

Showcase of projects supported by IGES / CCAC-MSWI in Asia addressing waste management and SLCPs

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CCAC Municipal Solid Waste Initiative, Room 101, 1F, Convention Hall,
BEXCO, 31 August 2016
17th IUAPPA World Clean Air Congress and 9th CAA Better Air Quality
Conference



CLIMATE AND CLEAN AIR COALITION TO REDUCE SHORT LIVED CLIMATE POLLUTANTS MUNICIPAL SOLID WASTE MANAGEMENT INITIATIVE

What is the Coalition?

The Climate and Clean Air Coalition is the only global effort that unites governments, civil society and private sector, committed to improving air quality and protecting the climate in next few decades by reducing short-lived climate pollutants across sectors.

Complementary to mitigating CO2 emissions, the Coalition acts as a catalyst to create, implement and share immediate solutions addressing near-term climate change to improve people's lives rapidly, and to ensure sustainable development for future generations.

Starting in February 2011 with 6 Countries and 1 International Organisation, the coalition has rapidly expanded to 49 Countries, 44 NGOs, 16 International Organisations (as of September 2015).

The Municipal Solid Waste Management Initiative is one of 11 initiatives currently being undertaken by the coalition.

Short Lived Climate Pollutants from the Solid Waste Management Sector

Methane (gas)

- Landfill gas comprises ~50% methane and ~50% CO2
- Global warming potential of 25 (100-year time horizon), relative to CO2
- Anthropogenic – formed as a result of management of waste from humans

Black Carbon (fine particles in aerosol form)

- Most strongly light-absorbing component of particulate matter
- Formed by the incomplete combustion of fossil fuels, biofuels, and biomass
- Emissions patterns and trends vary significantly across regions, countries and sources
- An aerosol (not a greenhouse gas)

How Cities Participate in the MSW Initiative

- Undertake City Waste Assessments
- Quantify SLCP emissions and identify suitable sustainable alternatives for waste management – Emissions Quantification Tool
- Develop Work Plans
- Attend training and capacity building workshops targeting specific waste related themes
- Participate in city-to-city collaboration
- Obtain technical and financial analysis support in developing sustainable waste management projects
- Get access to resources and information on best practices on the CCAC MSW Initiative Knowledge Platform
- Get access to a world-wide network of experts

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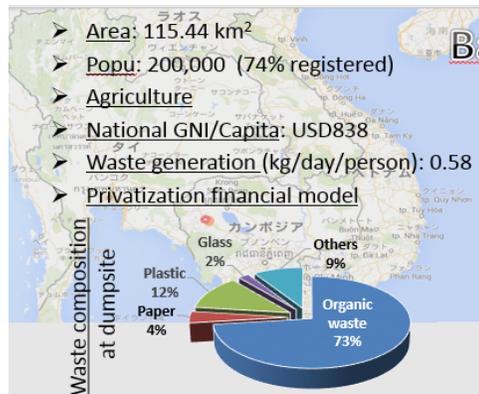
Development of Work Plan to Reduce SLCP from MSWM in Battambang, Cambodia



BATTAMBANG, CAMBODIA

Location	Battambang Province	Status	Rapid City Assessment Complete
Population	200,000		City Action Plan Complete
			Work Plan In Progress

Battambang is an agricultural city located in the northwest of Cambodia and an important rice producer. Under the Work Plan Battambang will now undertake activities towards the promotion of waste separation at source; improving final waste disposal site; integrating preservation of urban heritage and municipal solid waste management; and improving accountability of SLCP emissions from MSW management.



Battambang in Cambodia

- Area: 115.44 km²
- Popu: 200,000 (74% registered)
- Agriculture
- National GNI/Capita: USD838
- Waste generation (kg/day/person): 0.58
- Privatization financial model

Problems

- Black carbon emissions from open burning.
- No budget for MSWM from local and national governments.
- Lack of personnel and technical knowledge.
- No recycling facility.
- Residents' perception is low.

