



Biogas Potential in Thailand

Renewable Energy Biogas/Biomass
Made in Germany
Conrad Hotel, Bangkok
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- Industrial wastewater
 - Tapioca/Palm Oil/Ethanol
 - Food canning and process
 - Frozen Seafood








- Agriculture wastewater
 - Pig/Chicken/Duck/Cow



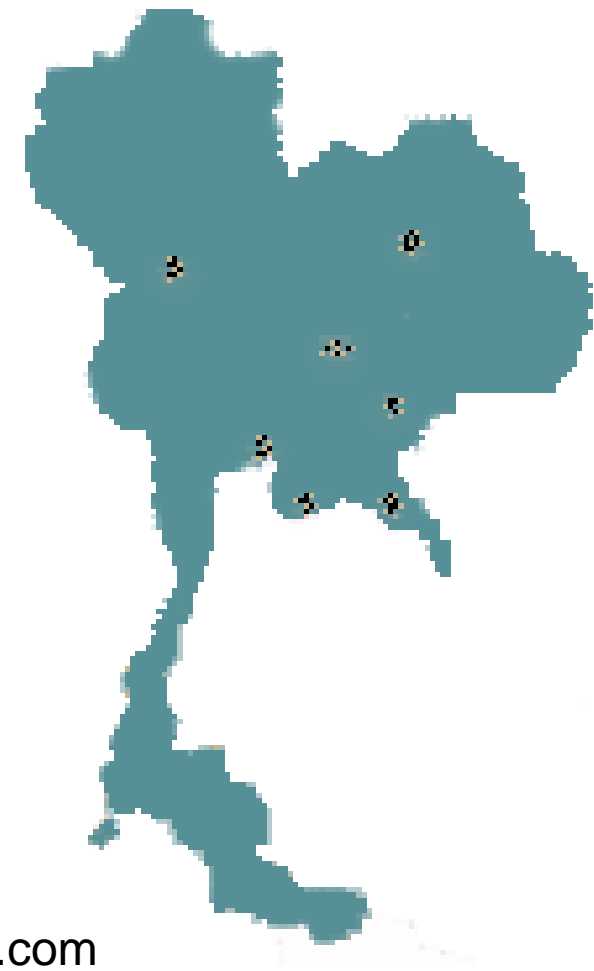
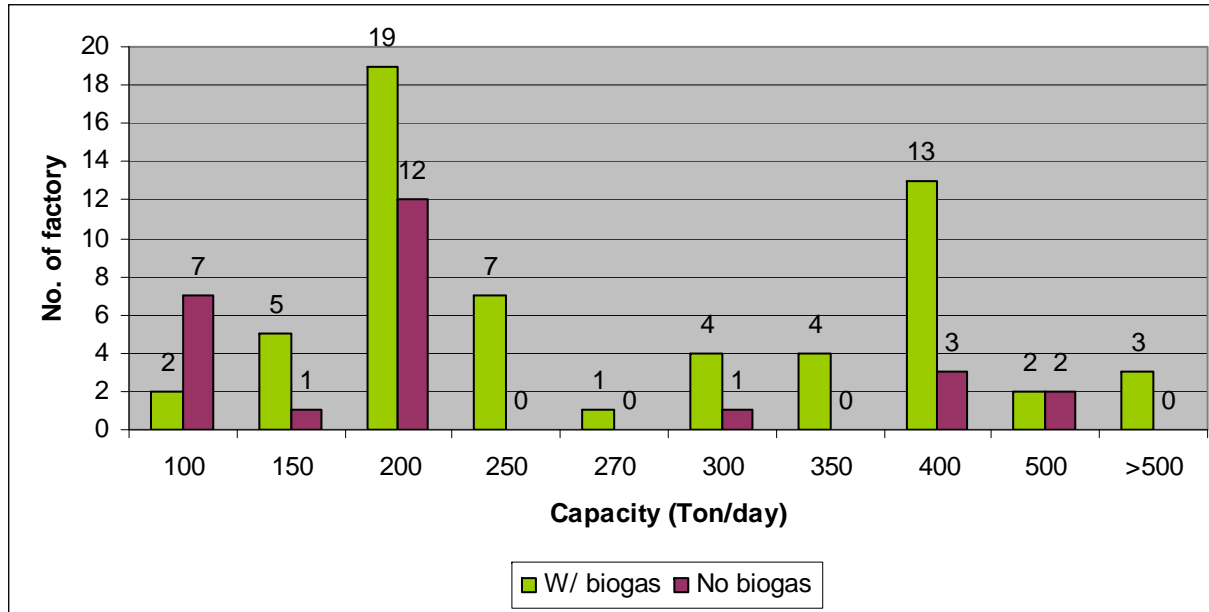
- Municipal Solid Waste (MSW)



