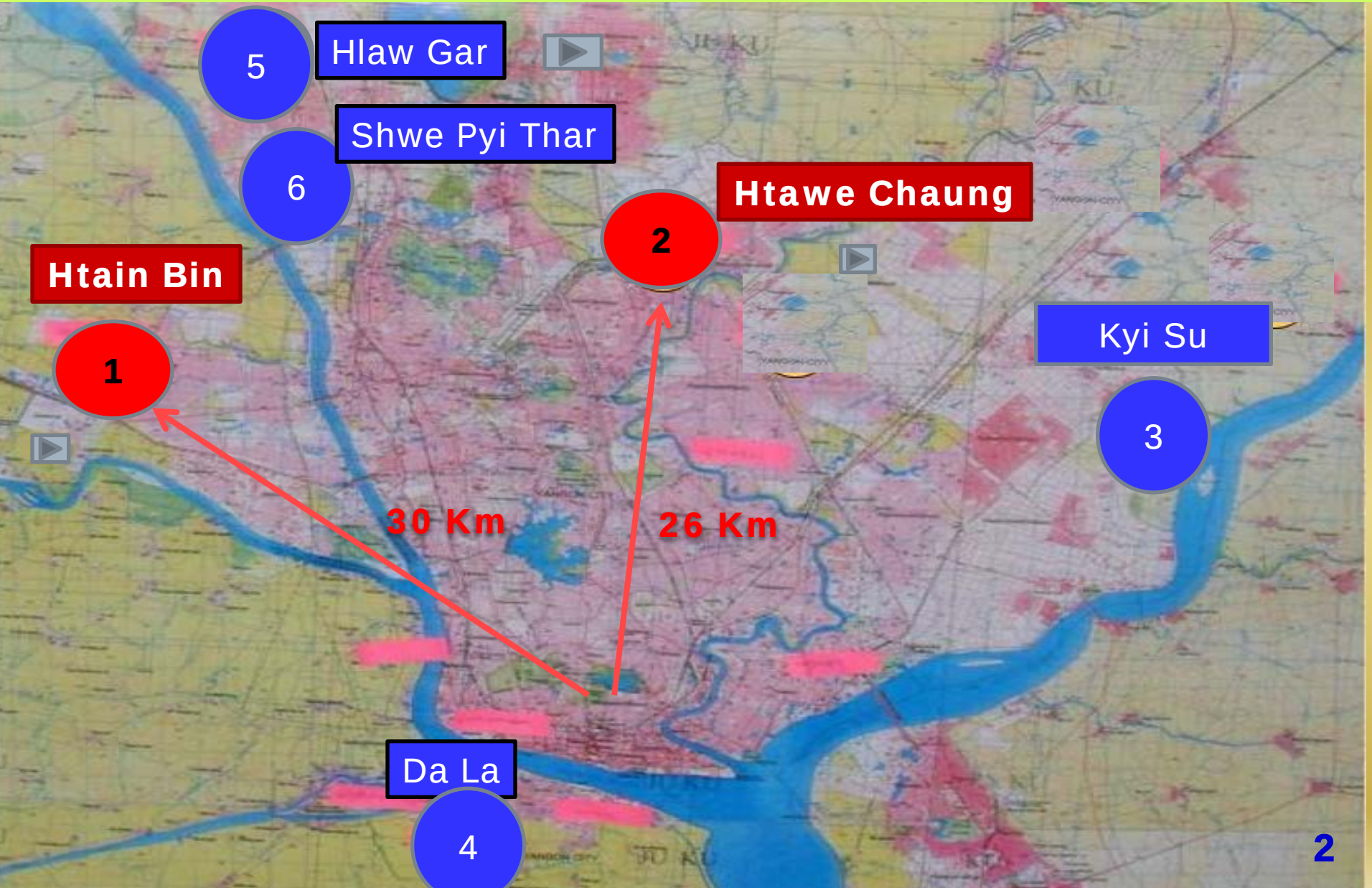
Integrated Solid Waste Management: Towards Low-carbon Waste Management in Yangon - Myanmar

Nirmala Menikpura, PhD
Sustainable Consumption and Production (SCP) Group
Institute for Global Environmental Strategies (IGES)

