Mitigation of GHG Emission from Solid Waste Disposal in Thailand

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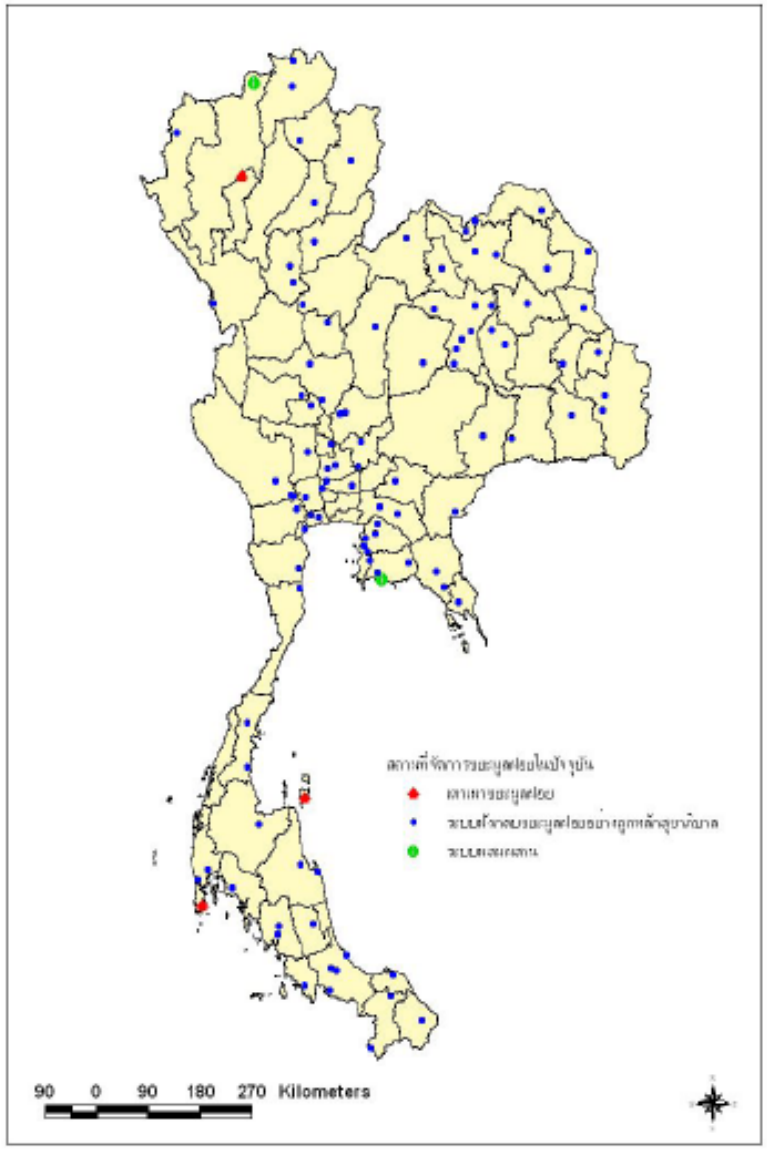
Statistics of MSW in Thailand (2008)

Total MSW generation	41,023	tpd
- *Bangkok*	8,780	tpd
- *Municipalities & Pattaya*	14,766	tpd
- *Sub-district Administrative Organization*	17,477	tpd
Waste recycling (22.7%)	9,329	tpd
Waste disposal		
- *Sanitary landfill* (35.5%)	10,832	tpd
- *Open dumping* (64.5%)	20,862	tpd