Data: 2008

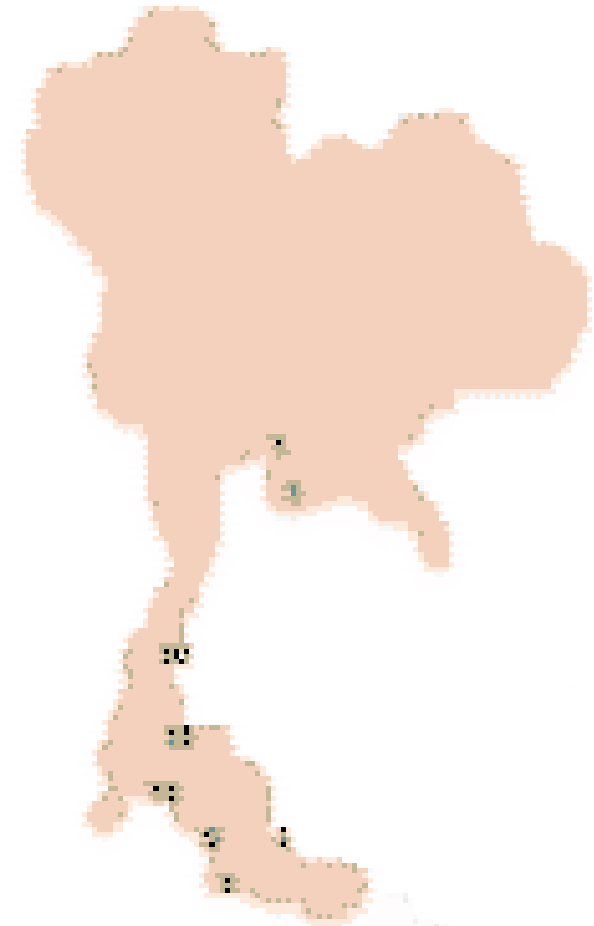
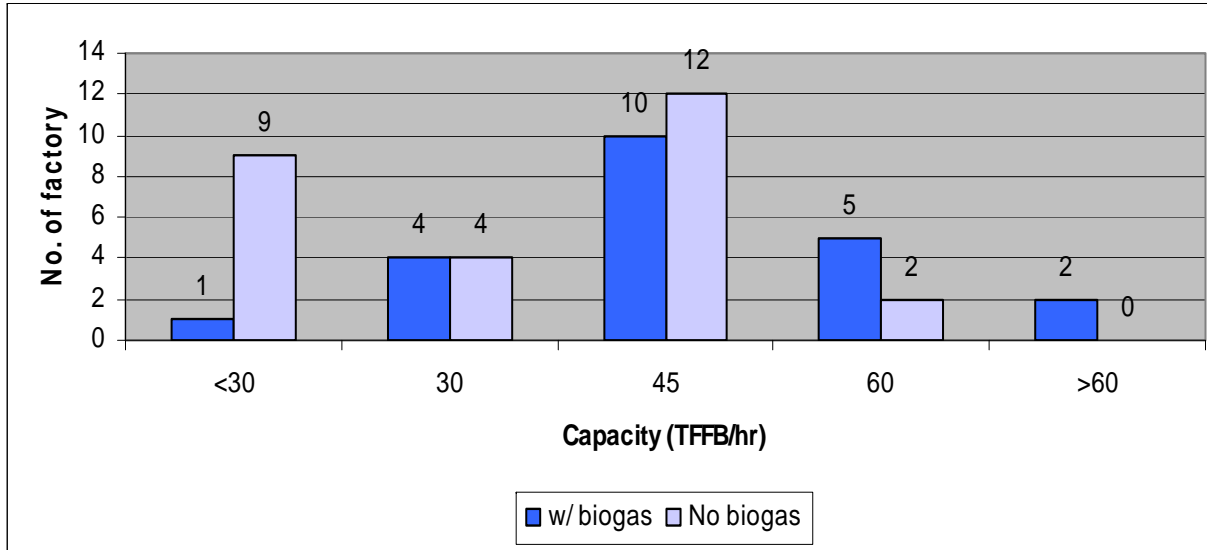
Industry		Total factories	Biogas systems	No Biogas
1. Starch/Tapioca		86	60	26
2. Palm oil		49	22	27
3. Ethanol		24	11	13
4. Rubber		88	4	84
5. Food processing		66	26	50