International workshop on sustainable waste management in Yangon, 20 Dec 2013

Open Dumping is the Major Disposal Method in Yangon

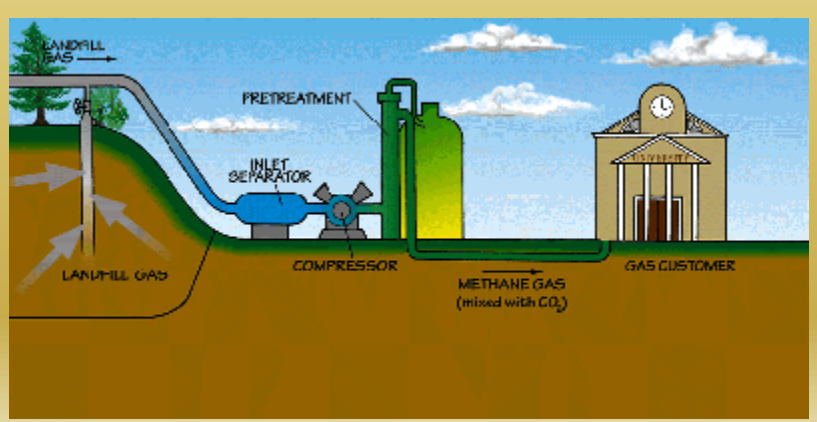


Present Situation of Waste Management in Yangon

- This is the biggest open dumpsite in YCDC
- 847 tonnes of incoming waste is disposed per day

Future

- PCDC is planning to implement a landfill gas-to-energy recovery plant to replace this open dumpsite



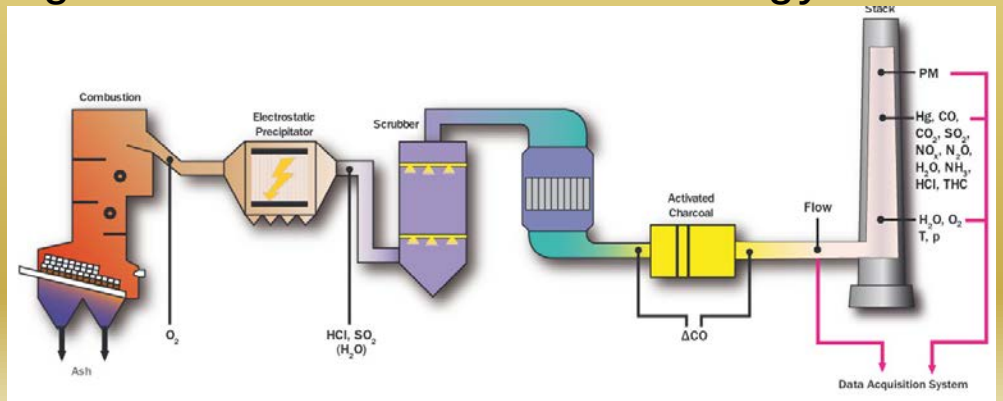
Present Situation of Waste Management in Yangon

- This is the second biggest open dumpsite
- 612 tonnes of incoming waste is disposed per day

Dumpsite at Htwei Chaung

Future

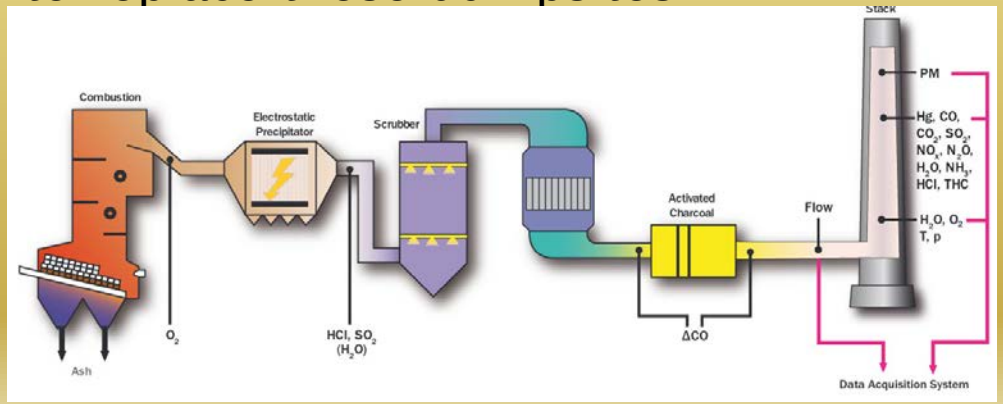
- YCDC is considering installation of waste-to energy incineration plant.