Proposed activities under CCAC

- To reduce black carbon emission by extinguishing fire at dump site and etc..
- To reduce waste disposal on open burning sites by promoting waste separation at source.
- Capacity building, awareness-raising, technical and financial support.
- City-to-city exchange programs and technical workshops.

Local initiatives

- "Clean, Green and World Heritage City" policy
- "Improve the cleanliness of the city", "Promote waste separation at source", "Improve the condition of landfills" programs
- Waste separation at source has been practicing at Boeng Chhouk Market. Composting and anaerobic Digestion is operated by COMPED (local NGO)
- Signed MOU in 2013 to receive technical support from Phitsanulok

Open dumpsite (as final disposal)



No bottom liner, no soil cover and open burning is on-going.



Waste pickers play a major role in segregating recyclable waste.

Aims to be a 'Clean, Green and World Heritage City'.



90% of generated waste from the urban is collected daily door-to-door and disposed by CINTRI (a private company).



Anaerobic digestion operated by COMPED (local NGO)



Battambang-Phitsanulok Cooperation since 2013

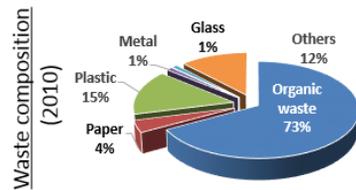


Development of Work Plan to Reduce SLCP from MSWM in Cebu, Philippines

CEBU CITY, PHILIPPINES			
Location	Cebu Province	Status	Rapid City Assessment Complete
Population	870,000		City Action Plan Complete
			Work Plan In Progress
<p>Cebu City's economy is based on trade and services focused on its bustling port. Under the Work Plan Cebu City is improving waste separation at source; undertaking improvements to material recovery and composting facilities; improvements of the final disposal site; and improving the institutional framework for cooperation amongst stakeholders. Cebu City will also be undertaking a study tour to Kitakyushu City, Japan.</p>			



- Area: 315.0 km²
- Popu: 866,171 (more than a million in daytime)
- Secondary & Tertiary industry
- National GNI/Capita: USD7,820
- Waste generation (kg/day/person): 0.58



Local initiatives

- “Creation of Supportive Institutional System”
- “Implementation of No Segregation No Collection Policy”
- “Promotion of Composting for Organic Waste Recycling”
- Encourage community-based and private sector recycling programmes

Cebu, Philippines

Problems

- No coordination among institutions responsible for SWM.
- Low budget allocation.
- Lack of capacity in Barangay (commune which is responsible for SWM).

Proposed activities under CCAC

- Implementation of waste separation at source.
- Promotion of composting at medium& larger-scale (business chance).
- Improvement of final disposal site.
- Building partnership for planning and implementation of the Integrated Solid Waste Management (ISWM) system for achieving SLCP reduction.
- Learn and share the experience and good practices through city-to-city exchange.

Cebu City will be caught in a “climate sandwich”.



Implementation of No segregation No Collection Policy



Cebu Environmental Sanitation Enforcement Team (CESET) for carrying out information/ environmental education and enforcement of laws.



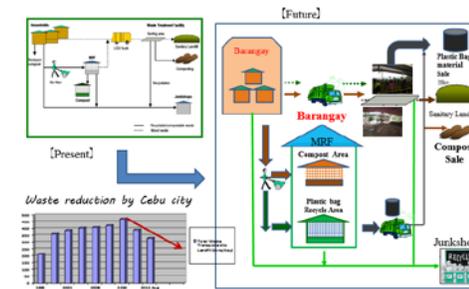
Backyard composting



Barangay Environmental Officers (BEOs) for environmental education, establish and supervise MRF and composting facilities.