Existing MSW Disposal Facilities

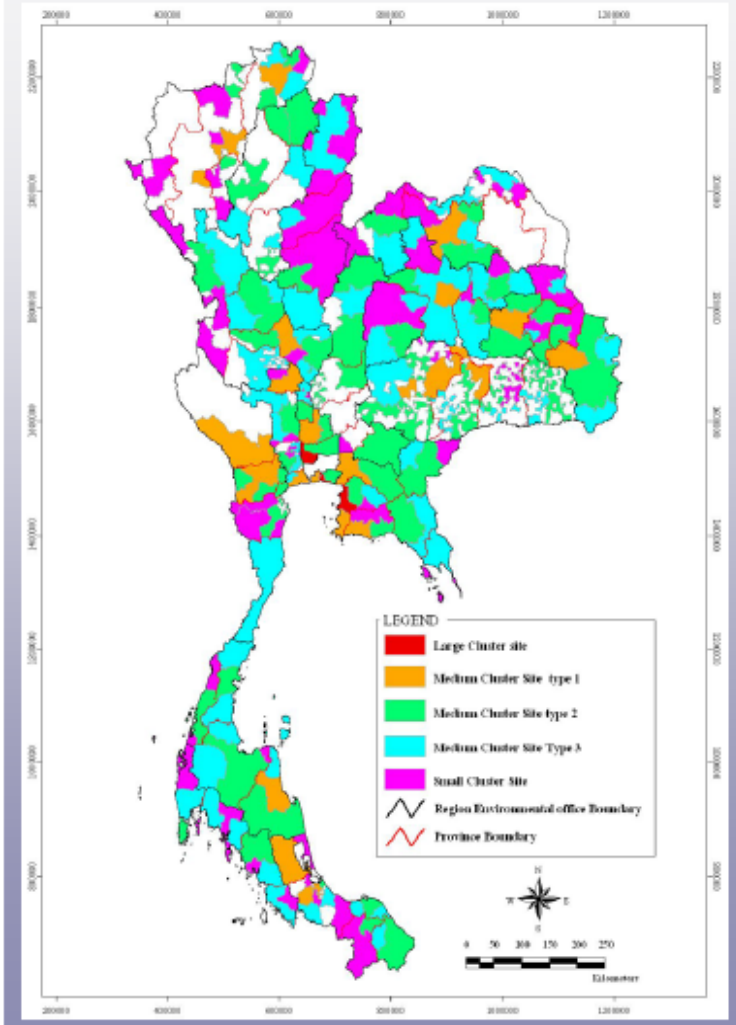


Incineration	❑ **Phuket municipality (250 tpd)** ❑ **Samui Island (75 tpd)** ❑ **Lampoon Province (10 tpd)**
Sanitary Landfill	❑ **In operation 96 sites** ❑ **Under construction/renovation 10 sites**
Integrated Waste Management System	❑ **Wieng Fang Municipality (150 tpd)** ❑ **Rayong Municipality(80 tpd)** ❑ **Chonburi Provincial Administrative Organization (300-400 tpd)**