Present Situation of Waste Management in Yangon

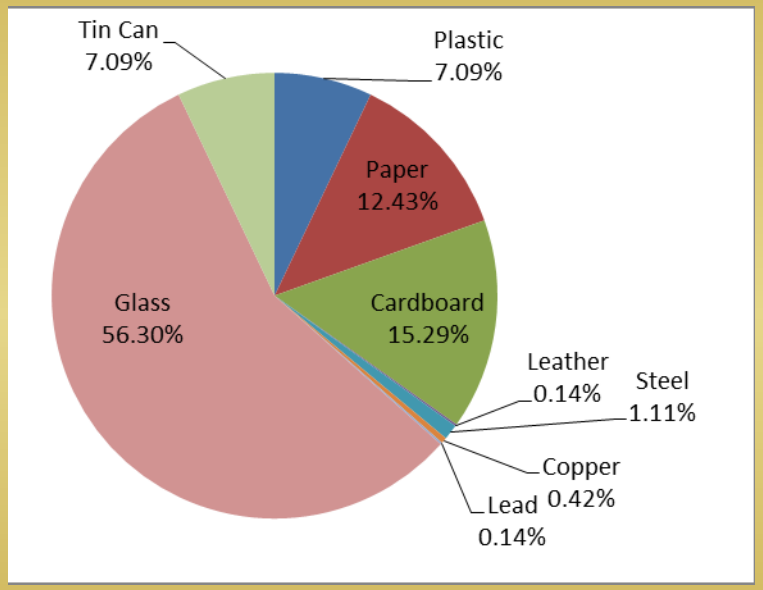
Future

- YCDC is considering installation of small incineration (without electricity production) plants to replace these dumpsites .



Situation of Waste Recycling in Yangon

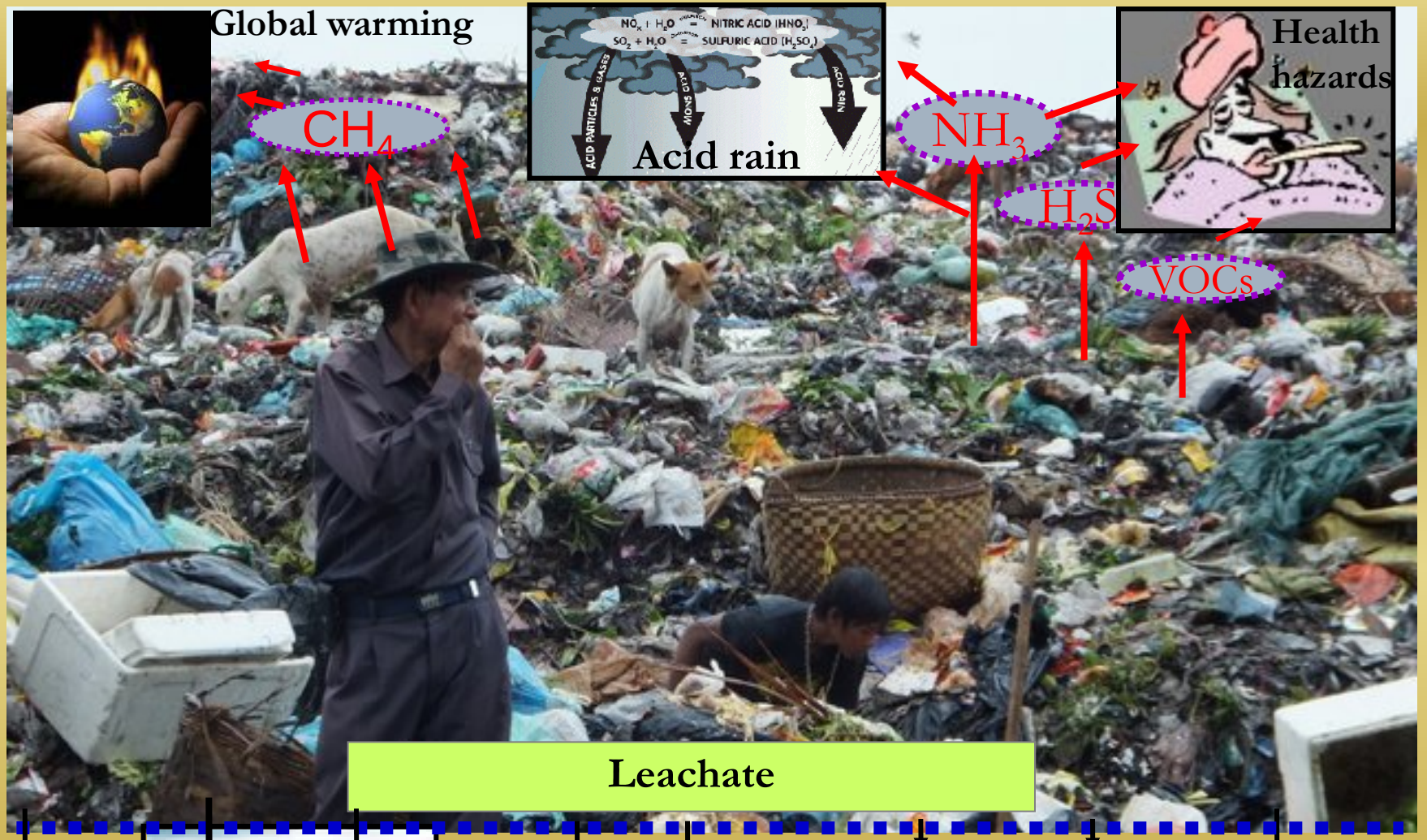
- According to Yangon City Development Committee (YCDC) 86 tonnes/day generated waste is recycling
- Valuable recyclables are stored at household level and sell to the nearby junkshops
- YCDC is also running a small-scale plastic recycling plant and green and blue plastics bag is produced using the waste plastic.