Source: Chulalongkorn University, <http://www.thaibiogas.com>



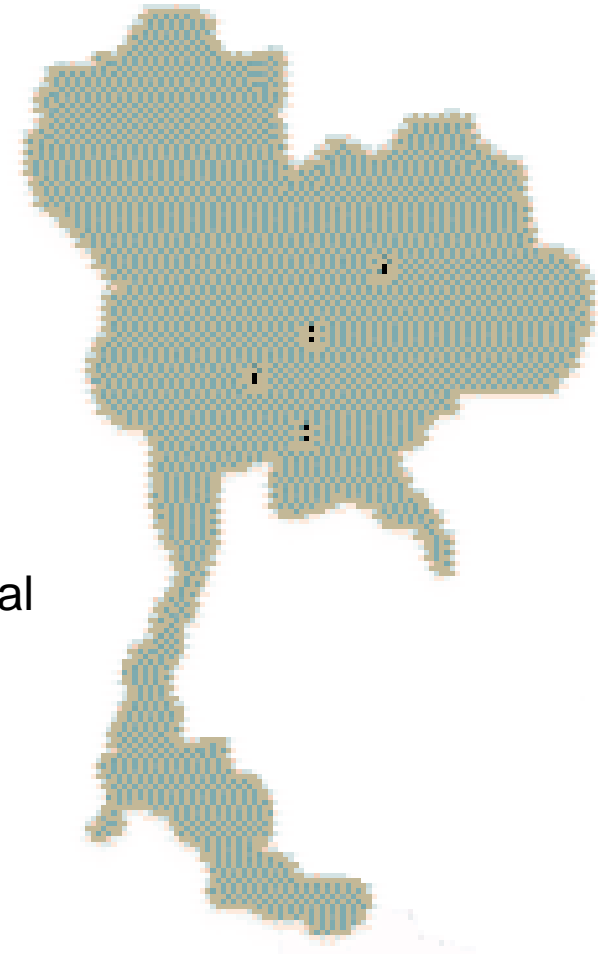
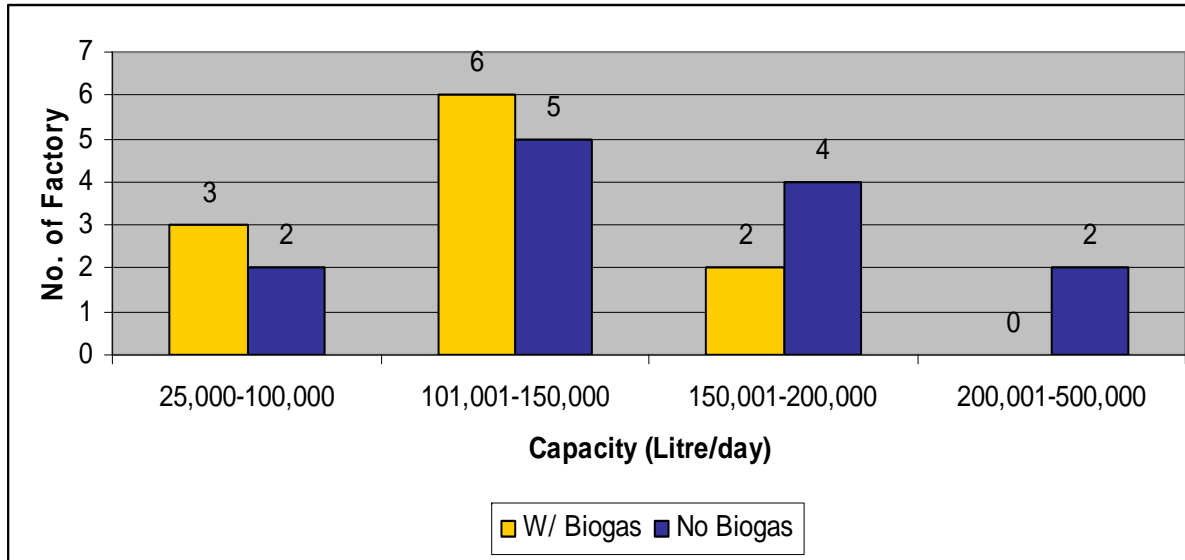
- Starch/tapioca industry has high biogas technology penetration, nearly 70%.
- Remaining potential is in smaller factories (production capacity 100-200 Ton/day)
- Potential in tapioca wet cake

