparation
- Donors on SWM are organised in the Sanitation Donor Group (WW + SW), chaired by USAID
- JICA works on upgrading of dumpsites
- KfW works in emission reduction for 5 cities

Current Status SWM

- Currently, 20 percent of all waste is collected and ends up on a dump site (40% in urban areas)
- The remaining 80 percent is either burned, buried, or dumped in rivers of open spaces
- Target is: 80 percent waste collection in urban areas by 2014
- Collected waste on dump sites is also often burned to safe storage capacity

Mid-Term SWM Review / City Sanitation Strategies

Bappenas is also responsible for Mid-Term SWM Review, will be completed early 2011

- Twenty four Kapubaten have completed City Sanitation Strategies (SW + sewerage), 12 through SSDIP; 12 through USAID)
- Forty one City Sanitation Strategies are ongoing
- Sixty three new CSS are scheduled for 2011
- Three hundred and sixty six Kapubaten need to have completed a CSS by 2014
- SSDIP will become standard approach for development of a CSS
- Bappenas assists cities through establishing working groups. Cities (mayors) themselves are responsible for CSS
- Based on CSS, detailed Investment/financing plans are required for each city
- Cost of preparing a CSS is about 750 M Rupiah for consultants, plus 4500 M Rupiah for city itself

Accelerated Development Program for SWM

- Objective for 2013 is 80 percent service coverage for urban areas, and 100 percent disposal of collected waste on sanitary landfills
- Currently there are 376 dump sites in Indonesia; 20 sanitary landfills have been planned; 10 are under construction and 4 sanitary landfills are operational
- A Public Company, responsible for SW operations is allowed to receive budget from Central Government (for construction only)
- One idea to prevent littering and burning of waste: paying people who bring waste to dedicated landfill

Solid Waste Road Map

Bappenas prepares a Solid Waste Road Map, including investment scenarios on spatial level, and including RRR objectives (Reduce, Reuse and Recycling)

Minutes of Meeting

KfW - Germany

Björn Thies

21 December 2011

KfW finances between 25 and 60 M€ . This will be provided as soft loan in the field of emission reduction and solid waste management for five cities (down from original 11). Objective: to contribute to the implementation of the Indonesian climate change strategy in selected cities:

- Infrastructure investments with impact on climate change mitigation in cities with focus on solid waste management (upgrade of SWM-system, recycling and composting, methane gas capture, waste to energy and certified emission reduction / CDM, environmental improvements).
- Accompanying training measures: support to local government institutions

Status

- Eleven cities proposed by PU. 1st phase FS identified 5 potential cities (Jambi, Malang, Surakarta, Jomblang and Sidoarjo).
- Detailed FS on all aspects of SWM including CDM will be carried out in these cities and 2 cities (Semarang and Pekalongan) will be supported with a site selection study.
- This Feasibility Study on investment alternatives is underway, and is scheduled to be completed in March 2011. IndII will also be invited for the related workshop.
- Second phase feasibility study will start afterwards.

Issues to be resolved yet:

- Organisational set-up
- Improving collection rates
- Enforcement/public information

- NGO – involvement

Further Information:

KfW Jakarta
Ester Hutabarat
Email: Ester.Hutabarat@kfw.de

KfW Frankfurt
Julia Crause
Email: Julia.Crause@kfw.de

Minutes of Meeting

GtZ - Germany

Dieter Gomez

22 December 2011 (telephone meeting)

- GtZ focuses on technical assistance / capacity development on emission reduction / climate change in Central and West Java, including solid waste
- Currently a feasibility study is performed focusing on 8 cities on how to reduce green house gas reduction and climate change actions
- SWM has been highly neglected so far. It is believed by GtZ that substantial amounts of climate savings can be made by optimising SWM, including waste separation, dump coverage, sanitary landfilling, composting or digestion treatment techniques and landfill gas collection
- The Feasibility study will lead to proposed pilot projects on waste management, capacity development and more.
- Implementation in foreseen in 2011

Minutes of Meeting

Regional SWM Office – Jawa Barat

Date : Monday 03 January 2011

Dedi Setyo Gunadi - Head of BPSR

Budi Agriawan - staff BPSR

Sudartoyo - staff BPSR

Arif Permana - staff BPSR

J. Sinarko Wibowo - Consultant DHV / MLD

This MoM records the meeting between Balai Pengelolaan Sampah Regional (BPSR) - Jawa Barat (Regional Solid Waste Management Office – Jawa Barat) with JSi on Monday 3rd Jan 2011 in BPSR office in Bandung.