Total number of site = 927

Source: Pollution Control Department/ Kasetsart University

Cluster Organization of Solid Waste Disposal Facilities

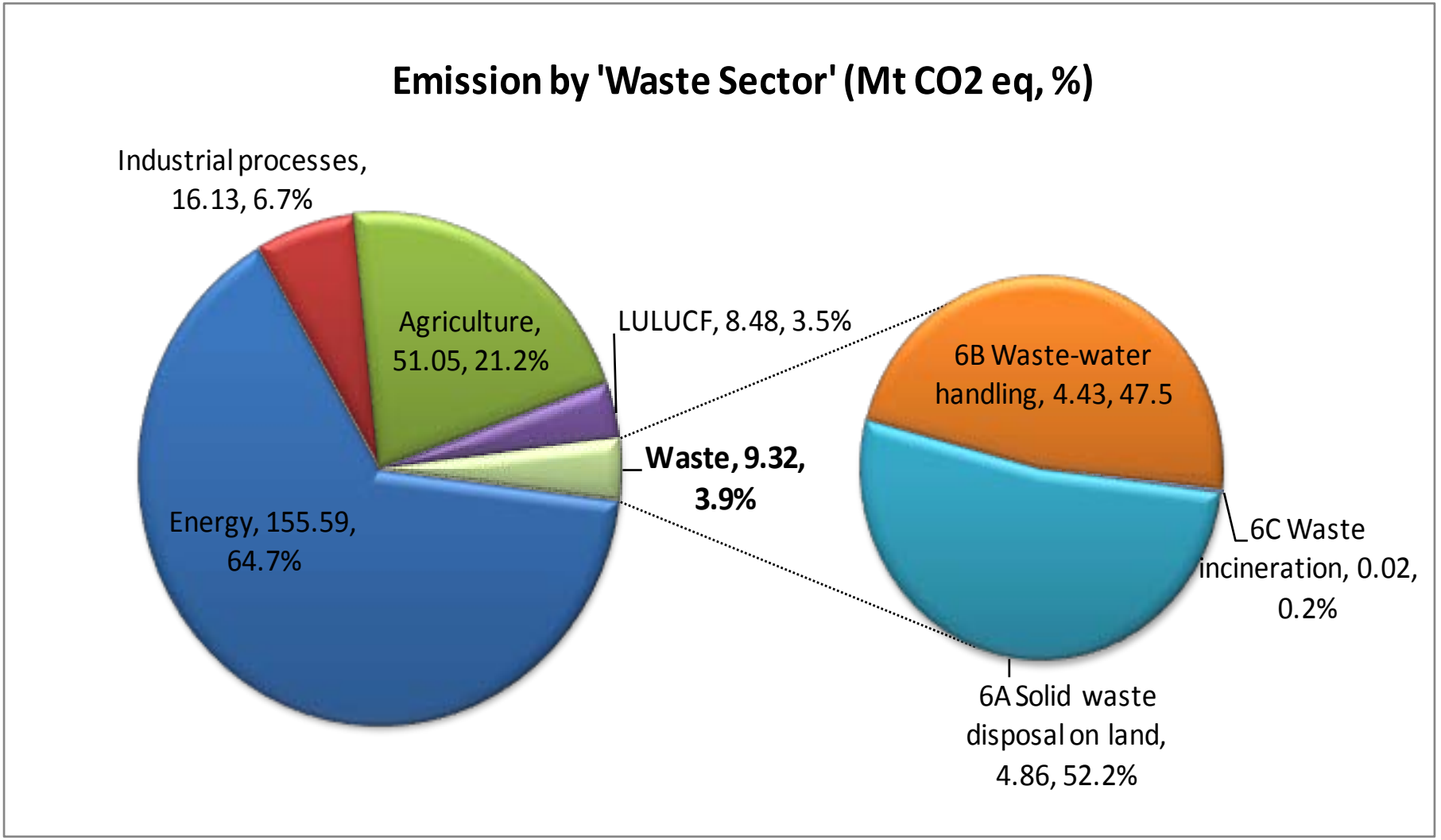


Combination of Adjacent local Administrative Organization for handling municipal solid waste (privatization is needed)