Composition of recyclables in Yangon

Plastic recycling activities at YCDC

Environmental Damage and Health Issues from Current Waste Management in Yangon



Climate Impact from Current Waste Management in Yangon

- **IGES GHG calculation tool** was used to estimate the climate impacts from current waste management in Yangon

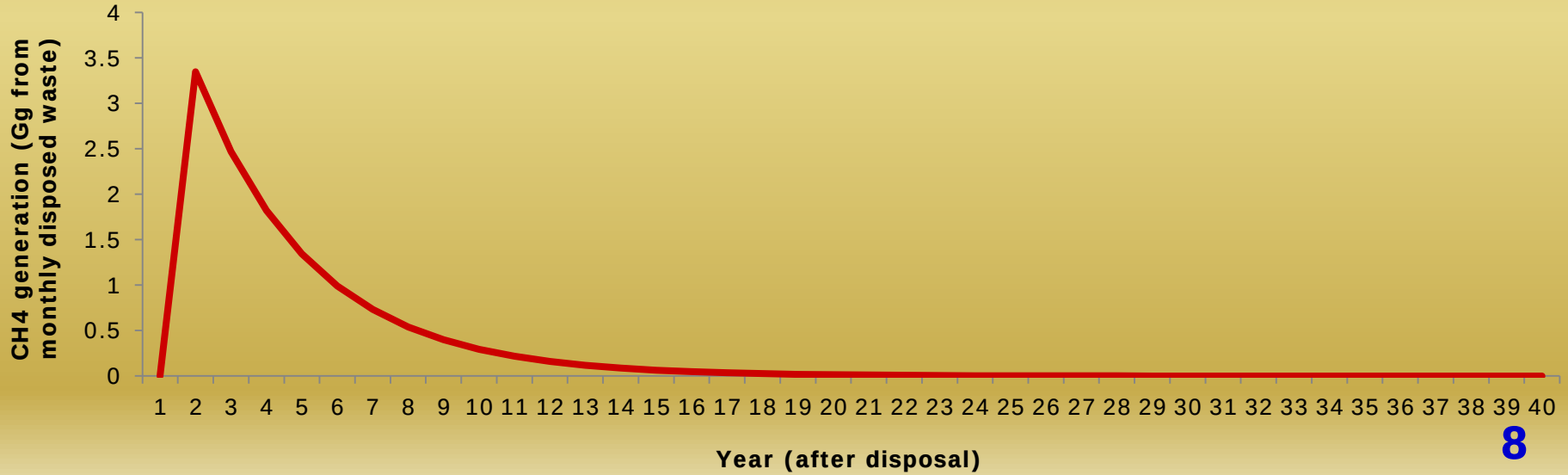
GHG emissions from Waste Transportation

YCDC uses 128,704 L diesel and 900 L of gasoline for waste transportation

GHG emissions from transportation	7.51	kg of CO2-eq/tonne of waste
Monthly GHG emission from transportation	**349**	tonnes of CO2-eq/month

GHG emissions from open dumping

Emission of CH_4 from open dumping	22.88	kg of CH_4/tonne
Direct GHG emission from mixed waste open dumping	480.48	kg of CO2-eq/tonne of mix waste
GHG emission from open dumping from monthly disposed waste	**22,342**	Tonnes of CO2-eq/month