AGENDA

1. Inform objectives of the study
2. Collect information on program and progress of regional TPA in Jawa Barat to date
3. Discuss possibilities and priorities of program to be supported by IndII

DISCUSSION

The meeting started at 13.15 hrs.

1. BPSR has been established since one (1) year ago as a formal body (legalised by local regulation) to deal with regional solid waste issues in Jawa Barat province. It is under the province of Jawa Barat.
2. The province will only involve in the end part of the system, i.e. the final disposal site.
3. There are several ongoing processes for developing regional TPA in Jawa Barat province:
   a. Metropolitan Bandung area, consists of Kota Bandung, Kabupaten Bandung, Kabupaten Bandung Barat, Kota Cimahi, Kabupaten Sumedang and Kabupaten Garut.
   b. Bogor area consists of Kota Bogor, Kabupaten Bogor and Kota Depok.

c. Cirebon area consists of Kota Cirebon, Kabupaten Cirebon, Kabupaten Indramayu, Kabupaten Majalengka and Kabupaten Kuningan.

d. Sukabumi area consists of Kota Sukabumi and Kabupaten Sukabumi.

e. Subang area consists of Kabupaten Purwakarta, Kabupaten Subang and Kabupaten Karawang.

f. Tasikmalaya area consists of Kota Tasikmalaya, Kabupaten Tasikmalaya, Kabupaten Ciamis and Kabupaten Banjar.

4. It has just been decided by the Ministry of PU that JICA will support Metropolitan Bandung area and Bogor area.

5. Issues in Metropolitan Bandung area:

   a. Support from JICA is for the DED of the final disposal site located in Legok Nangka, eastern part of Metropolitan Bandung. The study is expected to be ready by July 2011.

   b. Land acquisition of this area is ongoing; however the existing issue is about archeological site located at or near the proposed final disposal.

   c. It is still unclear whether transfer station will be part of the DED. BPSR will make sure that this issue will be part of the study covered by JICA.

   d. The Consultant has informed that design of transfer station (location and size) shall consider the associated costs (per m^3 or per ton of waste delivered) to be borne by the local government, not limited to technical design only. Several options are required and agreement as well commitment from the local governments for the location of transfer station including its associated costs is important.

   e. Option (of locations) which has been developed by GBWMC-CS in 2004-2005 will most likely be used.

   f. In the beginning the city and Kabupaten agreed to deliver certain amount of waste to regional TPA which will be the basis for DED. However the fix amount seems will be around 50 – 60 %.

6. Issues in Bogor area:

   a. Further study will be financed by JICA, as just has been decided by Ministry of PU

   b. Part of the landfill site is owned by Kabupaten Bogor. The rest still under PERHUTANI (a government owned forestry company) and does not have the agreement yet to be converted as disposal site.

7. Issues in Cirebon area:

   a. The province is going to tender TA for the preparation of Solid Waste Master Plan for regional waste management in Cirebon area.

   b. One of the outputs of the study is indicative locations of regional landfill site.

c. The Consultant has informed that though the executive heads have shown interest for having a regional landfill site and to develop cooperation between local governments, it does not assure that they will agree for the budget to be allocated to cover transportation cost and tipping fee (to transfer station).

d. For that reason it is expected another study is required, as a follow-up to the Master Plan, to calculate expected costs to be allocated by local governments. This has to be well informed to local decision makers and agreed upon before further actions are taken (such as land acquisition, etc).

e. As the successfulness of a regional system is very much dependent on local collection, BPSR expects there will be an integrated study which covers the whole system from waste production till final disposal at regional TPA.

f. For point e) above, the Consultant suggested to apply "capacity building approach scheme" instead of "consultant driven approach scheme", imitating the approach which has been developed by ISSDP. Combination of approaches seems also appropriate if time limitation is to be considered. This approach assures ownership.

g. BPSR suggests the Cirebon area as candidate for further support from IndII.