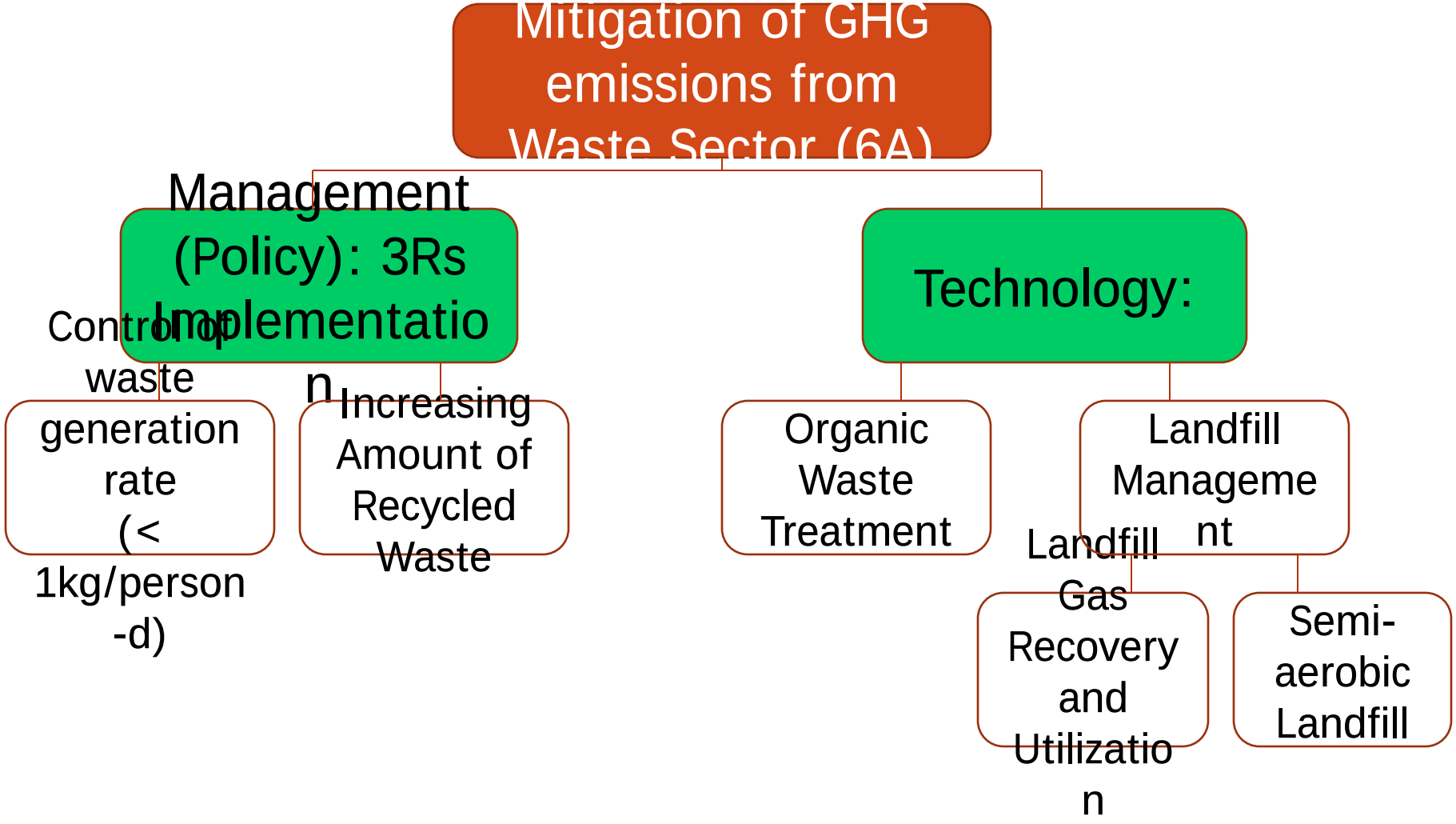
Size of clusters	Solid waste to system (t/d)
Large (3 clusters)	> 500
Medium (206 clusters)	
M1	250 - 500
M2	100 - 250
M3	50 - 100
Small (90clusters)	< 50

Source: Pollution Control Department

GHG Emission from Waste Sector in Thailand (2000)



Mitigation of GHG Emission from Waste Sector (6A)