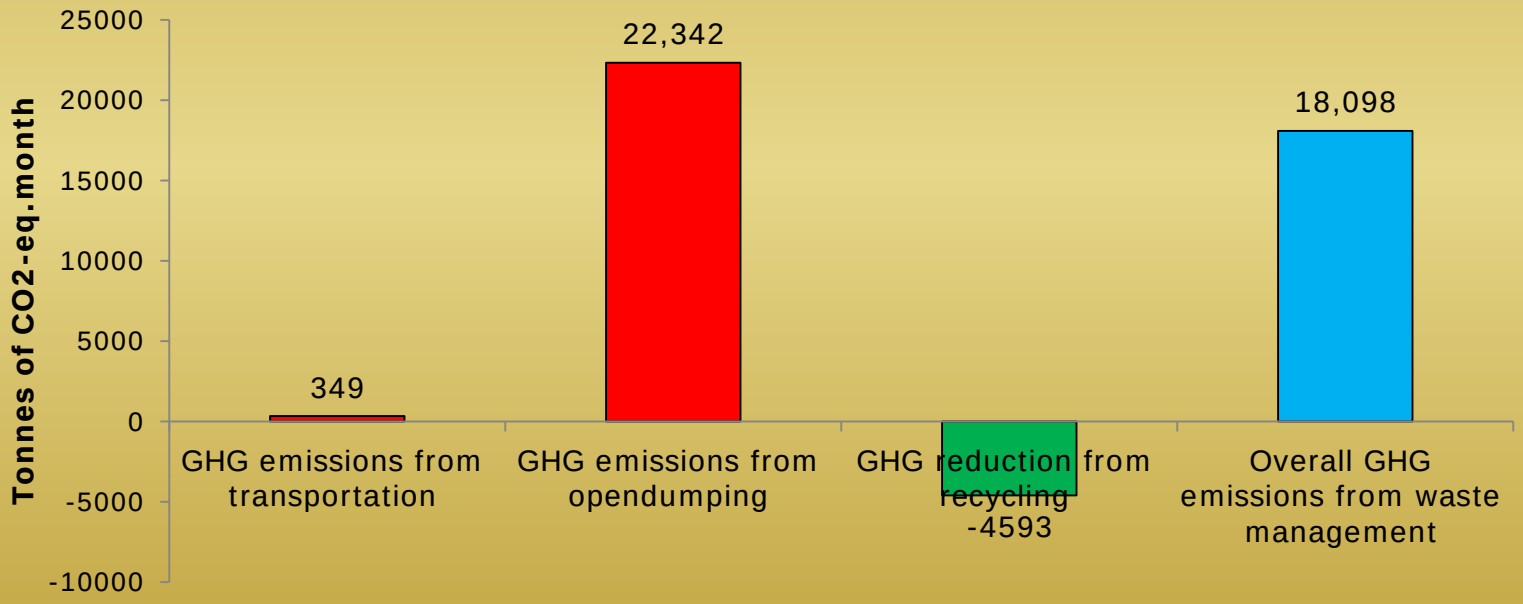


Climate Impact from Current Waste Management in Yangon

GHG emissions from recycling activities in Yangon

Direct GHG emissions from recycling	866.42	kg of CO2-eq/tonne of mixed recyclables
Avoided GHG emissions from recycling via materials recovery	2646.79	kg of CO2-eq/tonne of mixed recyclables
Net GHG emissions from recycling (life cycle perspective)	-1780.37	kg of CO2-eq/tonne of mixed recyclables
Monthly total GHG reduction from recycling	**-4,593**	**Tonnes of CO2-eq/month**

Overall GHG emissions from waste management in Yangon

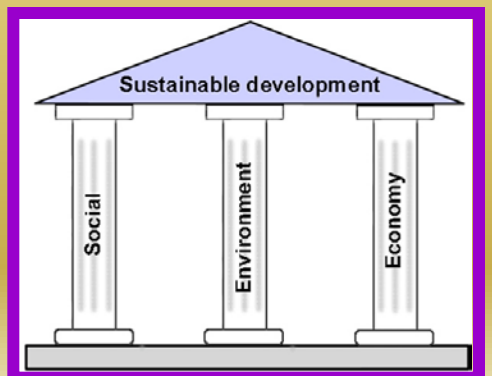


Is the Current Waste Management in Yangon Sustainable?