8. The progress for the rest (Sukabumi area, Subang area and Tasikmalaya area) is still too premature for further support from IndII.

9. It seems the general understanding of most executives and legislatives on solid waste issues is limited. Some have the idea that solid waste is a profitable business, others put attention more on the landfill instead of looking at the overall system. This is the concern of the head of BPSR and for that reason he has the opinion about the need for good advocacy. The issues are, among others: a) solid waste a system; b) financial aspect of solid waste issue.

The meeting was closed at 15.30 hrs.

Minutes of Meeting

Regional SWM Office – Jawa Barat

Date : 06 January 2011

Melda Mardalina - Staff Ministry of Environment (KLH) dealing with solid waste

Johny P. Kusumo - Assistant to Deputy at KLH dealing with data & information

J. Sinarko Wibowo - Consultant, DHV, MLD

This MoM records the meeting between KLH staff with JSi on Monday 6 January 2011 in KLH office.

AGENDA

1. Inform objectives of the study
2. Collect information on program of KLH
3. Discuss possibilities and priorities of program to be supported by IndII

DISCUSSION

The meeting started at 10.30 hrs.

Discussion w/ Ms. Melda Mardalina

1. The main attention of KLH at the moment is “waste reduction”, followed by “waste process” and “recycle”.
2. Two Government Regulations, as a follow-up of the Solid Waste Law, is expected to be ready by end of February 2011.
3. The Government Regulations will be followed by Presidential Decree, and Ministry Decree, and then Technical Implementation Document.
4. Initiatives in solid waste are part of emission reduction target. In 2014, the target is 26% reduction in emission in which 6% from solid waste.
5. KLH deals with policy. “Hard ware” is with Ministry of Public Works. Training can also be part of programs under KLH.
6. All activities in KLH are under coordination of Planning Bureau of KLH which will distribute programs/projects from outside to its related section in KLH.
7. Suggestion from her side: if IndII would like to join in developing programs, take the end side of the solid waste system, i.e. waste treatment. Intervention at the

upstream (e.g. at source composting) is not necessary because there are a lot of players already.

Discussion w/ Mr. Johny P. Kusumo

1. There is a request from KLH to Local Governments (LGs)to submit annual data on solid waste, but it is voluntarily.
2. Very little LGs have so far supply solid waste data and information to KLH.
3. In respect of IndII possible involvement, option discussed is as follows:
   a. The idea is to develop good national data on solid waste throughout the country
   b. LGs which have shared their data will receive rewards, or eligible to receive grants.
   c. The eligibility can be based on number of years data submitted and quality of data.
   d. Rewards could be in the form of training, or comparative study which is possible under KLH.
4. The scheme is similar for the existing Infrastructure Enhancement Grant from IndII. It is called OBA (output based aid).
5. Further discussion is required to develop this idea.

The meeting was closed at 13.30 hrs.

Minutes of Meeting with IndII

- Jim Coucouvinis, Technical Director Water & Sanitation
- David Ray, Facility Director
- Dedi Budianto, Water and Sanitation Specialist
- Bob Sinarko, Consultant MLD DHV
- Arifien CBS, Legal and institutional Consultant
- Jeroen Kool, Consultant DHV

Date: 21 January 2011

The purpose of this meeting was to get feedback from the client on the directions of the anticipated project results, based on the findings so far by the Consultant.

The Client explained that it is interested mainly in sanitary landfill disposal components, and not in receiving proposals related to collection, transportation or transfer of waste. It would like to co-operate on the level of national or provincial level, preferably not on municipal levels.

It should like to receive an institutional review of the SWM sector, including roles of central and regional governments, and identification of bottlenecks.

It would specifically like to be advised on the status of the development of regional sanitary landfills in terms of: (1) technical status of preparation; (2) status of regional SWM organisation for operation of landfill; (3) donor and financial commitments; (4) stakeholders and organisations involved; (5) problems to be resolved for further implementation; (6) opportunities for IndII to step in.

The type of IndII involvements might relate to Grants, TA, or institutional strengthening, for instance:

1. Financial grant support to landfill construction, like financing a specific landfill cell
2. Projects focused on RRR at landfills: reuse and recycling, like composting, energy generation, CDM projects and recycling of valuables
3. Institutional support to Regional Waste Companies / organisations
4. National study of SWM tariffs, taxing and financing
5. National SWM information projects, like distribution of DVD's for schools etc.