Waste recycling in EVO private MRF



Development of Work Plan to Reduce SLCP from MSWM in Phitsanulok, Thailand

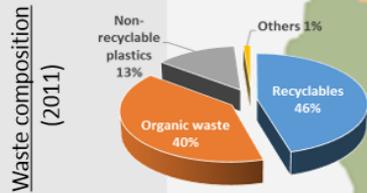


PHITSANULOK, THAILAND

Location	Phitsanulok Province	Status	Rapid City Assessment Complete
Population	170,000		City Action Plan Complete
			Work Plan In Progress

Phitsanulok is located in the centre of Thailand with a product and services economy. Under the Work Plan the city will undertake a range of activities from mainstreaming 3Rs and community based waste management to increasing organic waste separation as well as improving the accounting system of SLCP emissions from MSW management; and developing a plan to establish a learning centre for SLCP emissions reduction.

- Area: 18.26 km²
- Popu: 180,027 (40% registered)
- Secondary & Tertiary industry
- National GNI/Capita: USD13,270
- Waste generation (kg/day/person): 0.83 (national average: 1.15; 2013)



Local initiatives

- Strong leadership of the present vice-mayor
- “Toward zero waste” “toward zero landfill” policy
- Phitsanulok model of household waste management
- Community Participation
- City-to-City Cooperation (e.g. Battambang)

Phitsanulok in Thailand

Problems

- Organic waste separation rate is low (3.45% in 2013).
- Compost-like substance from mixed waste MBT is not being used.
- Data on MSW is limited.

Proposed activities under CCAC

- Improvement of the integrated MSW management system (i.e. composting, utilization of compost-like substance, biogas production from leachate, 3Rs, and etc.), for achieving SLCP reduction.
- Improvement of data collection for quantitative assessment and management of MSW based on LCA and MFA approach.
- Capacity building.
- Learning center in south-east Asia.

Community Base Solid Waste Management



To promote organic waste separation at source for composting is considered as one of methods for reducing SLCP emissions.



However, compost-like substance from mixed waste MBT is not being used.



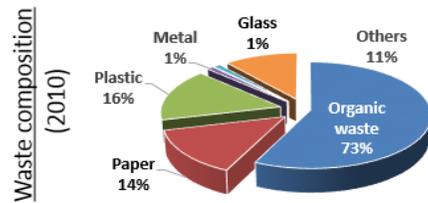
Development of Work Plan to Reduce SLCP from MSWM in Surabaya, Indonesia

SURABAYA, INDONESIA			
Location	East Java Province	Status	Rapid City Assessment Complete
Population	3,100,000		City Action Plan Complete
			Work Plan In Progress

Surabaya is the second largest city in Indonesia and a major port. The economy is primarily trade and services with a large manufacturing sector. Under the Work Plan Surabaya is focusing on improving and scaling up community-based SWM and 3R programmes; improvement of temporary disposal sites into intermediate waste recycling facilities; promotion of composting; and improvement of the landfill.



- Area: 374.8 km²
- Popu: 3 million
- Secondary & Tertiary industry
- National GNI/Capita: USD9,260
- Waste generation (kg/day/person): 0.62
- Landfill rate: 69%



Local initiatives

- Promotion of community-based SWMS
- Public awareness through Environmental facilitators and carders
- Promotion of composting for organic waste recycling (21 composting centers are distributed)
- Encourage community recycling through waste bank
- Building partnership with private sector to improve the transfer stations at Depot and the final disposal site at [Benowo](#).
- Environmental cooperation with Kitakyushu since 2001

