City Cluster in Waste Management –
Gamping Fruit Market in Sleman Regency, Indonesia –
the Project and the Future –
Appropriate Transfer and Management through Partnership

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INDONESIA

- Population: 222 million
- Capital: Jakarta, 13 million
- Nature: a vast equatorial archipelago of about 17,000 islands extending 5,150 kilometers (3,200 miles) east to west
- Language: Bahasa Indonesia, English, Dutch, Javanese, and other local languages

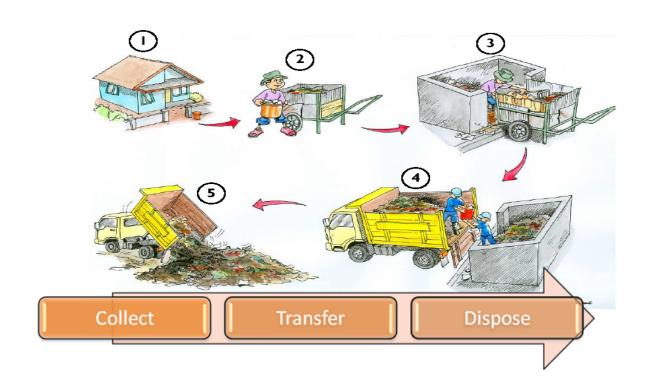




GADJAH MADA UNIVERSITY

- Location: Yogyakarta
- 18 Faculties
- 2 schools:
 - graduate (multidiscipline) school
 - vocation school
- More than 200 study programs
- 25 research centers
- About 55,000 students
- Further info: www.ugm.ac.id

Current practice of (municipal) solid waste management in Indonesia



Consequences

- require wide land
- Problems of pollutions
- Social conflict
- Wasting resources unsustain



Several initiatives in 3R Programs

- Community based waste management
 - Sorting at the source (household)
 - Waste bank
 - Waste processing (compost, fuel from waste plastics)
- Private based waste management
 - Organic fertilizer
 - Energy



Demo Plant – Biogas from fruit Waste

Location: "Gemah Ripah" Fruit Market, Yogyakarta

| Waste | Mass (kg/day) | % | | | |
|-------------|------------------|-------|---------------|-----|-------|
| Fruit Waste | 8,013 | 80.13 | | | |
| Rice Straw | 652 | 6.52 | Type of Fruit | | % |
| Leaves | 325 | 3.25 | Orange | | 64.67 |
| Wood | 10 | 0.10 | Mango | | 24.72 |
| Fabrics | 735 | 7.35 | Apple | | 5.03 |
| Plastics | 265 | 2.65 | Pineapple | | 1.99 |
| Total | 10,000 | 100 | Watermelon | | 1.22 |
| | | | Oth | ers | 2.37 |



Demo Plant – Biogas from fruit Waste

- 4 tons / day of rotten fruits
- Waste → Biogas → Electricity
- Potency of gas: 333 Nm³ with 54% CH₄
- Potency of electricity: 548 kWh /day
- Launched February 11, 2011

Before and After the Demo Plant





Partnership

- National
 - University: UGM
 - Local Government: Sleman
 - Private: Koperasi Gemah Ripah (Fruit Market Cooperation)

- International
 - University: University of Boras, Sweden
 - Local Government: Boras Municipality
 - Private: Boras Energy & Environment

UGM

- Reseach
- Education
- Design

ROLES AND RESPONSIBILITY OF STAKEHOLDERS

Sleman

- Legal Aspects
- Bridge to Central Gov and comm

Gemah Ripah Fruit Market

- Provide Location
- Operation and maintenance

University of Boras

- Research collaboration
- Exchange students

Boras Municipality

- Share exp on waste mang
- Share exp on policies and regulation developments

Boras Energy & Environment

 Share experience on technical aspects

Integration of 3 pillars (Education, Research & Community Services)

Research

Potency of biogas from different types of fruits

design of biogas plant

utilization of side products

standard operating procedure

Problems found in the operation of biogas plant are further investigated



Products of research are brought to class for study case

Community Service

building the biogas plant

work with government and others for optimizing the plant

Education

research as part of master thesis

dissemination of results and concepts to other stakeholders

Improvement on the subject → improvement on the quality of community service

The Roadmap



Focus research



Challenges

- Sustainability
 - Operational
 - Feedstock
 - Process
 - Product quality
 - Financial
 - Economic capacity
 - Spirit
 - One strong vision
 - Active engagement of all stakeholders (according to respective responsibility)

City Cluster Project

toward zero waste society in Sleman

• Area: 574.82 km²

• urban: 84.25 km²

• rural : 490,57 km²

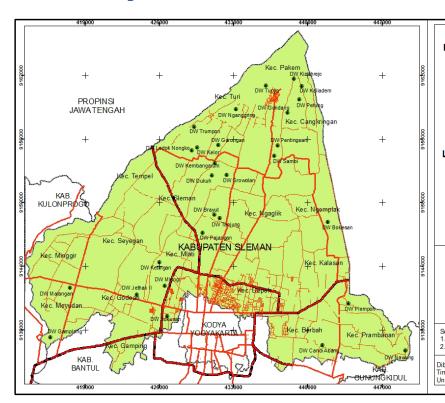
• Population : 1.1 million

Waste generation: 3000m3/day

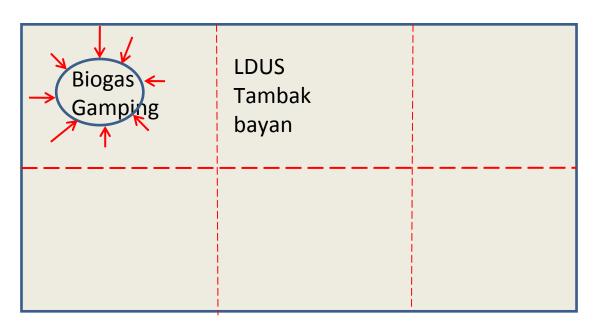
• organic : 62%

• Inorganic: 38%

Have no landfill facility



The Concept



- Sleman is divided into several imaginary clusters
- Each cluster has one appropriate waste management system for zero waste concept
- Eg. Area surrounding Gamping Market is centralized in the Market with "waste to biogas"

The implementation

- Integrate with Gamping Biogas plant
- UGM community outreach program
 - Sorting waste at household level
 - Waste characterization potency for biogas?
 - Other utilization and other conversion process for other waste fractions
- Recycling station waste bank

Community Outreach Program



Thank you