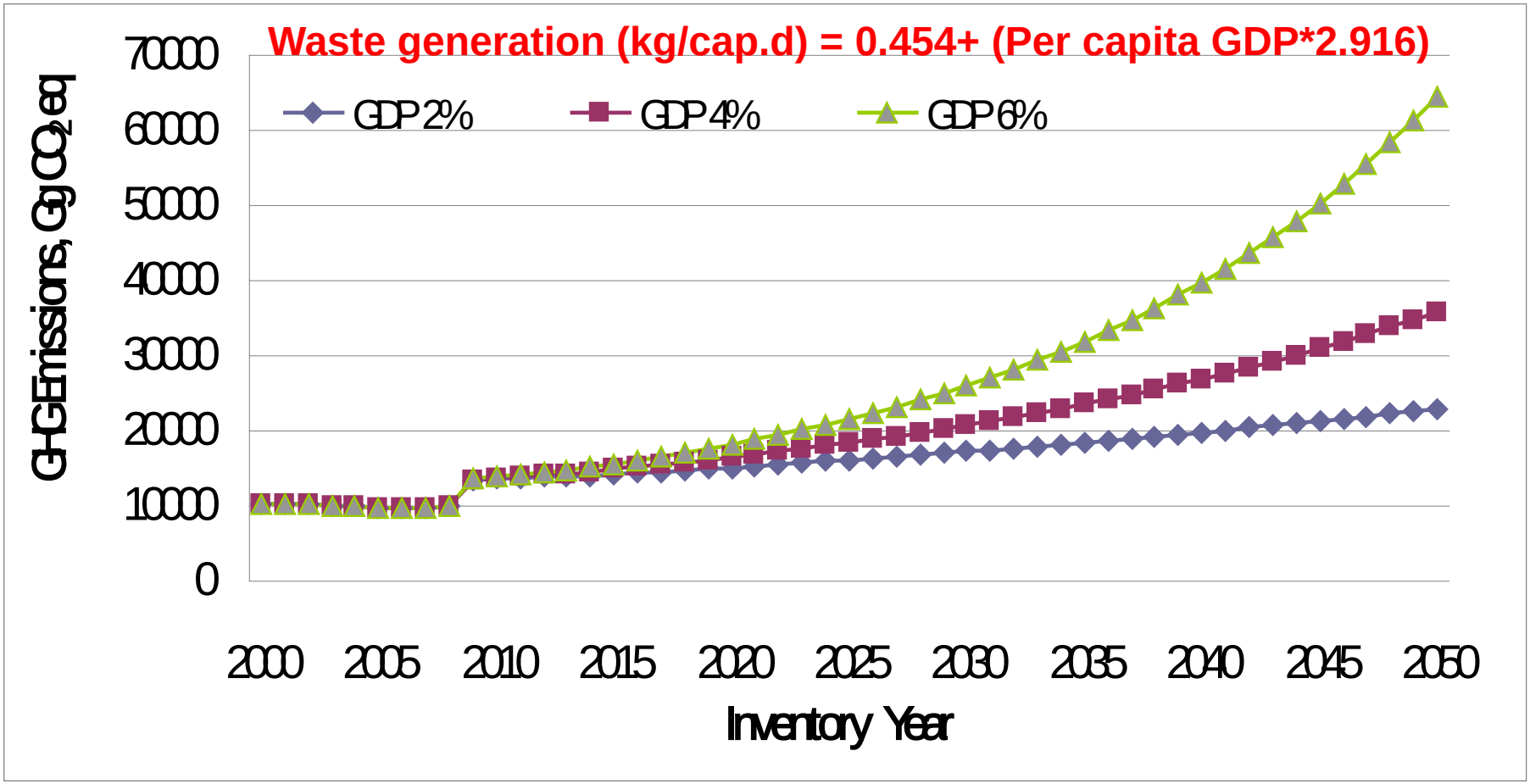
Potentials and Limitations of GHG Mitigation Technology Options

Option	Potentials	Limitation/constraints
Organic waste treatment	- High fraction of organic wastes/ moisture - Possible for both on-site and centralized application	- Poor segregation/ upstream management - Lack of public participation/ interest from local authorities
LFG recovery	- Pre/post construction possible -Financial return from electricity generation	- Economically feasible only in large landfills - Low yield and unreliable gas production in uncontrolled /poor operation
Semi-aerobic Landfill	- Simple operation - Low investment cost	- Facilitating aeration into landfill under extremely wet condition (?)

Assumption for Evaluation of GHG Emissions Reduction from Mitigation Measures

Policy	**- Prevention**	Control of waste generation < 1 kg/person-d
	- Recycling	Separation of usable and recyclable materials - Constant recycling rate of 30% - Increasing recycling rate (projection from current increasing trend)
Technology	**Organic waste treatment (AD, Composting)**	- Increasing trend to 30% of total waste amount - Technology combination (target: 70% composting 30% AD)
	LFG utilization	- Applied in large landfills (> 1 million tons of accumulated MSW) – 5 potential sites in 2005 assumed 75% recovery
	Semi-aerobic Landfill	-For other small and medium sized landfills where LFG utilization is not feasible assumed 50% GHG reduction