Surabaya, Indonesia

Problems

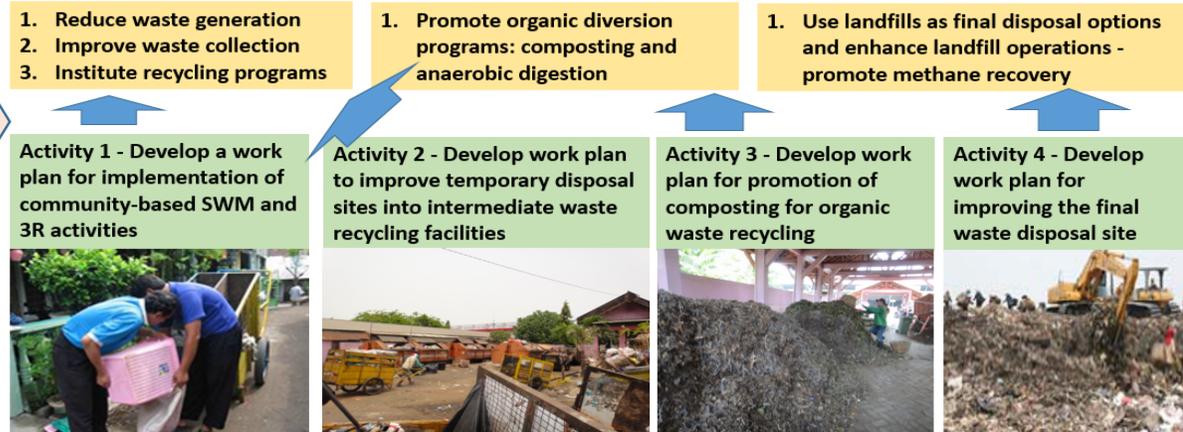
- No coordination among institutions responsible for SWM?
- Lack of waste recycling facility?

Proposed activities under CCAC

- Improve the temporary disposal site (transfer stations) as an intermediate waste recycling facility.
- Promotion of composting at medium and larger-scale (business chance).
- Improvement of final disposal site (waste to energy).
- Building partnership for planning and implementation of the Integrated Solid Waste Management (ISWM) system for achieving SLCP reduction.
- Learn and share the experience and good practices through city-to-city exchange.

Improve Municipal Solid Waste Management (MSWM) in Surabaya City to reduce Short-Lived Climate Pollutants (SLCPs)

(1. Methane Gas – open dumping; 2. Black Carbon – waste collection (incomplete combustion of fossil fuels, biofuels) and open burning (biomass))



Development of Action Plan to Reduce SLCP from MSWM in Rayong/ Map ta Phut, Thailand

RAYONG AND MAP TA PHUT, THAILAND

Location	Rayong Province	Population	55,000 (Rayong City); 5,000 (Map Ta Phut)
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Rayong and Map Ta Phut are located in the southeast of the country. Rayong City is known as a fishing town and is the main producer of Thailand's fish sauce. Map Ta Phut is well known as the host of Thailand's largest industrial estate. Rayong and Map Ta Phut are currently collaborating with Kitakyushu City to improve the cities' industrial waste management. Under CCAC MSWI the cities will look to further improve their municipal solid waste management with the assistance of Kitakyushu City and IGES.

Project Partners



Project Implementation Process



Oct 2015
Kick-off meeting with city officials
Preliminary survey and visualize the current waste management system



Feb 2016
Detailed survey and identify the gaps
Introduction of good practices of Kitakyushu City in waste management



Mar 2016
Workshop to develop an action plan to improve the waste management
Identify the key actions for work plan stage of CCAC
Training of community leaders/volunteers on 3R (reduce, reuse, recycle)