Source: Chulalongkorn University, <http://www.thaibiogas.com>



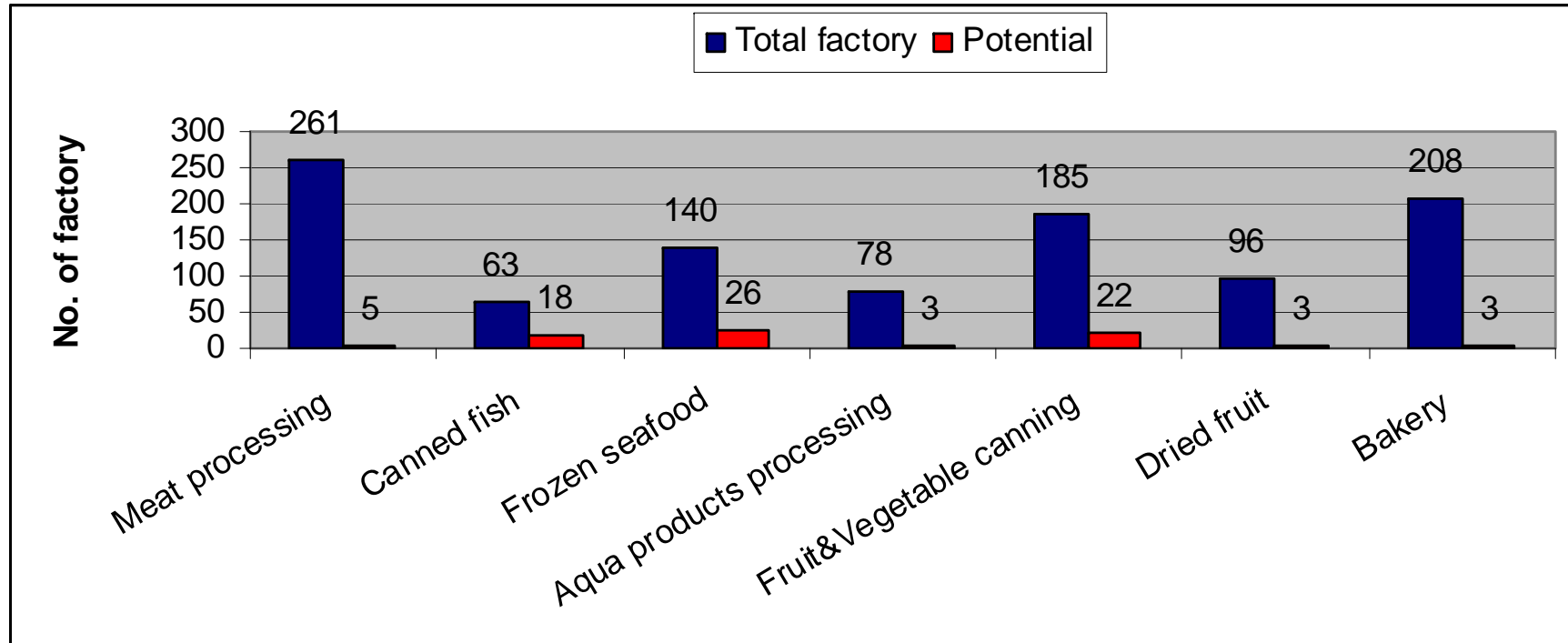
- 40% of Palm oil industry has biogas plants
- Potential of EFB for biogas is being studied in GTZ Sustainable Palm Oil Project (Contact: Daniel.May@gtz.de)