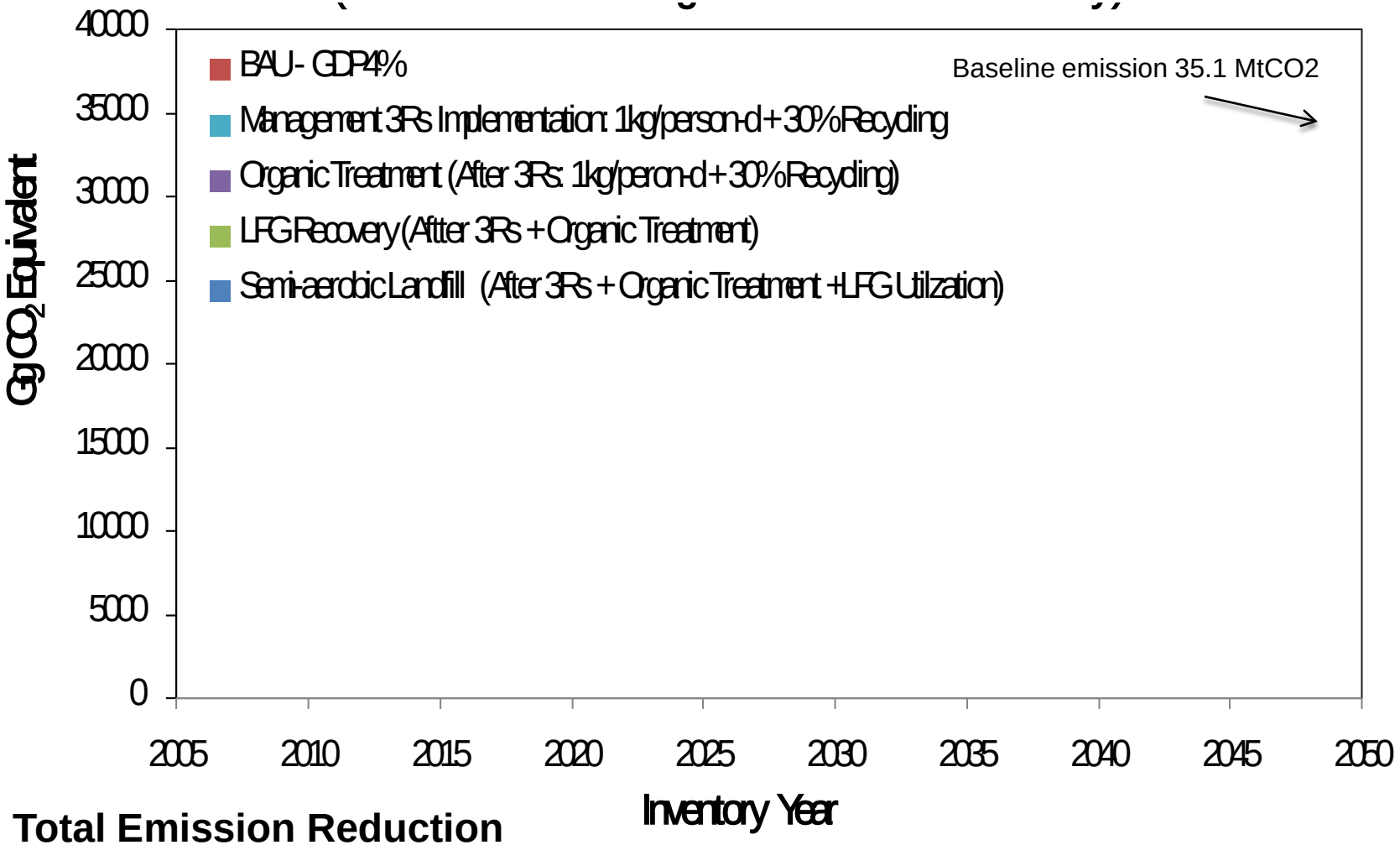
Thailand's GHG emissions: BaU scenario (6A Solid Waste disposal on land)



Remark:

1. based on GDP growth rate of 4%
2. MCF: LF=1.0, OD = 0.4
3. DOC = 0.14, DOC_F = 0.77
4. F= 0.53
5. R= 0
6. OX: LF = 0.17, OD = 0