- The conventional practice of 'collection and disposal' is unsustainable in term of resource inefficiency, environmental impacts and socio-economic impacts

  - Difficulties in finding suitable landfill sites/dumping sites
  - Large costs associated with collection and disposal
  - Recovery of resources (material and energy) is very low and so on

- To overcome these drawbacks **development of sustainable solid waste management methods is crucial**



Integrated Solid Waste Management: A Practical Solution Towards Sustainable Waste Management

•ISWM would be the most promising approach to solve the waste management problems since it provides multiple benefits from waste

Integrated waste management

Social benefits

Improve the well-being of the local community
-Creation of jobs
- Improving the indirect income generation ways

Environmental benefits

Improve the efficiency waste management and reduce the emissions to air, water, soil

Economic benefits

Creation of ways of revenue generation to all the stakeholders in waste management process chain

Environmental benefits

Recovery of materials and energy from waste and replace the conventional production processes

•These benefits from ISWM can be achieved by selecting and adapting the best suited technologies to a particular municipality

Integrated Solid Waste Management (ISWM): A Practical Solution Towards Sustainable Waste Management




Intended integrated system for Kolkata Metropolitan, India

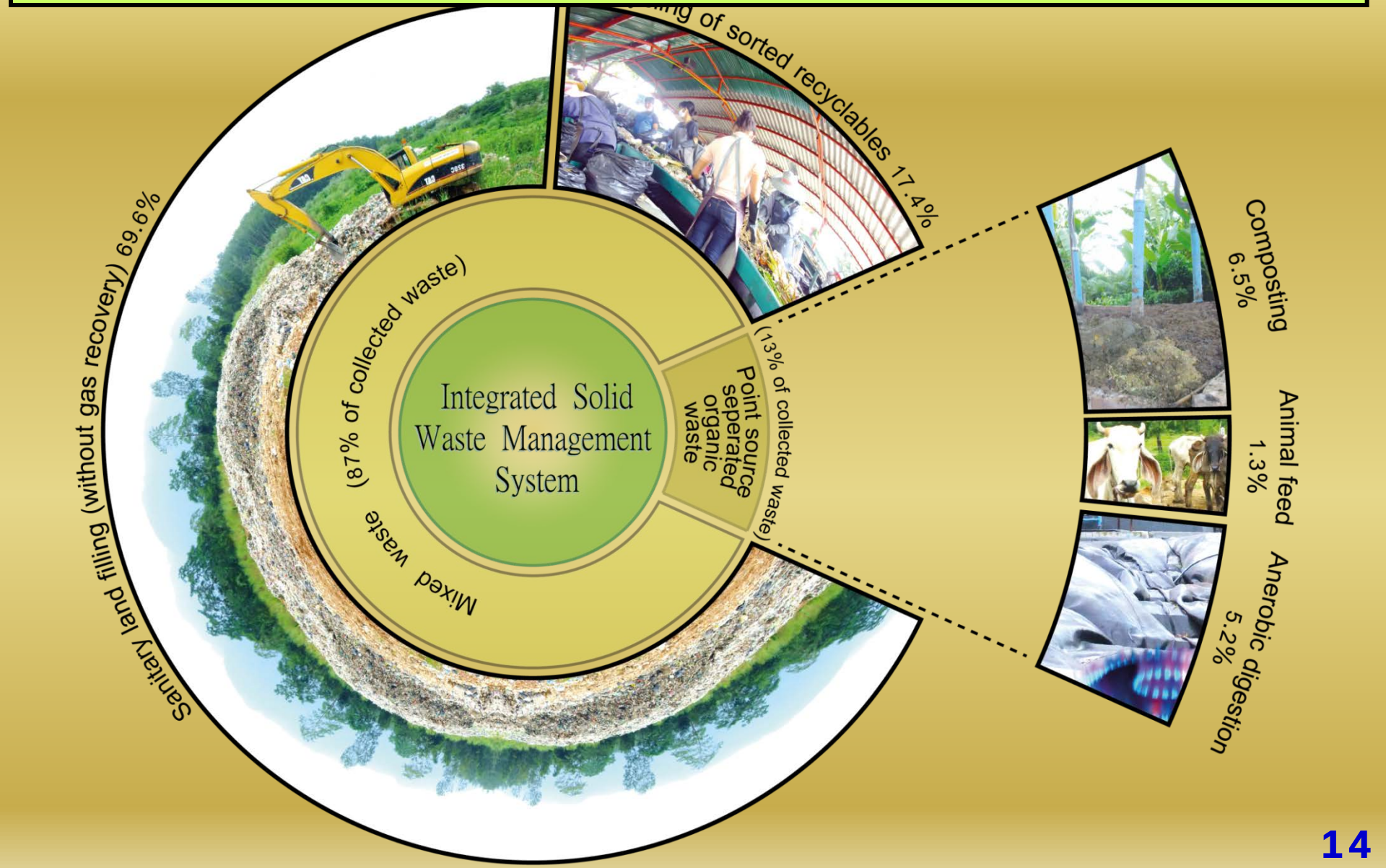
(Source: Menikpura, PhD thesis, 2011)