The IndII project shall have preferably duration of about 3.5 years. The total packages may by about 20 M AUSD including 3 or 4 larger projects and some additional minor projects.

The Consultant is expected to provide ranking criteria for projects, such as:

- SWM related stress of project area
- Commitment of government and stakeholders towards the project
- Available co-financing from other donors
- Completed or advanced site selection

The projects are to be presented in a matrix, including: technical description, institutional setting, planning and duration, investment costs; IndII contribution; and above criteria

ANNEXE 2: Relevant Reports and Documents

2008 Indonesian Domestic Solid Waste Statistics

In 2008, the Department of Environmental Pollution Control of the Ministry of Environment conducted a waste questionnaire survey among 465 kota and kapubaten in 33 provinces in Indonesia covering the operational year 2006. A total of 154, or 33% of the kota and kapubaten participated in the questionnaire (50% on Java). The participating municipalities represent about 40% of the total Indonesian population of 232 million. The following conclusions were made based on extrapolation of these data.

The total number of staff employed in the domestic waste management sector in Indonesia is about 73,500 staff (31,900 on Java), of which 40% is employed as street sweepers, 16% as hand-cart operators, 28% as trick drivers, 4% of landfill operators, 7% as administration officers and 5% others.

It is estimated that a total of 38.5 million tons of waste is generated annually by the 232 million inhabitants in Indonesia (450 gram per person per day), of which 21.2 million tons on Java. The 26 biggest cities in Indonesia inhabit totally 40.1 million people, generating in total an estimated 14.1 million tons per year (about 1 kg per person per day).

The municipal waste is composed of 58% of mainly organic waste, 14% plastics, 9% paper, 2 % glass, 2% rubber and leather, 2% metals and 13% of other waste types.

An estimated 56% of the population, 130.4 million people, receives municipal waste collection services. On Java 59% of the population is served (80.8 million in total). The highest service levels are found in the Sumapapua region (68%, or 14.2 million people being served). The following table provides an overview.

National Waste Generation and Service Data (2006)

Region	Population Million	Total Waste Generation Mtons/yr	Waste Gen per person kg/day	Population being served Million	Actual waste Collection Mtons/yr	Non collected Waste Gen Mtons/yr
Sumatera	49,3	8,7	0,48	23,4	4,13	4,57
Jawa	137,2	21,2	0,42	80,8	12,49	8,71

Region	Population Million	Total Waste Generation Mtons/yr	Waste Gen per person kg/day	Population being served Million	Actual waste Collection Mtons/yr	Non collected Waste Gen Mtons/yr
Balinusra	12,6	1,3	0,28	6	0,62	0,68
Kalimantan	12,9	2,3	0,49	6	1,07	1,23
Sumapapua	20,8	5	0,66	14,2	3,41	1,59
Total	232,8	38,5	0,45	130,4	21,72	16,78

Collection

Totally 16.7 Million tons of waste is not collected by the municipal services. It is estimated this non-collected waste is partly transported to a dump site by the communities themselves (11.8 Mtons / year), buried underground (1.6 Mtons per year), composted by the communities (1.2 Mtons / year), burnt in open air (800,000 tons per year), or thrown into the rivers (500,000 tons per year).

Transfer

Waste is collected by the municipalities (totally 21.7 million tons per year) mainly by small hand cards, and brought to small transfer sites, or temporary storage sites (TPS). It is estimated that a total of 59.000 of these transfer sites are present throughout Indonesia (23.300 in Sumatera and 11.800 on Java), consisting of an open dump area, sometimes including 6 m3 storage containers, and sometimes foreseen by roof and pavement facilities.

Transportation

In most cases waste is collected from these small transfer sites to large dump sites and landfills in the area by waste transportation trucks. It is estimated that totally 7700 waste transportation vehicles are functioning and operating in Indonesia (3600 on Java). Practically all waste vehicles are owned by the municipalities (97%), with 3% rented from private companies. Most trucks applied in Indonesia are Dump Trucks (51%) with or without hydraulic systems. Also Armroll trucks are applied (29%), capable of loading and transporting 6, 8 or 10 m3 containers. Finally 2.5% of the waste vehicle park consists of Compactor trucks operating in Indonesia with 6, 8, or 10 m3 capacities.