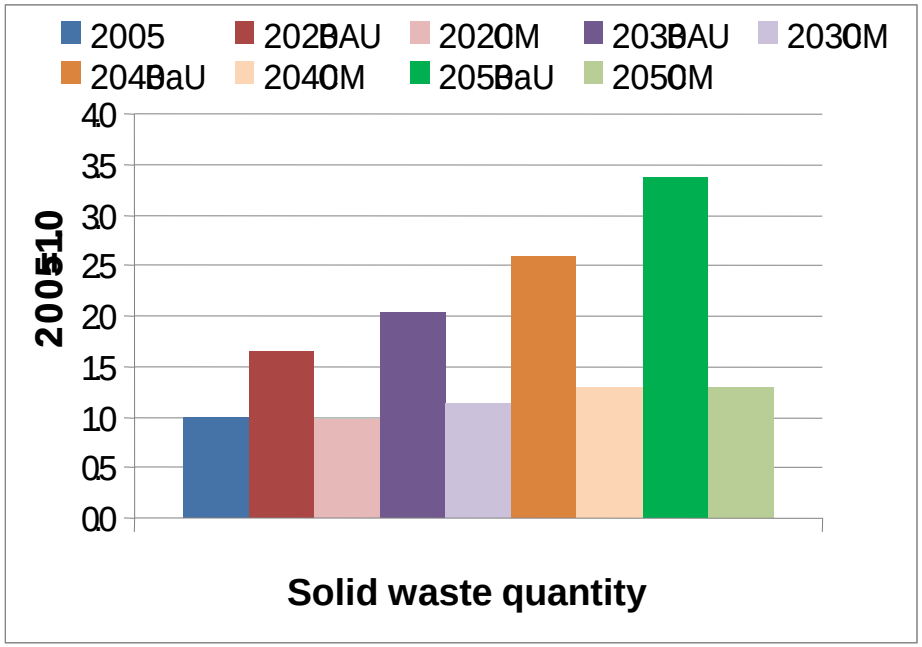
Thailand's project GHG emissions (from 6A): BaU vs mitigation options

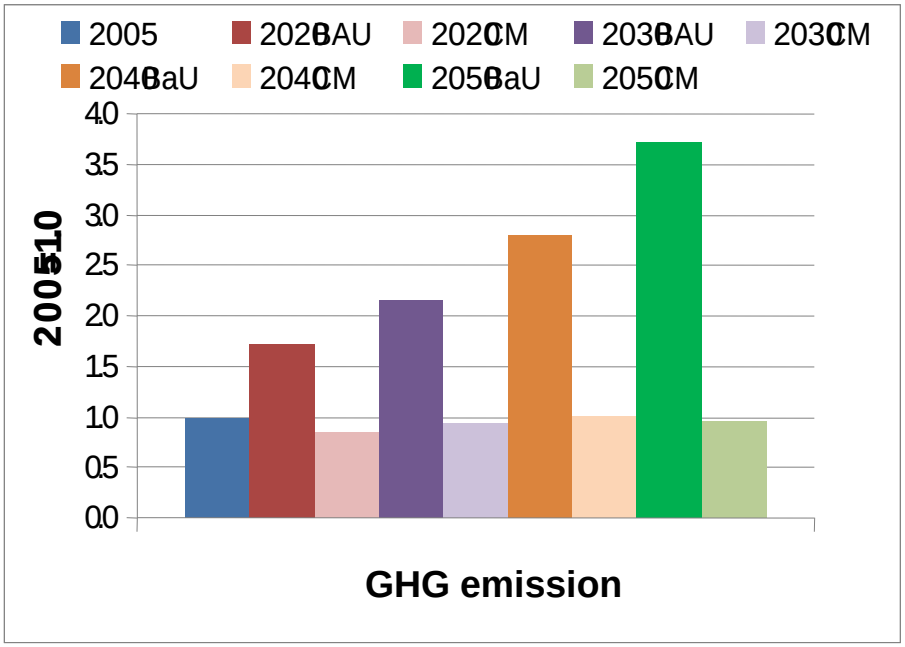


Total Emission Reduction

	2008	2010	2020	2030	2040	2050
Emission Reduction (MtCO2)	0.0	7.0	8.9	11.2	14.5	21.5
Emission Reduction (%)	0.0	50.7	53.9	54.6	56.3	65.0