Integrated Waste Management: Towards Low Carbon Waste Management

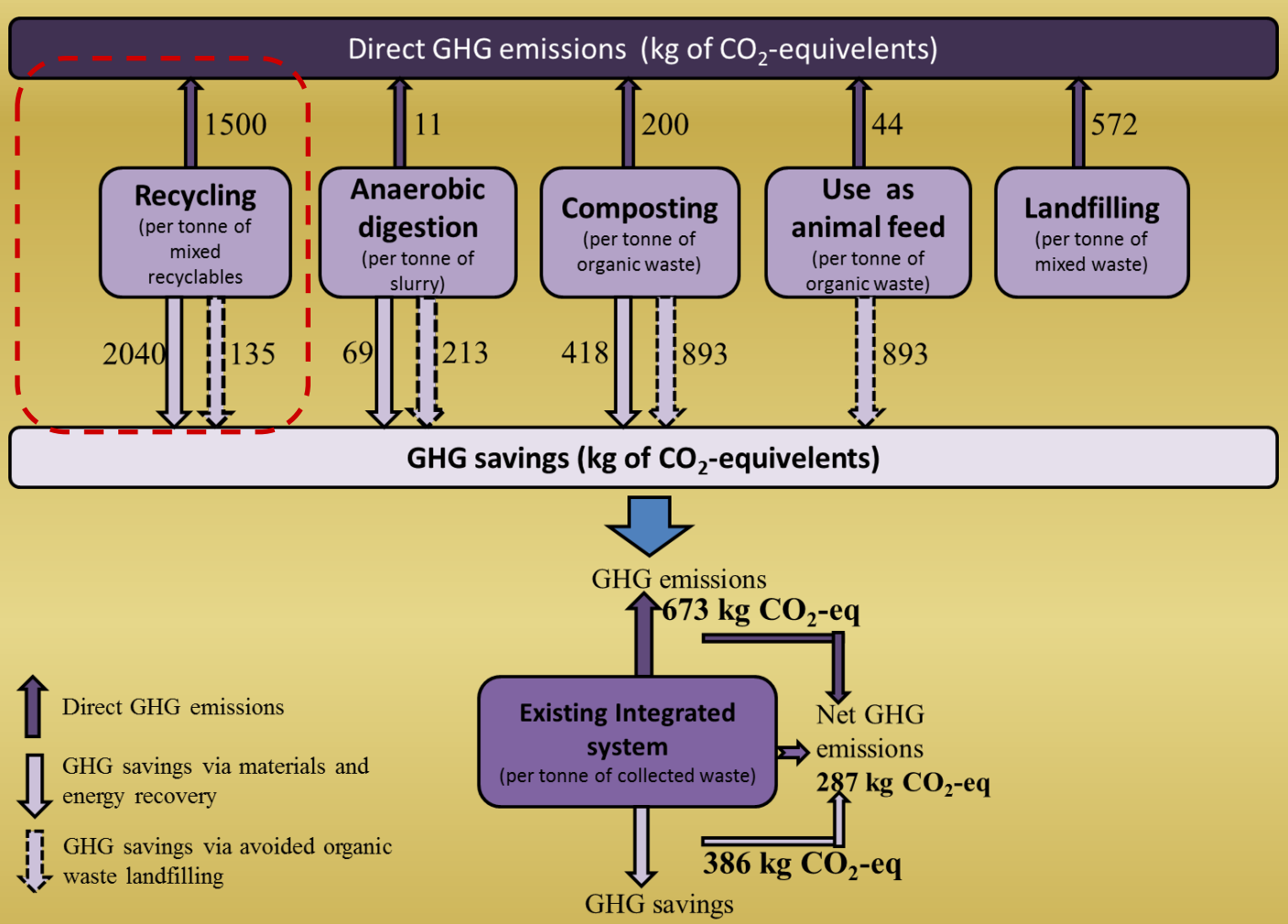
A case study Muangklang Municipality, Thailand

