

添付資料11-5: 成果4サブグループ会議

11-5-3 : 3rd SG4

TECHNICAL COOPERATION PROJECT (TCP) ON CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES

3rd SUB-GROUP MEETING FOR PROJECT OUTPUT 4

ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/

RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES OTHER THAN WTE

03 September 2020, Thursday, 9:00 AM (via Teams)

3rd SUB-GROUP MEETING FOR PROJECT OUTPUT 4
ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES OTHER THAN WTE

03 September 2020, Thursday, 9:00 AM (via Teams)

TENTATIVE AGENDA

1. Call to Order/Meeting Objectives / Acknowledgement of Attendees and Adoption of Agenda by *Ms. Ma. Della Cristina Valdez, EMB-SW/MD, PMO*
2. Review of the previous discussions from the last Sub-group meeting - *Ms. Kyoko Kimura, JET*
3. Presentations/Discussions on some examples of "Good Practices/ Good technologies" of other SWM technologies in third world countries under Activity 4-3 (Presentation 30 mins + Q&A 15 mins):
 - Intermediate Treatment Facility/3R by *Engr. Reynaldo L. Esguerra, DOST-ITDI Sanitary Landfill - Engr. Elisa P. Madrazo/Engr. Lukandiva Soliman R. Orcullo, LGU Davao City*
 - Collection Method - *Engr. Glory Rose C. Manatad, LGU Cebu City*
 - IEC of Waste Reduction and Evaluation Methods of IEC - *Mr. David John S. Yergara, LGU Quezon City*

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TENTATIVE AGENDA (cont.)

4. The proposed format to consolidate the Good Practices and Technologies - *Ms. Ika Sato, JET*
5. Wrap-up/Required Actions/Agreements - *Ms. Nikole Andrea Mallare, JET*
6. Schedules of the next Sub-group meetings - *Ms. Elwira S. Pausing, EMB-SW/MD-PMO*
7. Other matters

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LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
CONCERNED GOVERNMENT AGENCIES			
1	Engr. Reynaldo Esguerra	DOST-ITDI	✓
	Engr. Rochelle L. Retamar	DOST-ITDI	
	Engr. Dante C. Vergara	DOST-ITDI	
2	Ms. Ruby de Guzman	DOE-BEMD	
	Mr. Romeo M. Galangam	DOE-BEMD	
	Ms. Charisse Pascual	DOE-BEMD	✓
3	Mr. Carlo Mari Crisregionald C. Tan	DILG-BLGS/NAPOLCOM Center	
	Ms. Maria Clarisol L. Agas	DILG-BLGS/NAPOLCOM Center	
4	Mr. Aldwin U. Urbina	NEDA IPG	
	Mr. Gilbert V. Kintanar	NEDA IPG	

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NO.	NAME	AGENCY/OFFICE	CONFIRMED
CONCERNED GOVERNMENT AGENCIES			
5	Dir. Justine E. Padernos Atty. Phebean Belle Ramos-Lacama Ms. Maria Beatriz N. Quintos	PPP Center PPP Center PPP Center	✓
DENR-EMB FOCAL PERSONS			
6	Engr. Marcelino N. Rivera, Jr.	EMB-Environmental Quality Management Division	
	Ms. Consolacion P. Crisostomo	EMB-Planning, Policy and Program Development Division	
7	Ms. Mary Esther D. Ofiaza Engr. Majoc Cristobal	EMB-Planning, Policy and Program Development Division EMB- Environmental Research and Laboratory Services Division	✓ ✓
8	Ms. Fatima Annelgo R. Molina Mr. Roger C. Evangelista Jr.	EMB- Environmental Research and Laboratory Services Division	