Rayong Municipality MSWM issues in 2015

Rayong Municipality

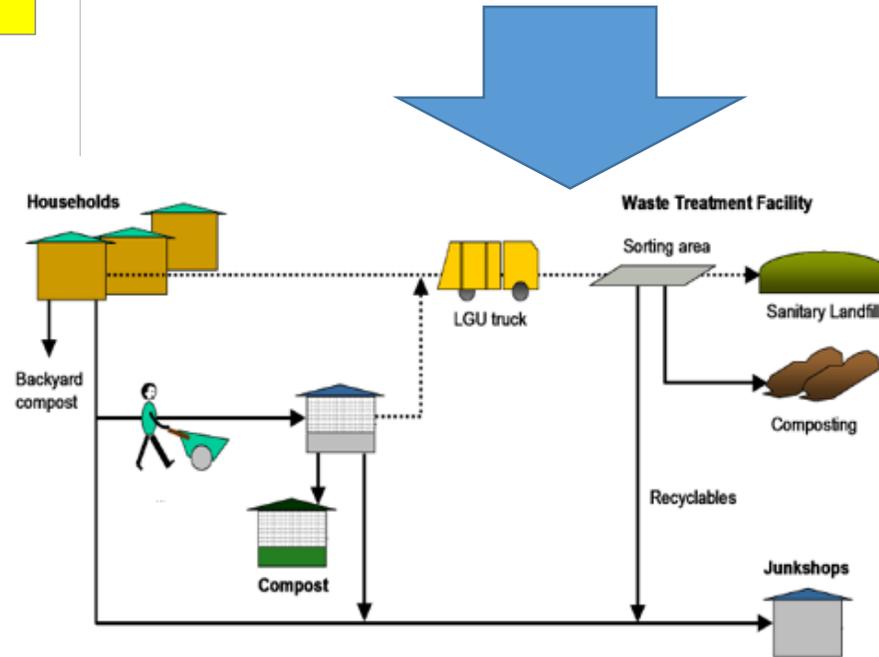
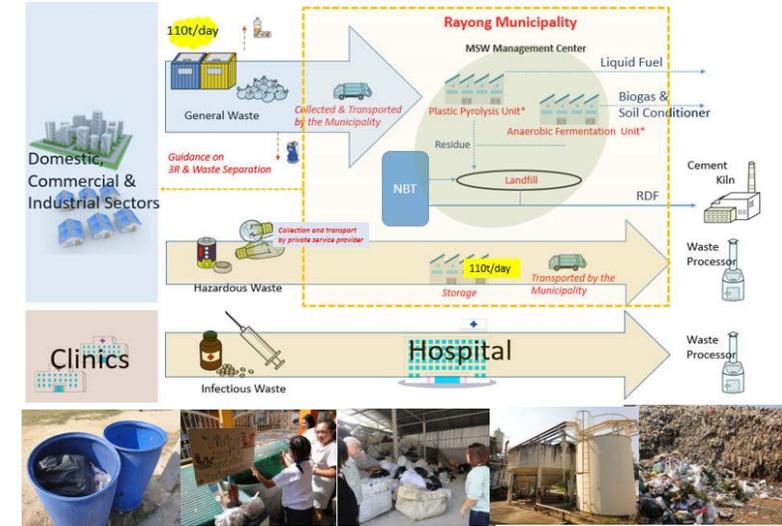
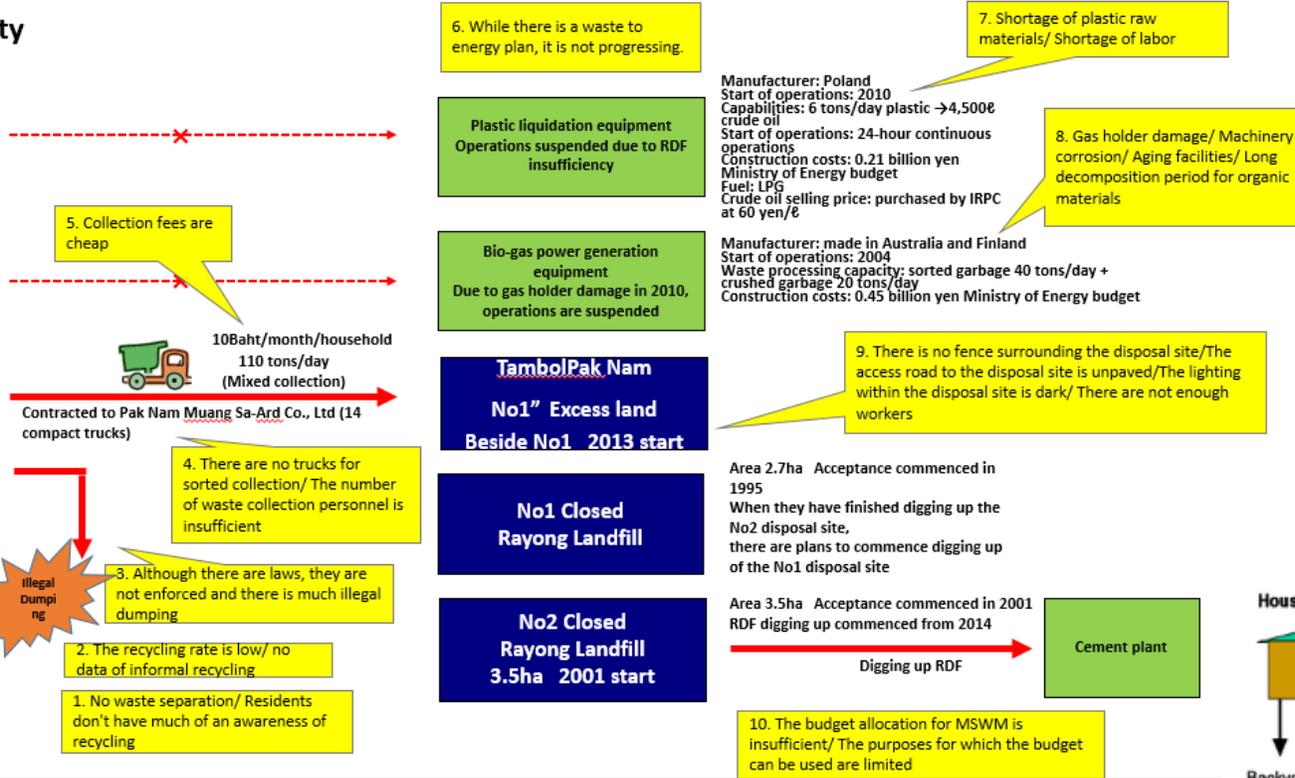