Disposal

The collected waste is transported to one of the estimated 537 central dumpsites in Indonesia. Most municipalities operate their own municipal dump site within the city boundaries. It is estimated that 12% of the municipalities use a central dump site outside their own city area. Most dumpsites lack protection in terms of lining, soil or groundwater protection, causing direct negative impact on nearby water resources and the environment. About 40% of the dumpsite has some kind of leachate monitoring, collection and treatment system, mainly through simple sand filtration technologies.

The land of the dumpsites is in most cases owned by the government (93%) and connected to an access road which is asphalted (79%) or at least compacted (16%).

About 123 dumpsites have reached their maximum storage capacity and need to be closed and replaced urgently. About 200 dumpsites still have a life span until 2015, about 160 dumpsites have a life span until 2020, and the remaining dumpsites can stay in operation until 2021 or longer.

Various dump site operators register the volumes of waste entering the dump sites. About 13.8 million tons of waste per has been recording as being received. This is about 64% of all waste collected by the municipalities.

These central dump sites are favorite spots for scavengers, who come and pick waste valuables from here. It is estimated that totally 50,000 scavengers consistently operate from these dumpsites throughout Indonesia. Numerous other waste pickers operate in the waste collection circuit and from one of the 59,000 small waste transfer sites.

Separate from disposal of waste on dumpsites, a limited number of municipalities operate modest composting or incineration facilities in Indonesia. It is estimated that around 242 municipal composting facilities are in operation, processing less than 1% of the total waste volume, and 64 small incinerators, processing together less than 10,000 tons per year. These figures do not take into account home operated composting activities by individuals for private use.

Reuse and Recycling

Unofficially a substantial part of the waste valuables, possibly up to 10% of the total waste flow, is withdrawn from the municipal waste streams and recycled by scavengers from the households, at the waste transfer sites (TPS) or dump sites (TPA). Officially a limited number of municipalities have adopted the formal RRR policies of the national government (Reduce, Reuse and Recycle). It is estimated the municipalities recycle about 2.26% of the waste streams from the source, 2% from the TPS's and 1.6% from the TPA's.

SWM Costs and Retribution

It was estimated that for 2006 the total expenditures of waste management in Indonesia were 2,342 Billion IDR, or around 10,000 IDR (about 1 €) per person per year. This is extremely low from an international perspective. No figures are available concerning the total retribution from waste generators, although in terms of percentages 50% of waste fees are collected directly, 27% in combination with the water bill and 23% in combination with the electricity bill.

Private sector involvement is limited in the waste sector: 7% of the transportation services are privatised, 9% of the waste treatment services, 4% of the waste disposal activities and 5% others.

Greater Bandung Waste Management Corporation Project (2005)

The Greater Bandung Waste Management Corporation (GBWMC) project (2004, 2005) was a technical assistance package under the Western Java Environmental Management Program (WJEMP). The overall objective of the technical assistance is to support the improvement and integration of solid waste management in Greater Bandung area through the establishment of Waste Management Organisation (WMO) owned by Participating Local Governments (PLGs). This WMO, for the time being is called Greater Bandung Waste Management Corporation (GBWMC), will contribute to the realisation of three components under WJEMP, i.e. a) Overall Urban Environmental Management/OUEM; b) Solid Waste Management (SWM); and c) Community and Private Sector Participation.

The GBWMC will consist of Kota Bandung, Kota Cimahi, Kabupaten Bandung, Kabupaten Garut, Kabupaten Sumedang and now also Kabupaten Bandung Barat.

PPSP / USDP Waste Management – Treatment Technologies (2010)

This paper provides an overview of alternative water treatment technologies that could be considered for the Indonesian solid waste sector. The main technologies are presented hereafter:

<u>Landfill Gas Recovery and Utilisation</u>

Description: The recovery of methane rich landfill gas, produced by the decomposition of organic materials under anaerobic conditions, and its utilisation for heat or power generation.