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NO.	NAME	AGENCY/OFFICE	CONFIRMED
DENR-EMB FOCAL PERSONS			
9	Engr. Jundy T. Del Socorro Engr. Wiyona Kay C. Rativo	EMB-EQMD-Air Quality Management Section EMB-EQMD-Air Quality Management Section	✓
LOCAL GOVERNMENT UNITS			
10	Mr. Vincent Ferdinand Paul G. Ymarao Mr. David John S. Vergara Engr. Editha D. Peros Engr. Glory Rose C. Manatad Atty. Dwight Tristian P. Domingo Engr. Elisa P. Madrazo Engr. Lakandwiwa Soliman R. Orcullo	LGU Quezon City LGU Quezon City LGU Cebu City LGU Cebu City LGU Davao City LGU Davao City LGU Davao City	cannot attend (informed thru email) ✓ ✓ ✓ ✓ ✓ ✓

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LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
PROJECT COORDINATORS			
13	Dir. Angelito V. Fontanilla Mr. Eddie Abugan Ms. Marianica Philina Obmerga Ms. Ma. Della Cristina Valdez Ms. Elvira S. Pausing	DENR-FASPS DENR-FASPS DENR-FASPS EMB-SWMD-PMO EMB-SWMD-PMO	✓ ✓ ✓ ✓

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LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
EMB-SWMD-PMO			
15	Ms. Nelie Dimer Ms. Raquel Reyes Ms. Rodeth Antonio Engr. Jedidiah Mangubat Engr. Roxanne Barcenas Ms. Kris Morada	EMB-SWMD-PMO EMB-SWMD-PMO EMB-SWMD-PMO EMB-SWMD-PMO EMB-SWMD-PMO EMB-SWMD-PMO	✓ ✓ ✓ ✓ ✓ ✓
JICA Philippines			
16	Mr. Christian Perez Ms. Florda Chan	JICA Philippines JICA Philippines	✓ ✓

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 03 September 2020, Thursday, 9:00 AM (via Teams)

LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
JICA EXPERTS TEAM (JET)			
	Mr. Takahiro Kamishita	Nippon Koei Co., Ltd./JET	✓
	Mr. Satoshi Higashinakagawa	Nippon Koei Co., Ltd./JET	✓
	Mr. Makoto Kosaka	Nippon Koei Co., Ltd./JET	✓
	Mr. Tomoyuki Hosono	Nippon Koei Co., Ltd./JET	✓
	Ms. Kyoko Kimura	Nippon Koei Co., Ltd./JET	✓
	Ms. Iku Sato	Nippon Koei Co., Ltd./JET	✓
	Ms. Nikole Andrei Mallare	JICA Experts Team (JET)	✓
	Mr. Eric Cea	JICA Experts Team (JET)	✓

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SCHEDULE OF SUB-GROUP MEETINGS for CY 2020

PROJECT OUTPUT	JUNE	JULY	AUG	SEPT	OCT	NOV
OP 1	4 (Thu)	7 (Tue)	20 (Thu)		12 (Mon)	5 (Thu)
OP 2		16 (Thu)		10 (Thu)		
OP 3					8 (Thu)	
OP 4	24 (Wed)		26 (Wed) tbc			
ITWG					15 (Thu)	
JCC						4 (Wed)

3rd SUB-GROUP MEETING FOR PROJECT OUTPUT 4
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 03 September 2020, Thursday, 9:00 AM (via Teams)

ADJOURNMENT



3rd Sub Group Meeting for

Output 4: Enhancement of The National Government's Capacity to identify issues and provide suggestions/recommendations for other SWM technologies other than WTE

3rd September 2020 (Thursday) 9:00 a.m.

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies

2. Review of the previous meeting (1/3)

Output 4: National Government's and target LGUs' capacity to identify issues and provide suggestion/recommendation for other SWM technologies than WTE is enhanced.