Source: Chulalongkorn University, <http://www.thaibiogas.com>



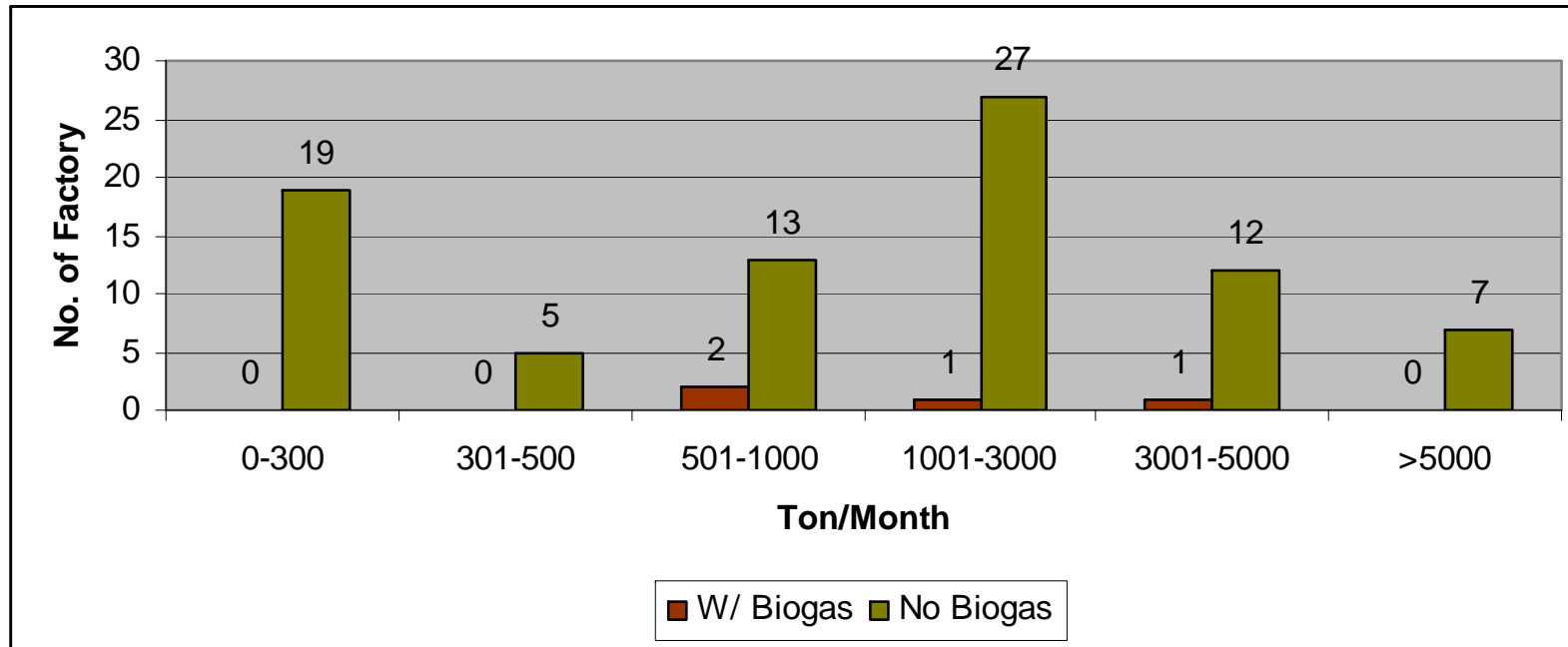
- Existing biogas systems are nearly 50% of total potential
- Ethanol can be produced from cane molasses/cassava