Implementation Status: The technology of landfill gas extraction is widely practiced and has become a standard feature for environmental control at medium to large sized sanitary landfills in high-income countries. Utilisation of landfill gas is also a well established technology, with several hundred schemes operating throughout the world.

Accelerated Landfill or "Energy Loaf"

Description: The rate of decomposition and landfill gas/leachate generation within the landfill can be accelerated by making conditions as near to optimum as possible, usually by operating in individual 'cells'. This is generally accomplished by re-circulating the leachate continuously through the deposited waste in the 'cell' so that it remains saturated. It also requires positive venting of the gas which is generated under these anaerobic conditions. The aim is to stabilise the waste in as short a time as possible and utilise the gas.

Implementation Status: Laboratory, research and field-scale trials in many countries (mainly USA and Europe).

Japanese Semi-Aerobic Landfill

Description: The aim of this technology is to stabilise the waste as quickly as possible. This is achieved by maintaining the waste at least partly aerobic, as aerobic decomposition occurs at a much faster rate than anaerobic decomposition. The technique involves introducing air into the leachate circulation system, which is generally constructed above the water table.

Implementation Status: This technique has been used widely in Japan since tile 1985. Similar techniques have been used elsewhere to promote accelerated decomposition of organic matter within a landfill

Landfill Mining

Description: The aim of landfill mining is to utilise technically good sites to their full potential, by excavating the land-filled material once it has stabilised, to create more void space for further landfilling. The excavated material, due to its semi-inert nature, is less sensitive for disposal elsewhere, especially when it has been in place for several years. Where the organic content of the incoming waste is sufficiently high, as it is in Jakarta, and decomposition is nearing completion, the waste can be excavated and screened for use directly as a soil enhancing material.

Implementation Status: Currently receiving considerable interest in the USA as a way of utilising ideally located and well-engineered landfills to the full. It is currently employed on a number of sites in Indonesia.

Aerobic Composting

Description: The decomposition of organic wastes under controlled conditions through the use of micro-organisms. Products include water (mainly as water vapour), carbon dioxide, compost and heat. Composting systems include windrow and static pile methods which can require relatively large land areas, and vertical tower and horizontal drum systems, both of which require less land for the same throughput, although they still need a significant area of land for the maturation of the stabilised compost.

Implementation Status: Windrow/Static Aerated Piles is well established; Drum composting technology is well established but doubtful economically; Vertical tower composting is at a pilot/ demonstration stage.

Vermiculture

Description: This is a variant of composting where the decomposition of organic wastes is aided by the introduction of earthworms.

Implementation Status: Pilot or community scale with localised markets. Research has been undertaken in both the UK and at the Indian Institute of Technology. These facilities do exist in PPSP region and most produce good quality compost, but on a small scale.

Co-composting

Description: The decomposition of MSW with other organic materials, such as forestry and agricultural wastes, and food industry residues. Co-composting with sewage sludge is also possible but has encountered problems (primarily, the "bulking" of the mixture) in the past.

Implementation Status: Co-composting is used on a relatively small scale quite widely. Normally, various types of organic wastes are mixed together to complement each other and aid the composting process. For example, sawdust and other 'bulking' agents are used with waste animal slurries to produce compost in many countries. Trials have been carried out on co-composting sewage sludge and other organic wastes but various problems have been encountered. Co-composting with animal manure, slaughter-house wastes and food processing wastes are practiced in PPSP region.

Materials Recovery Facilities

Description: The recovery of materials from the waste stream for re-use or recycling. This can be carried out at source (i.e. at the household), at the disposal site (as happens in Indonesia) and at appropriates points in between. The ranges of materials that can typically be recovered include metals, paper, card, glass, plastics, textiles and wood.

Implementation Status: There is a wide range of materials-recovery schemes operating world-wide. This technique is widely used in Indonesia. Those most appropriate to low income countries include Private-sector or community-based source-separation and collection initiatives.

Baling

Description: Compresses loose waste into bales of densities between 0.75 - 0.95 tonnes/m^3, although densities up to 2 tons/m^3 are possible. Bales are typically 1.5m long by, 1.0 - 1.4m wide by 0.8 – 1.0m high, weighing around 1.3 tonnes. Hydraulic compression takes the materials beyond their elastic limit so that bales can be self-sustaining. However, bales are normally tied with steel or strong plastic straps. Low-density bales can be encased in plastic film to help retain their integrity. The bales are closely stacked in the landfill, typically using forklift trucks.