Specific activities

1st meeting

4.1 Grasp the current situation by National SWM strategy and 10 year SWM plan in the target LGUs.

4.2 Identify the current issues for other SWM technologies in the target LGUs.

2nd and 3rd meeting

4.3 Collect the information of "Good practice/Good technology" of other SWM technologies in Japan/third world countries.

4.4 Summarize and provide suggestion/recommendation to improve utilization of other SWM technologies to target LGUs.

4.5 Seminar for disseminating suggestion/recommendation is held.

Agenda

1. Call to Order/Meeting Objectives/ Acknowledgement of Attendees Adoption of Agenda
2. Review of the previous discussions from the last Sub-group meeting
3. Presentations/Discussions on some examples of "Good practices/Good technologies" of other SWM technologies in third world countries under Activity 4-3
4. The proposed format to consolidate the Good Practices and Technologies
5. Wrap-up/Required Actions/Agreements
6. Schedules of the next Sub-group meetings
7. Other matters

2. Review of the previous meeting (2/3)

Comparison "Challenges on LGUs" with "Good practice/Good technology"

#	Item	Activity 1&2 Challenges on LGUs
1	Budget	<ul style="list-style-type: none"> Inappropriate waste treatment cause of lack of SWM budget
2	WACS	<ul style="list-style-type: none"> Appropriate WACS method Effective utilization of WACS data
3	Collection	<ul style="list-style-type: none"> Incomplete segregation and separate collection

Activity 3 Good practice/Good technology	
Survey items	Current situation
Finished (~ 24 th Jun)	<ul style="list-style-type: none"> Some examples are shared by JET. (2nd SG meeting)
Collection of waste fee from residents	<ul style="list-style-type: none"> Sampling method and disclosure to residents Utilization of WACS data
Segregated collection (Station collection, Group resource collection)	<ul style="list-style-type: none"> Sampling methods and utilization of WACS data was presented by DOST and JET. (2nd SG meeting)
Collection with gathering the waste treatment fee	<ul style="list-style-type: none"> Collection method of organic waste and other waste will be shared by Cebu city at this meeting. (3rd SG meeting)

2. Review of the previous meeting (3/3)

➤ Comparison “Challenges on LGUs” with “Good practice/Good technology”

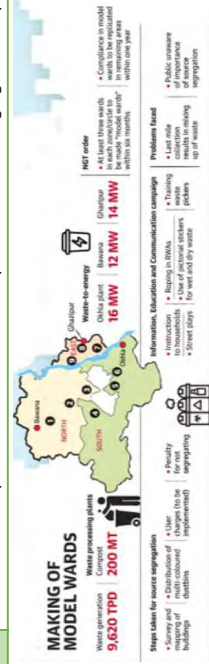
#	Item	Activity 3 Good practice/Good technology	
		Research items	Current situation
4	Intermediate treatment	<p>Activity 1&2 Challenges on LGUs</p> <ul style="list-style-type: none"> Further recycling 	<p>Finished (~ 24th Jun)</p> <ul style="list-style-type: none"> Example of basic recycling method (Organic waste, paper, plastic and bin, can)
5	Landfill	<ul style="list-style-type: none"> Necessity of the infrastructure rehabilitations for inappropriate management (waste overflow and rough road) Need to secure a new landfill site 	<ul style="list-style-type: none"> JET presented the basic recycling method previous SG meeting. DOST will present more specific technology at this meeting. (3rd SG meeting) Davao city will present the technology of SLF at this meeting. (3rd SG meeting)
6	IEC	<ul style="list-style-type: none"> Conduct of effective IEC 	<ul style="list-style-type: none"> Some examples are shared by JET. (2nd SG meeting) Quezon city will share the good practice of IEC.

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

Intermediate treatment facility (3R)

Scheme

Title	Model Ward Initiative, National Green Tribunal (NGT) Delhi, India
Outline	<ul style="list-style-type: none"> Areas from the north, east and south Delhi are to be made as “model wards” in six months where complete compliance of solid waste management rules is expected. A record of 60,000 households is targeted for complete compliance in source segregation. Officials from the NGT were to demonstrate waste segregation and provide segregated bins to households Based on the monitoring, only 22.5% of households were compliant with source segregation (13,500 out of 60,000 households) The project aims to divert segregated waste from the cooperating households to composting facilities (200MT) and to three waste-to-energy facilities. The amount of waste to be fed in the facilities is expected to increase once the practices of source segregation is replicated in Delhi.