- The Muangklang Municipality is located in Rayong Province (190 km from East Bangkok)
- It has a total of 13 communities and covers 14.5 km^2
- The registered population within the Municipality -17,200 (Dec 2010)
- This municipality has initiated an integrated waste management system as a sustainable solution by incorporating effective waste collection and transportation service, waste sorting facility for recovery of recyclables, anaerobic digestion facility, composting facility, raising some farm animals to feed organic waste and so on

Existing Integrated System in Mungklang Municipality, Thailand

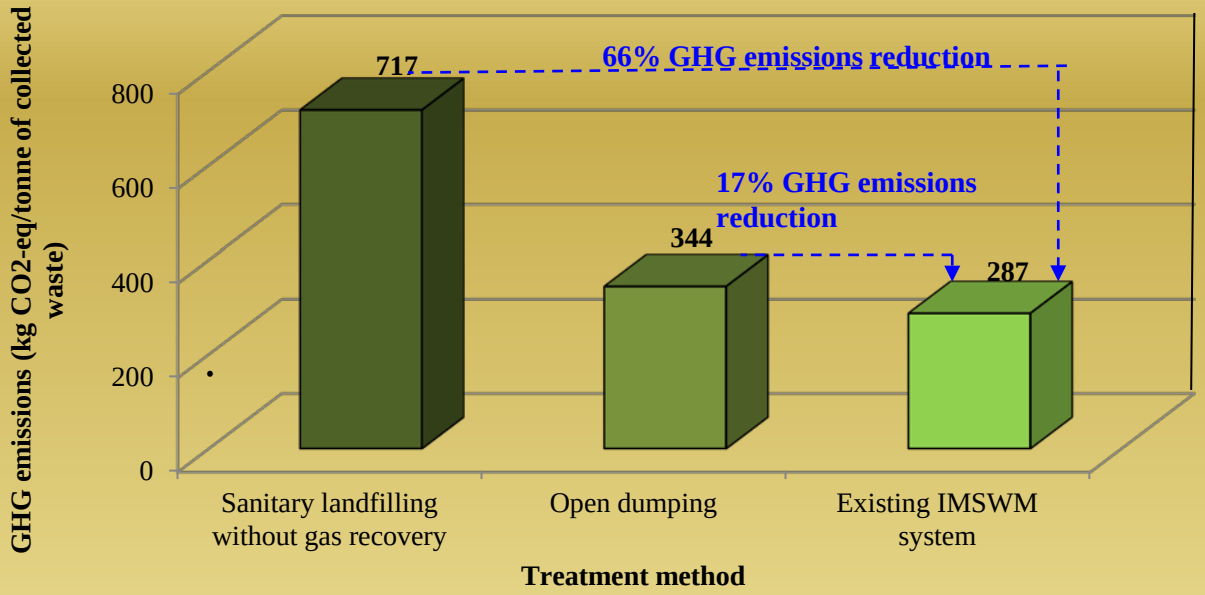


GHG Emissions and Savings Potential from Individual Technologies and Integrated System



- Net GHG emission from the integrated system is still positive due to high fraction of waste landfilling (69.6%)

GHG Emission Reduction from Existing Integrated System as Compared to the BAU Practice



- This integrated system achieved a considerable reduction in GHG emissions by utilising only 30% of collected waste for resource recovery
- Development of integrated systems would be a local initiative that could make meaningful contributions to global climate-change mitigation
- In addition there is a high potential for obtaining socio-economic benefits via integrated waste management

Summary: Towards Sustainable Waste Management in Yangon

- Landfill gas-to-energy recovery and incineration would be the two major technologies in the intended waste management system in Yangon.
- To enhance the efficiencies:

  -Careful planning is very important in the designing phase to avoid the failure that may happen after the implementation

  -Composition and the moisture content of the waste can be greatly effected on the efficiency of the incineration plant. Pre-treatment would be necessary

  -Development of proper recycling scheme in Yangon would contribute for significant GHG reduction and then to attain the target of low carbon city

- For long term sustainability, development of appropriate integrated systems, which designed for maximum resource recovery would be the key driving force towards greenhouse gas mitigation as well as for getting maximum economic and social benefits from waste management in Yangon

THANK YOU VERY MUCH FOR YOUR ATTENTION

Nirmala Menikpura, PhD

Sustainable Consumption and Production (SCP) Group

Institute of Global Environmental Strategies (IGES)

E-mail: menikpura@iges.or.jp

International workshop on sustainable waste management, Yangon-Myanmar. 20 Dec 2013

IGES
Institute for Global Environmental Strategies