Municipal waste generation

- Total 110 tons/day
- 1.7kg per person/day

Waste composition

- Organic (25.55)
- Paper (12.12)
- Textile (8.49)
- Grass/wood (16.36)
- Plastic (30.91)
- Metal (0.61)
- Glass (2.42)
- Others (3.54)



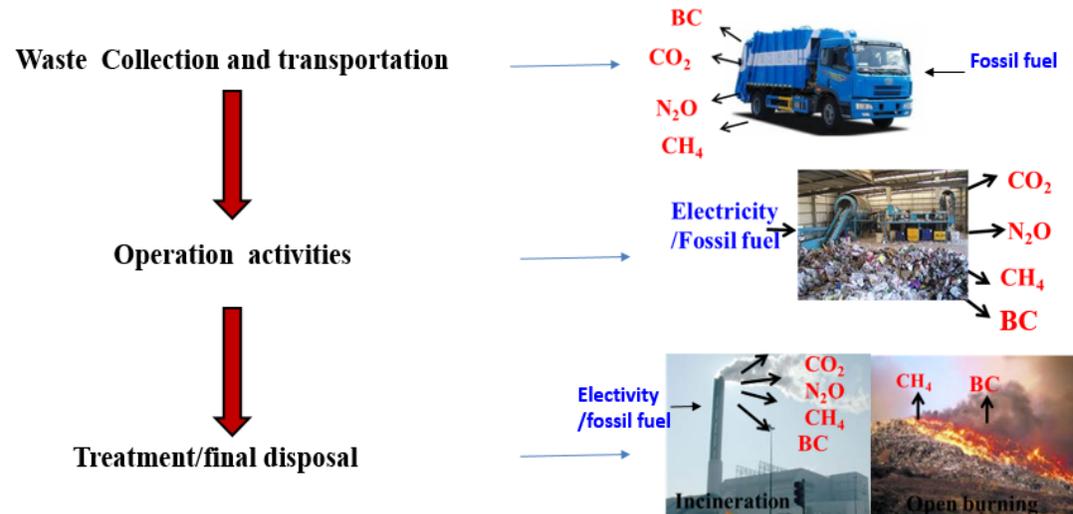
Development of SLCP Emissions Quantification Calculator