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4. The proposed format to consolidate the Good Practices and Technologies
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3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

Intermediate treatment facility (3R)

Recycling/WTE

Title	URENCO Refuse Paper and Plastic Fuel (RPF) Hanoi, Vietnam
Outline	<ul style="list-style-type: none"> Refuse paper and plastic fuel (RPF) is a subclass of RDFs and serve as a compacted burning source with high calorific value Calorific value can be adjusted by changing the mixing ratio of waste paper and waste plastic. RPF's ash percentage is less than 6%(Coal's ash percentage is 12-15%) RPF production led by URENCO company in Hanoi together with Ichikawa Kankyo Engineering (IKE) cooperation in Japan. Aims to produce over 12000 T of RPF pellets Suitable technology for industrial waste like those from paper factory because the waste is already segregated. Refuse paper and plastics from household wastes must be segregated and collected separately



URENCO 11 RPF Facility



RPF pellets

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

DOST

Intermediate treatment facility 3/R

WTE

Title	Rayong Waste-to-Energy Facility Rayong, Thailand
Outline	<ul style="list-style-type: none"> Anaerobic digestion system capable of accommodating 70 tons per day of organic waste for generation of biogas. Aimed at producing 340,000 kg of methane per year Technology suitable for segregated agricultural waste and food processing waste Technology also suitable for organic waste segregated from municipal solid waste.



Rayong Biogas Plant

Juidamrongphan, W. 2018. Sustainable Waste Management and Waste to Energy Recovery in Thailand. Advances om Biofuels and Bioenergy

NIPPON KOEI
EJEC 8

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

DOST

Intermediate treatment facility 3/R

WTE

Title	Waste-to-Energy Project for the rice milling sector in Cambodia Cambodia
Outline	<ul style="list-style-type: none"> Technology aimed to generate electricity from rice husks in milling factories. Funded by EU, SWITCH-Asia, SNV Cambodia. Use of rice husk gasifier technology for energy generation. Rice millers to invest in driers so that they can process the wet paddy they currently export at a low cost As of 2014, 116 rice husk gasifiers were installed in 12 provinces in Cambodia. Thru gasification, one liter of fuel can be replaced by 6kg of rice husk for electricity production. However, wastewater from syngas cooling and cleaning is commonly discharged with little treatment. Tar produced was generally thrown away or burned. About 85% of rice husk ash or biochar remains unused, 6% were sold off, 9% were given away to villagers as raw material for brick making or as soil amendment



600KW rice husk gasifier

SNV Cambodia. “Waste to Energy for the Rice Milling Sector in Cambodia”. http://eas.europa.eu/delegations/cambodia/documents/publications/waste_to_energy_en.pdf

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EJEC 10

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

DOST

Intermediate treatment facility 3/R

Composting

Title	District Model of Waste as a Resource in Suan Luang District Bangkok, Thailand
Outline	<ul style="list-style-type: none"> Segregated collection of source separated yard waste and food waste from households and restaurants for diversion to composting facility and as animal feed. Community-based management; Promotes waste reduction and segregation via scheduled collection, provision of waste separation bins, establishment of SWM Learning Center Average 3.4 tons/day collected yard waste for composting; average 2 tons/day food waste collected from restaurants as animal feed



Lammawichai J. 2017. Solid Waste Management in Bangkok. Department of Environment, Bangkok Metropolitan Administration. Retrieved from <https://www.jesc.or.jp>

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EJEC 9

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

DOST

Intermediate treatment facility 3/R

Composting

Title	FORWARD Black Soldier Fly (BSF) Upcycling of Urban Organic Solid Waste Sidoarjo, Indonesia
Outline	<ul style="list-style-type: none"> R&D project funded by the Swiss State Secretariat for Economic Affairs (SECO); implemented at Sidoarjo. Uses black soldier fly larvae for compost production and animal feed production Able to process 2 tons per day of organic waste. Grown larvae are harvested and processed to animal feed (fish and poultry) while the residue is used as compost Technology can be used in conjunction with other technologies such as WTE’s since it only address a small portion of waste.