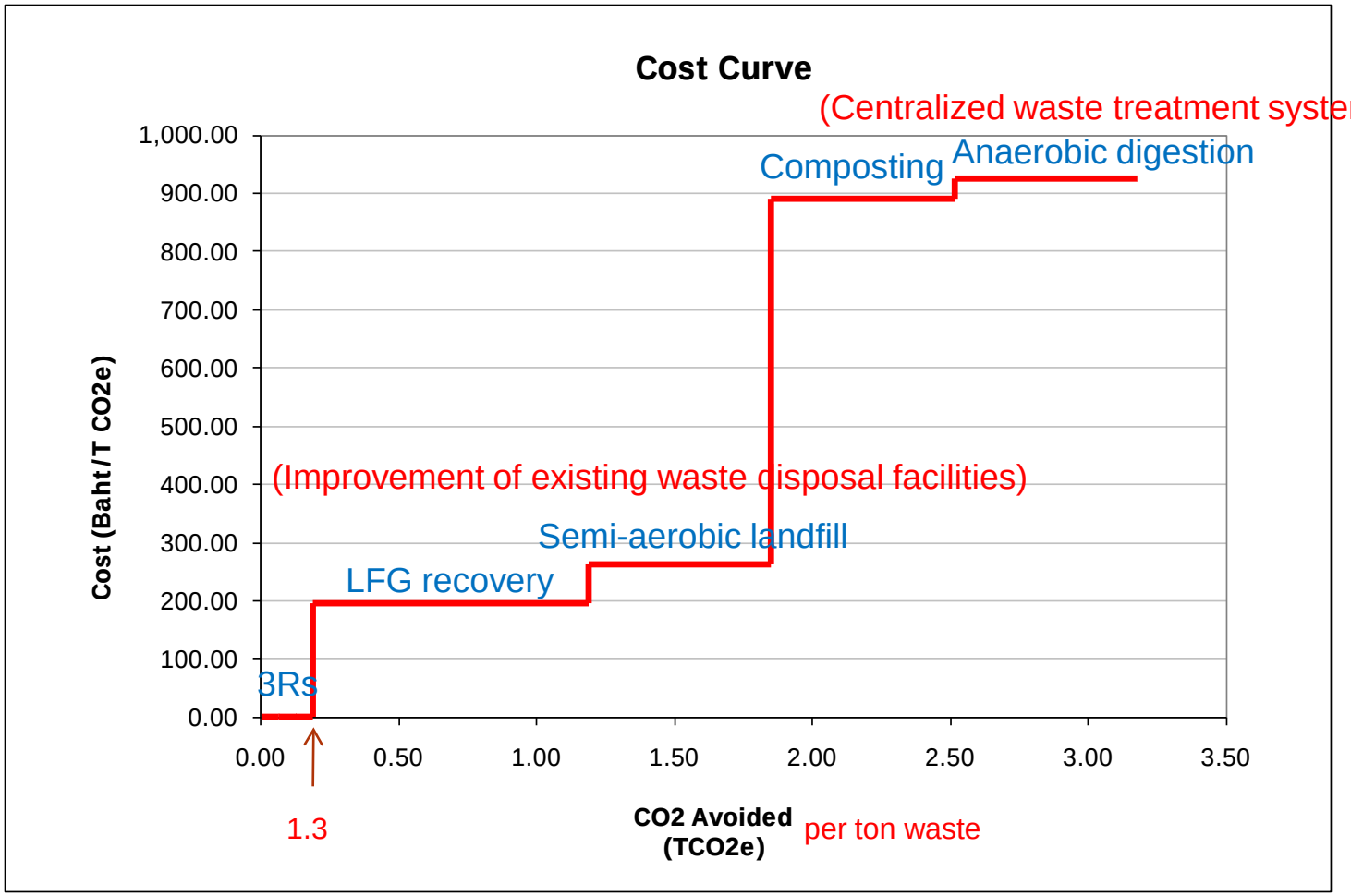
Projected solid waste quantity & GHG emissionsfrom 2005 (base year) to 2050: Comparing between BaU and best practice cases





Solid waste quantity

GHG emission



Option Name	Tons CO2 Opton Potential	Tons CO2 Cumulative Mitigation	Baht/Ton CO2 Cost of Saved CO2	X bar	Y bar
Baseline	-	-			
Policy: 3Rs (1 kg/person-d)	0.06	0.06	0.00	(0.06)	0.00
Policy: 3Rs (30% recycling)	0.06	0.13	0.00	(0.06)	0.00
Policy: 3Rs (increasing recycling)	0.06	0.19	0.00	(0.06)	196.30
Landfill Gas Recovery and Utilizati	1.00	1.19	196.30	(1.00)	67.29
Semi-aerobic Landfill	0.66	1.85	263.60	(0.66)	626.58
Composting	0.66	2.51	890.18	(0.66)	36.34
Anaerobic Digestion	0.66	3.18	926.52	(0.66)	

Thank you for your kind attention