EMISSIONS QUANTIFICATION CALCULATOR

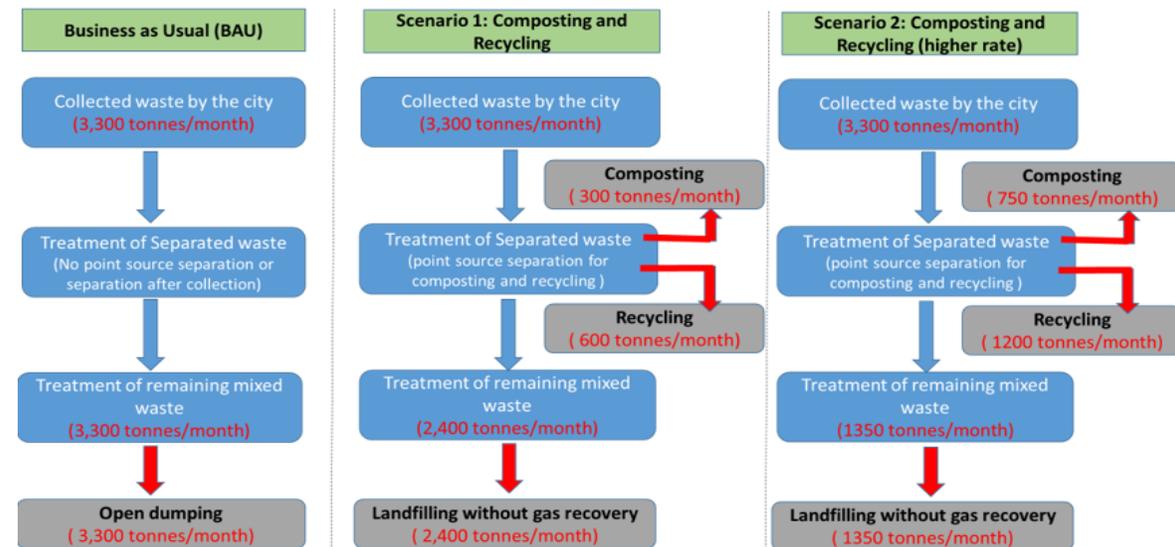
IGES has developed an emissions quantification calculator which will allow cities and national governments to measure and monitor progress in reducing GHGs and SLCPs through their actions in the waste sector, using a common methodology. The tool has been designed to assist public authorities in conducting a rapid assessment of emissions, thereby supporting decision making on the identification of alternative waste management options. It provides step-by-step guidance on how to enter data, monitor and report on mitigation efforts over time to guide the implementation of climate-friendly waste management practices and approaches.