Organic waste recycling facility in Sidoarjo



Black soldier fly composting

<https://www.eawag.ch/en/department/sandec/projects/mswm/forward-from-organic-waste-recycling-for-development/>

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EJEC 11

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

DOST

Intermediate treatment facility (3R)

Composting

Title	Bokashi composting of food waste from restaurants and hotels in Fraser’s Hill Fraser’s Hill, Malaysia
Outline	<ul style="list-style-type: none"> Backed by JICA and Solid Waste Corporation Management (SWCorp), establishments were trained in managing kitchen waste thru Bokashi method. Processed about 9000kg of food waste from commercial establishments, produced 200kg of fertilizer. Increased recycling rate, turn food waste into fertilizer and diverts waste from the Cheroh landfill near the hill top resort of Fraser’s Hill Technology can be used in conjunction with other technologies such as WTE’s since it only address a small portion of waste.



Fraser’s Hill Food Waste Compost Centre

<https://www.reawag.ch/en/department/sandec/projects/mswm/forward-from-organic-waste-recycling-for-development/>

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EJEC 12

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

JET

Collection and Transportation (2/3)

Prices of Designated Garbage Bags in Taipei City

1
3-liter bag
COSTS
0.0357 USD
~1.75 PHP

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EJEC 14

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

JET

Collection and Transportation (1/3)

Pay As You Throw (PAYT) System

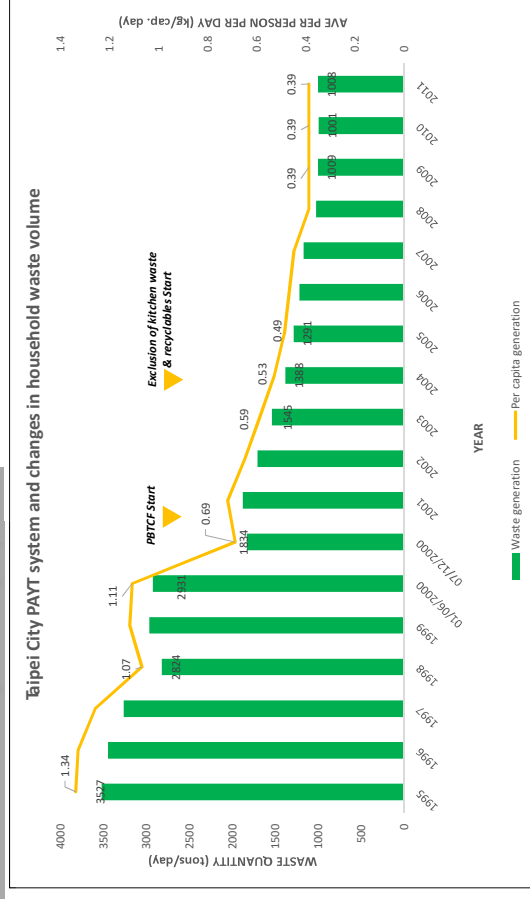
Title	Trash Per-Bag Fee Collection Program (Taipei, Taiwan)
Outline	<ul style="list-style-type: none"> Through the program, residents are charged with fees according to the weight or volume of generated waste, through the use of specific containers, stickers or garbage bags. Collected fees from the program is used for waste management and other environmental problems. Certified garbage bags are provided by the City Government Department of Environmental Protection (TDEP) and can be purchased at convenience stores. Waste not included in this program: (Free of charge collection) <ul style="list-style-type: none"> Recyclables Kitchen waste / Food waste
Advantage	<ul style="list-style-type: none"> Fair treatment of fee collection Resource recycling and waste minimization Promotion of recycling
Disadvantage	<ul style="list-style-type: none"> Risk of illegal dumping