Implementation Status: Well established, with bale-fills operating worldwide.

Shredding and Pulverisation

Description: Reduces the size of the waste constituents and makes the resulting material more homogenous and increases its density. Pulverisation is typically based on swing hammers rotating at high speed on a horizontal shaft. Material is continuously pummelled until it will pass through grids or wear bars, which are variously sized, depending on requirements. Shredding tends to be a less aggressive process, whereby material is passed through a series of contra-rotating cutters to effect size reduction. Both pulverisation and shredding can be used prior to landfilling, but where waste is being processed for other purposes, shredding typically takes place after initial pulverisation and screening, when the resulting material is likely to be less abrasive.

Implementation Status: Well established in many processing plants worldwide.

Mass Burn with Energy Recovery (WTE)

Description: Allows unsorted, non-bulky domestic and similar commercial and industrial wastes to be fed directly into the furnace and burnt. The grate of the furnace is normally inclined, which allows the waste to tumble and move down the grate as it combusts. The ash remaining on the grate, known as bottom ash, eventually, tumbles off the end and is quenched in water. The hot gases that are given off by the process can be passed through a boiler system and are then cleaned before release to atmosphere. Modern emission control systems are capable of removing particulates, acidic gases and organic micro-pollutants to meet stringent international emission standards.

Implementation Status: Well established and reliable. Installed worldwide in high income countries. Poor track record in low income countries.

Incineration

Description: The thermal destruction of combustible materials in unsorted, raw municipal solid waste, including commercial waste and selected industrial wastes. This type of incineration is also prevalent as a means of disposing of waste arising within the healthcare industry.

Implementation Status: Basic incineration has been used for more than a century, so the system is well established. The addition of improved feed mechanisms and burning grates, plus gas cleaning systems over the past four decades has improved the technology to the point where it has become the basis of most modern thermal destruction techniques.

Bali Denpasar IDEP Small Scale Waste Management (2009)

The project aims at increasing community awareness about the waste management problems being faced in Bali, and at encouraging community participation in helping to reduce the problem at the community and household level. For this purpose Yayasan IDEP has developed several small-scale waste management pilot programs, including Women's Cooperative Waste Recycling Micro Enterprise Program This innovative program works though the Indonesian Women's Organisation (PKK).

In Denpasar, the provincial capital of Bali, garbage is scattered throughout the city - in the market and on every street corner, smelling and creating an unhealthy urban environment. The Denpasar mayoralty has waged a war against garbage for the past few years in an effort to create a cleaner and more pleasant city. Yet, efforts are proving futile in the absence of an effective waste management system. In neighboring areas like the regencies of Badung and Tabanan, and Gianyar in Ubud, the problem is even worse.

Denpasar alone produces around 1,525 cubic meters of garbage per day, while Badung produces 755 cubic meters. Tabanan receives 360 cubic meters of waste per day, and Gianyar around 910 cubic meters of garbage a day. These areas are all prominent tourist destinations.

The Suwung dump site is located near Sanur beach and therefore cannot be expanded further than its original plan. It is a swampy area covered in mangrove forests, and is vital in preserving the ecosystem and in acting as a natural buffer against the ocean. It is expected that the daily volume of garbage will double to 3,870 cubic meters for Denpasar, 1,080 cubic meters for Badung, 1,360 cubic meters for Gianyar and 660 cubic meters for Tabanan.

To increase community awareness about the enormous waste management problems being faced in Bali, and to encourage community participation in helping to reduce the problem at the community and household level, Yayasan IDEP has developed several small-scale waste management pilot programs: Women's Cooperative Waste Recycling Micro Enterprise Program. This innovative program works though the Indonesian Women's Organisation (PKK). Members of the women's groups sort plastic and paper in their own homes and about once a week bring their waste to a central bin built with donated funds from the local village authorities.

