Partnership in WASTE MANAGEMENT within the Regencies of SARBAGITA (DENPASAR, BADUNG, GIANYAR, TABANAN)

OLEH: BPKS

Government Agency for Renovation within the area of SARBAGITA
Processing Plant for Municipal Solid Waste (MSW), IPST SARBAGITA
Reasons for Establishment of this Partnership:

- Bali is the main tourist destination in Indonesia
- Renovation is something needed, but not always wanted
- At present, the participation from the public in waste handling is very low:
  - The waste volume is continuously increasing
  - The implementation of 3 R (reduce, reuse, recycle) is lower than expected
  - The retribution from Municipal Solid Waste handling is still very low
- Renovation in general has become the responsibility of the government:
  - Waste collection
  - Waste transportation
  - Waste processing
- The capacity of the disposal areas within the Regencies is very limited:
  - Pollution is increasing (smell, leachate, smoke, and increased health risks)
  - Limited finance (bin, container, landfill sites, trucks, heavy equipment)
  - Limitation in technologies used (only open dumping is being practiced)
  - Limitation in expertise (both in quality and quantity)
  - Difficulties in finding land for new waste disposal (rejected by the public)
Program for the Partnership:

- Establish one regional MSW processing plant, which is to high standards within technologic, economic, environmental and social aspects.
- Establish a professional management which shall be able to improve the efficiency of solid waste processing.
- Improve the solid waste handling service to the public, both within quality and in volume.
Rules and Regulations for the establishment of the Agency for Municipal Waste, SARBAGITA

- Government Reg. No. 22/1999, about Local Governance
- Government rules & regulations for the SARBAGITA partnership, of 24 July 2000, about the basis for the partnership between local governments in the establishment and socialization of the regional government’s waste management government agency, SARBAGITA.

- Local Governments Agreement Document (SKB) on the establishment of the agency SARBAGITA, reported the Provincial Government of Bali 16 April 2001 about:
  - Manage the Municipal Waste within the region of SARBAGITA
  - Assist the Local Government Renovation Agencies to execute the rules, regulations and work planning in waste management within the region of SARBAGITA
  - Rules and regulations and the juridical status under which the Agency SARBAGITA is operating.
  - Required capability manning of the Agency per 27.08.2001
The Agency for Municipal Waste, SARBAGITA
(Badan Pengelola Kebersihan Sarbagita)

- Established according to the Agreement Document (SKB) signed by the Regents/Mayor
- An Administrative Agency outside the established Government Structure.
- The Agency is managed by personnel hired on the basis of “fit and proper tests”
- The work executed by the Agency is in accordance with what is dictated in the Local Governments Agreement Document (SKB)
- Operational budget for the Agency Sarbagita is allocated by the partners of the agreement. The budget allocations are made according to a agreed cost sharing program
Work Program for the Agency SARBAGI TA

**SHORT-TERM: SUBSYSTEM, WASTE DISPOSAL & PROCESSING**

- Identify a location which in log term shall be suitable for a Waste Processing Facility at a regional scale
- Establish a cooperation with third party/private industry in building a modern and environmental friendly processing facility for solid municipal waste
- Land rehabilitation of the current open waste disposal areas in the region.

**MID-TERM: SUBSYSTEM, WASTE TRANSPORTATION**

**LONG-TERM: SUBSYSTEM, WASTE SOURCE & WASTE COLLECTION**
Increasing waste volume
### Increase in Solid Municipal Waste – Projected increase in Municipal Solid Waste in Bali the period of 1997-2020 (WB report)

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Source: Survey by Consultant, BUIP PPPSWM, World Bank
Increase in volume Solid Municipal Solid Waste – Projected increase in volume Solid Municipal Waste within the Region of SARBAGITA, during the period of 1997-2020 (WB report)

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<th>Solid Waste Municipal Volume (m3/day)</th>
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<th>1346.5</th>
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<td>4764.7</td>
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</table>

Source: Survey by Consultant, BUIP PPPSWM, World Bank
## Volume of Municipal Solid Waste (m3) delivered to TPA SUWUNG

<table>
<thead>
<tr>
<th>YEAR</th>
<th>DKP DENPASAR</th>
<th>DKP BADUNG</th>
<th>TOTAL</th>
<th>AVG /HARI</th>
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<tr>
<td>2002</td>
<td>672,947</td>
<td>98,719</td>
<td>771,666</td>
<td>2,114.15</td>
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<td>2003</td>
<td>692,352</td>
<td>101,759</td>
<td>794,111</td>
<td>2,175.65</td>
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<td>2004</td>
<td>697,969</td>
<td>108,913</td>
<td>806,882</td>
<td>2,210.64</td>
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<tr>
<td>2005</td>
<td>778,949</td>
<td>104,343</td>
<td>883,292</td>
<td>2,419.98</td>
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<tr>
<td>2006</td>
<td>790,410</td>
<td>93,847</td>
<td>884,257</td>
<td>2,422.62</td>
</tr>
</tbody>
</table>

Source: DKP City of Denpasar
Waste transportation in the Denpasar City

Diagram shows the flow of waste transportation from different sources to the TPA SUWUNG controlled landfill. The sources include:

- Rumah - Rumah
- Rumah - rumah Pemukiman Padat
- Swakelola
- Taman - taman, Tempat Umum, Jalan - jalan
- Pasar
- Swasta

The transportation methods include:

- Gerobak
- TPS
- Container
- Arm Roll Truk DKP
- Truk - truk Kecil (Roda 4 & Roda 6
- BIN 70 ltr/m³
- Truk Sampah DKP
- Truk PD Pasar