Source: Chulalongkorn University, <http://www.thaibiogas.com>



- 66 factories are identified as good potential for biogas production (gas volume > 400 m³)
- Majority of potential factories are in food canning and frozen seafood

Source: Chulalongkorn University, <http://www.thaibiogas.com>

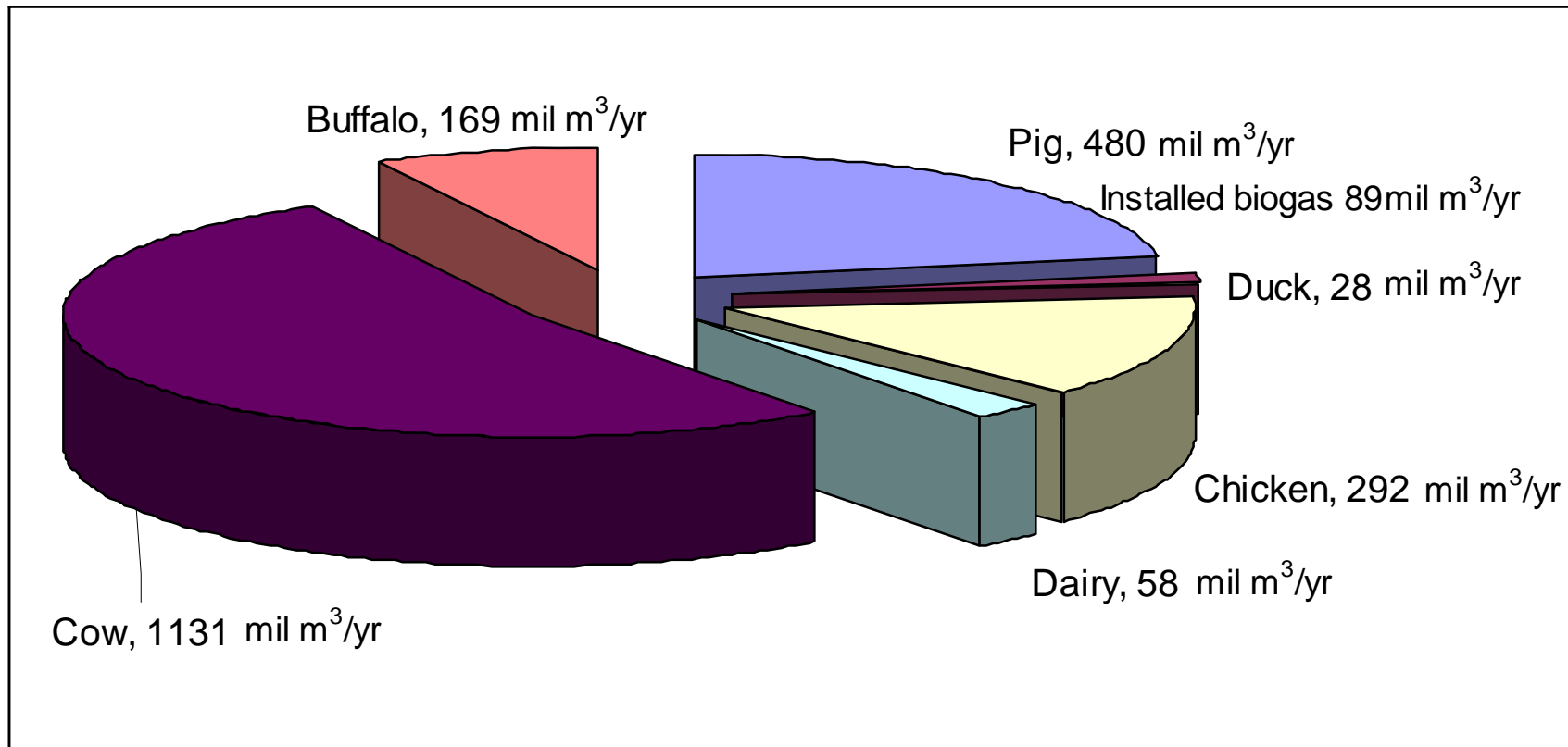


- Technical barrier
- Need research cooperation
- May need enforcement of environmental regulations on wastewater

Source: Chulalongkorn University, <http://www.thaibiogas.com>



- Pig farm is most developed in biogas installation with 20% of potential.
- With government subsidy target, pig farms will reach 40% of potential in 2013
- Other farms still behind in biogas development due to technical, financial barriers, collection of sources, and competing use in other sectors