SWM Master Plan for Post-Tsunami Banda Aceh (2007)

The SWM Master Plan has been prepared with support from the Dutch Municipalities of Rotterdam and Apeldoorn. The aim of the Master plan is the establishment of municipal SWM systems which meet the needs of all citizens including the poorer segments of the local society, in particular to promote the health and well-being of the entire urban population, to protect the quality and sustainability of the urban environment, to promote the efficiency and productivity of the urban economy, and to generate employment and income. The Master plan deals with a number of cross-cutting, strategic issues and objectives, notably of a political, social, environmental, institutional, organisational, operational, technical, financial, economic and behavioural nature.

During 2005-2006 a substantial part of these materials, randomly left behind after the withdrawal of the flood wave, and the gradual disappearance of the flooding of the land areas affected, has been taken away and has been deposited in and around the dumpsite at Gampong Jawa, and in other areas considered (temporarily) appropriate for this purpose. Efforts have been made to re-use and recycle parts of the waste materials as best as possible.

In parallel, sanitary and waste collection and removal activities were organised to attend to housing areas in urgent need of these services, and temporary shelter camps and barracks set up to provide a provisional, temporary housing for the homeless people.

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The SWM Master Plan addresses in particular:

- A reduction of the impact of waste materials on public health by focussing on waste-related attitudes and behaviour, and by streamlining, improving and extending the basic services of street and drain cleansing and waste collection.
- A reduction of the impact of waste materials on the urban and natural environment by focussing on waste-related environmental education, and by developing the concept of waste "chain" management, including (waste) materials management, re-use and recycling, and appropriate standards for intermediate storage and final disposal of waste materials.
- A progressively improved waste collection service delivery offered to all waste generators and economic actors of Banda Aceh, based on clear standards and a well-considered financial basis.
- A stepwise development of the informal and formal private sectors involved in waste management activities, aimed to reduce the waste flow and to create new employment.

The Master Plan for Banda Aceh concludes that the following short term actions are required:

Street cleansing:

Current capacities for street cleaning are small. It is suggested that 6 additional pick-up vehicles with the associated personnel are required to adequately upgrade street cleansing, including collection of street litter and sludge from the drainage conduits.

Waste collection:

The existing vehicle fleet of 40 vehicles, including 9 vehicles of UNICEF, is considered adequate to fully cover Banda Aceh with waste collection services. It is furthermore suggested to reorganise and optimise the waste collection logistics to include all urban areas, and put waste bins and 6 m3 containers at strategic locations. It is also advised to introduce a fee collection system to recover the costs for collection and disposal.

Final disposal:

The current dump site at Gampong Jawa is to be expanded to enable waste reception for another 3-5 years. Meanwhile, the planned sanitary landfill at Aceh Besar shall be prepared and constructed. The Master plan advises to construct two waste transfer stations on both sides of the Krueng Aceh River to support the waste transportation logistics.

The Sanitation and Park Department - DKP - is further advised to facilitate the play a facilitating and promotional the RRR principles (Reuse, Recycling and Reduction of waste), including involvements of the informal sector. The current composting pilot in Kuta Raja should be further developed in other sub-districts.

Institutional Strengthening:

The capabilities of DKP are to be strengthened during the next two years, in particular with respect to:

- Planning and programming of the day-to-day operations
- Administration of operational details
- Presentation of DKP in the public domain
- Financial administration linked to operational activities
- Establishment of a communication centre annex held desk
- Exchange of experience with comparable cities in Sumatra
- Establishment of specific personnel policies
- Strengthening co-operation with the Special Police Department, PEPPERDA, to improve enforcement matters

ANNEXE 3: Project Digests

Project Digest (1): National Solid Waste Information Management Project (IndII SWIMP)

Project Digest (2): National Solid Waste Strategy Project (IndII-SWSP)

Project Digest (3): National Solid Waste Advocacy Project

Project Digest (4): Regional Solid Waste master Plan for Malang Raya

Project Digest (5): Preparation of Road Map for Institutional Development of Mamminasata Regional Solid Waste Organisation

Project Digest (6): Preparation of Road Map for Institutional Development of Malang Raya Regional Solid Waste Organisation

Project Digest (7): Preparation of Site Operation Plan for Mamminasata Regional Sanitary Landfill

Project Digest (8): Climate Emission Reduction in Solid Waste Management

Project Digest (9): Financial Grants for Construction of Regional Sanitary Landfill

Proposed Implementation Schedule, IndII – SOLID WASTE SECTOR

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