The waste is collected and transported to the TPA SUWUNG controlled landfill.
Identify Suitable Location for the IPST
Location for the IPST, utilizing the existing landfill TPA Suwung

The present condition of TPA Suwung:

- Start of operation of the TPA; 1986
- Area allocated for the TPA; 38 ha
- Current waste area; 25 ha, 4m deep
- Technology utilized; Open dumping

Environmental concerns:

- TPA bordering 1.3km of mangroves
- No functioning leachate ponds
- No ventilation piping
- No waste water treatment

New solid waste treatment facility:

- IPST Sarbagita : 7 – 10 ha of land

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CITRA SATELIT LOKASI TPA SUWUNG

Skala 1 : 6.000

Sumber: Peta Ikonos 2002 Bappeda Denpasar
Daily life at the exiting TPA
Criteria for the selection of a Partner in Managing Municipal Solid Waste (Beauty Contest)

Technological Aspects:
1. Both existing waste and new waste delivered is being processed.
2. The waste processing facility is designed according to waste volume and composition.
3. Utilizing limited area of land.

Economical Aspects:
1. Marketing of products that are in demand.
2. The government do not take part in product marketing.

Environmental Aspects:
1. A waste processing facility which protect the environment.
2. Acceptance by the public in the area.
3. Modern industrial work place.

Cooperation Aspects:
1. Investment and operation cost is the responsibility of the Investor.
2. For both parties a Win-Win solution.
OVERVIEW OF THE PARTNERSHIP ACTIVITIES

PT. NOEI
(NAVIGATORGANIC ENERGY INDONESIA)

TECHNOLOGY BEING IMPLEMENTED: GALFAD
INVESTMENT NEEDED (APPROX.): US $3.5 JUTA/ 100 TON WASTE
TYPE OF WASTE TREATED: EXISTING AND NEW WASTE
CARACTERISTIC OF WASTE: UNSORTED WASTE
CAPACITY OF WASTE PROCESSING: 800 TON SOLID WASTE/ DAY
PRODUCT DERIVED FROM PROCESS: ELECTRICITY AND COMPOST

GENERAL OVERVIEW OF THE COOPERATION
LIFETIME OF COOPERATION: 20 TAHUN
SITE AREA - LAND UTILIZED: 10 HA
GALFAD

Derived from:

• GA - Gasification
• LF - Landfill
• AD - Anaerobic Digestion
GALFAD

- Separation of Municipal Solid Waste
- Wet organics to anaerobic digestion
- Dry organics to gasification
- Digested organics to compost
- Biogas and syngas fuel for electricity
IPST SARBAGITA - GALFAD
PUBLIC-PRIVATE PARTNERSHIP IN SOLID WASTE MANAGEMENT
(Average 800 MT/day unsorted waste)

LANDFILL
WASTE RECEPTION

- SANITARY LANDFILL
- LANDFILL OPERATION

WASTE RECEPTION

- GAS CAPTURE - Gas Flaring - Emission Control

STRUCTURED LANDFILL CELLS
(ANAEROBIC DIGESTION)

WASTE RECEPTION

- ORGANIC WASTE 70%
- COMPOSTING - Dry Organics 15%
- LANDFILL CELL - Wet Organics 55%
- LANDFILL - Landscaping
- GAS CAPTURE - Gas Flaring - Emission Control

WASTE SEPARATION

- NON-ORGANIC WASTE 30%
- RECYCLABLES - Plastics - Paper - Metals - Glass
- RECYCLABLES - Market Place
- LANDFILL - Inerts

WASTE (Fuel) PREPARATION
- Shredding
- Drying

THERMAL PROCESS "GASIFICATION"
- Pyrolysis

- LANDFILL - Ash/Coal sand

STEAM TURBINES
Electricity 5.6 MW

GAS ENGINES
Electricity 4.0 MW

PLN GRID 9.6 MW

Heat Recovery

PT. Navigat Organic Energy Indonesia (NOEI)
SITE PLAN
GALFAD waste-to-energy Site Plan
1 Capacity 400 MT/D
Modul GALFAD
Project status
KEY TO SUCCESS in MANAGING MUNICIPAL SOLID WASTE

- The local governments have to be committed to find a sustainable solution to manage Municipal Solid Waste (MSW)
- The local governments have to be committed to adapt to the climate change policies in their local regulations and be dedicated to together solve the waste problem
- There must be an institution which can direct the local governments to work together in a professional manner
- There must be a realistic work program, which when implemented can be monitored and audited
- We have to understand that investing into improving the environment is a long term investment, which shall be of benefit for us all
thank you, terima kasih
## SELECTION PROCESS TO FIND A PARTNER IN WASTE MANAGEMENT

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>24 December 2002</td>
<td>Ad in national newspapers &amp; letter to Embassies, about plan for processing of MSW in Bali</td>
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<td>18 January 2003</td>
<td>13 companies registered interest in investing into a solid waste processing facility in Bali</td>
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<td>5 sd 30 Juni 2003</td>
<td>After establishing a TOR for Public-Private sector coop., 10 companies were still interested</td>
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<td>2 September 2003</td>
<td>During the selection of Company-Investor, 6 companies passed the criteria for participation</td>
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<td>9 s/d 11 December 2003</td>
<td>5 companies presented their bids for the Selection Committee and Public Representatives</td>
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<tr>
<td>31 December 2003</td>
<td>Companies participating: PT Navigat Organics Energy Indonesia (I), PT Kusuma Satyaputra (II), PT Heliawan Elang Perkasa (III), Sunny Services Ltd (IV), PT Jalabhakti Yasbhum (V)</td>
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<td>2 April and 14 May 2004</td>
<td>Signing of the MOU between SARBAGITA and PT. NOEI</td>
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