SLCPs and GHGs Emissions from MSW Management

□ All the activities in waste management emit GHGs and SLCPs



Comparison of BAU Practice with Two Alternative Scenarios in Rayong



Estimated Results of SLCP Reduction

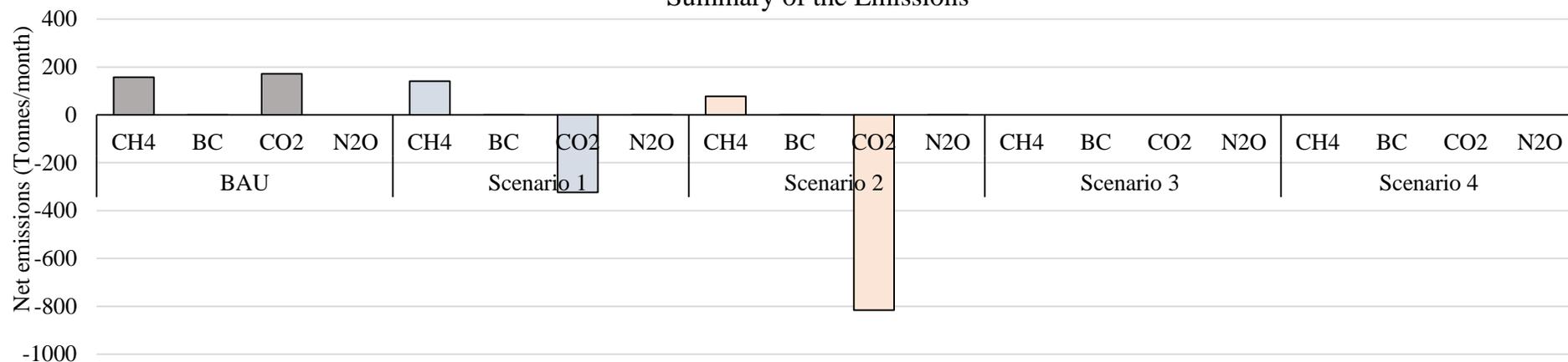
Results: Summary of the emissions

Show Graph

Print sheet

Category	Type of emissions	Emissions	Emissions from waste transportation (kg/month)				
			BAU	Scenario 1	Scenario 2	Scenario 3	Scenario 4
SLCPs	CH ₄	Direct (Type I fuel)	0.18	0.13	0.07	0.00	0.00
		Direct (Type II fuel)	0.00	0.00	0.00	0.00	0.00
		Direct (fuel at transfer Station)	0.00	0.00	0.00	0.00	0.00
	Net emissions		0.18	0.13	0.07	0.00	0.00
	BC	Direct (Type I fuel)	2.02	1.44	0.72	0.00	0.00
		Direct (Type II fuel)	0.00	0.00	0.00	0.00	0.00
		Direct (fuel at transfer Station)	0.00	0.00	0.00	0.00	0.00
Net emissions		2.02	1.44	0.72	0.00	0.00	
Other GHGs	CO ₂	Direct (Type I fuel)	4527.88	3234.20	1617.10	0.00	0.00
		Direct (Type II fuel)	0.00	0.00	0.00	0.00	0.00
		Direct (fuel at transfer Station)	0.00	0.00	0.00	0.00	0.00
		Indirect (electricity at transfer Station)	0.00	0.00	0.00	0.00	0.00
	Net emissions		4527.88	3234.20	1617.10	0.00	0.00
	N ₂ O	Direct (Type I fuel)	0.04	0.03	0.01	0.00	0.00
		Direct (Type II fuel)	0.00	0.00	0.00	0.00	0.00
		Direct (fuel at transfer Station)	0.00	0.00	0.00	0.00	0.00
	Net emissions		0.04	0.03	0.01	0.00	0.00
	Net BC emissions (tonnes of BC/month)			0.00	0.00	0.00	0.00
Net climate impact of other GHGs (tonne of CO₂-eq/month)			4.54	3.25	1.62	0.00	0.00

Summary of the Emissions



Organisation of training and capacity building through city-to-city exchange and networking (Cebu and Kitakyushu City)



DAY 1



1, 2: Lecture: Waste management of Kitakyushu

Kitakyushu Eco-town
3: Electric home appliances recycling (Nishinohon Kaden Recycle)
4: Automotive recycling (Nishinohon Auto Recycle)
5, 6, 7, 8: Fluorescent tube recycling (J-relights)



DAY 2



1-9: Practical lecture on Takakura Composting



DAY 4



1-5: Wrap-up session

6-8: Closing ceremony



Key Lessons Learned

- MSWM sector is one of the major contributor to global SLCPs
- This can be happened throughout the waste management system, starting from waste generation, collection, transportation, treatment and final disposal
- The actions including waste separation at source, decentralise primary collection, promotion of organic waste recovery (composting and biogas), integrate informal recycling (waste bank, material recovery facility), improving transfer facility and transport system and improving final disposal (closing open dumping and burning) are common activities that cities would like to take to reduce SLCPs from MSWM
- Climate impact from GHGs and SLCPs can be quantified with respect to the individual treatments as well as from an integrated system. However, other co-benefits (health, social, economic, environment) should also consider to see real impacts of the MSWM system
- The challenges are lack of data/ information, political leadership and long term visioning, and capacity (technical/financial)

Thank you