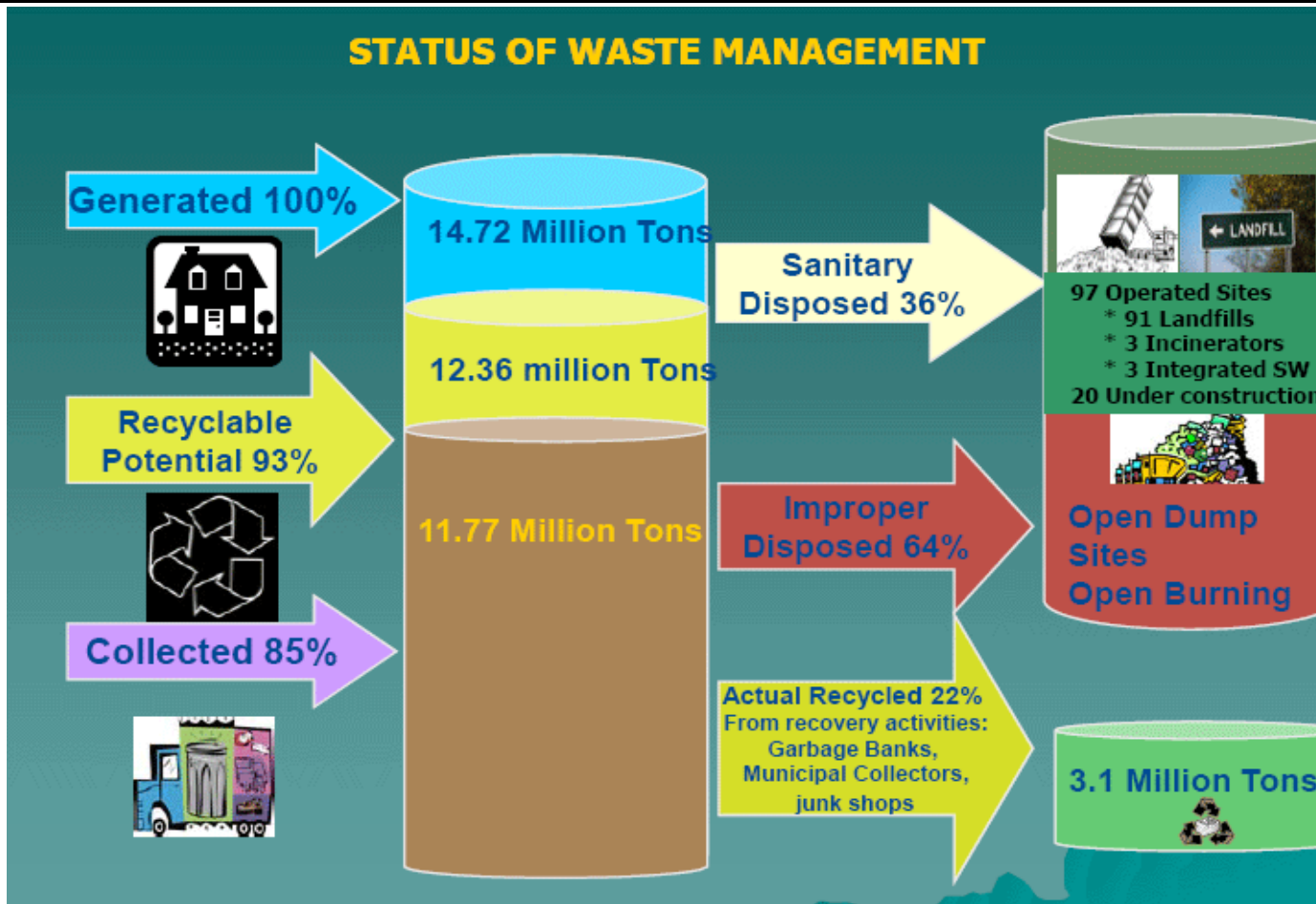


Source: Chulalongkorn University, <http://www.thaibiogas.com>

MSW and Domestic Wastewater



MSW	No.	Biogas Potential (mil m3/year)	Biogas in operation		Remaining Potential	
			No.	(mil m3/year)	No.	(mil m3/year)
Municipality and Sub-district	7,948	1,218	2	3.5	7,946	1,215



- Good potential for CDM projects
- Many landfill biogas projects are now being developed

Source: Pollution Control Department, 2004



Waste sources	Baht/m³ biogas	Baht/kWh
Dried fruit	0.33	0.28
Tapioca	0.77	0.64
Palm Oil	0.84	0.70
Pig farm	0.96	0.80
Starch	1.37	1.14
Slaughter (pig)	2.65	2.21
Paper	3.11	2.60
Alcoholic beverage	3.52	2.93
Beer	5.12	4.26
Solid Waste	5.44	4.53
Non-alcoholic beverage	7.19	5.99

Cost of biogas systems depends on several factors. The above table shown average investment cost regardless of technology from field survey, interview, and secondary data from 190 systems in Thailand.

- Only Initial Investment Cost
- System life time 15 years
- Overall biogas production

Source: A Study on Biogas Potential, KMUTT, 2006



- **Problems/barriers in Thai Biogas sector**
 - Human resource: under qualified operators leads to inefficient operation of systems/shut down
 - Lack of mutual agreement on standards
 - Lack of network for cooperation among several stakeholders

- **GTZ Biogas Project**
 - Identify incentives/measures for impenetrate sub-sectors
 - Quality system for operator/planner and human resource development
 - Biogas network/association

- **Project period:** 2 years (October 2009 – September 2011)



- **Biogas Producers**
 - Exchange of experiences
 - Leverage framework conditions

- **Research/Academic**
 - Exchange of information and compilation of database
 - Cooperation on research and testing

- **Policy Makers**
 - Agreement on standards and regulations
DIW, Ministry of Industry (safety standards)
PCD, Ministry of Natural Resources and Environment (environmental standards),
DEDE, Ministry of Energy (quality/performance standards)
 - Cooperation on database of biogas systems

- **Private Companies**
 - Contact point for products information
 - Access to market



- **Energy Research Institute (ERI)**
Chulalongkorn University
Tel: 02 218 8096-8
Website: www.thaibiogas.com, www.eri.chula.ac.th

- **Waste Utilization and Management
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