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3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

JET

Collection and Transportation (3/3)



Source Taipei Department of Environmental Protection, Taipei City Government (2012)

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EJEC 15

3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

JET

Collection and Transportation (1/2)

Embedding Local Economic Development (LED) into SWM

Title	<p>Participatory Solid Waste Management (Phangkon Municipality, Sakon Nakhon Province, Thailand)</p>
Outline	<ul style="list-style-type: none"> • SWM Programs of the municipality incorporate cultural, social, and economic aspects with the aim of promoting sustainable waste segregation by the residents. • The local government supplies the community members with tank for waste collection in their house. • Waste is segregated accordingly: <ul style="list-style-type: none"> ➢ Organic Waste → recycled into compost or biogas ➢ Recyclables → collected then sold ➢ Hazardous Waste → drop off points → sold to private companies → income donated to Buddhist monks • To ensure well-implemented approach, the local government worked closely with the community and local leaders, connecting the community with private sector towards sustainability of the process in particular the economic activities.

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3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

JET

Collection and Transportation (2/2)



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EJEC 17

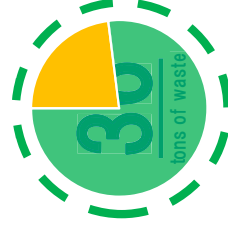
3. Example of “Good practice/Good technology” of other SWM technologies in third world countries

JET

Information, Education, & Communication Campaigns

Waste Wise Festival

Title	<p>Taipei Lantern Festival 2003 (Taipei, Taiwan)</p>
Outline	<ul style="list-style-type: none"> • Taipei City Government organized the Taipei Lantern Festival last 2003 with the aim of showing citizens that they can enjoy themselves, while at the same time, without leaving a great deal of trash behind. • Specially designed recycle bins were provided during the festival to collect recyclables, non-recyclables and food waste for composting. The festival lasted for ten days, and estimated attendance is over four million. • For those who dump the trash on the ground, 16 citations and 54 notices of improvement were issued.



NIPPON KOEI
EJEC 18

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4. The proposed format to consolidate the Good Practices and Technologies

Example of Booklet

- The booklet format is assumed to be a sample.
- If subgroup members have any other information you would like to include in the booklet, please contact us.
- In addition to the booklet, we plan to **prepare the web site about good practice.**

Request from JET

- JET will adapt the information gathered by subgroup members to this format.
⇒ So, **please share the output materials.**

#	Person in charge	Item	Output materials	
			Excel	Power point
1	DOST	Waste Generation Quantity and Quality	Received	Received
2	Davao City	Landfill	Received	Received
3	Cebu City	Collection and Transportation	Please share	Received
4	Quezon City	Education (IEC)	Please share	Please share

Booklet Sample

1. Scheme

Title of Good Practice _____ Country, (Prefecture) _____

Target waste _____

XXXX _____

Commencement date _____

Initial cost _____

Operation cost _____

Capacity _____

Area _____


XXXX City _____ XXXX m2 _____

Outline _____

- XXXXXX
- XXXXXX
- XXXXXX

Good Practice Point

- XXXXXX
- XXXXXX
- XXXXXX



Schedule of Output4

Activities	1st Year Mar/'19 - Mar/'20	2nd Year Apr/'20 - Mar/'21	3rd Year Apr/'21 - Mar/'22
4.1			
4.2			
4.3			
4.4			
4.5			
Sub-Group MTG	13-Feb ★	24-Jun 3-Sep ★★	
Main activity	<ul style="list-style-type: none"> Grasp the current situation and identify the current issues by National SWM strategy and 10 year SWM plan in the target LGUs. 	<ul style="list-style-type: none"> Collect the information of "Good practice/Good technology" of other SWM technologies in third countries. Summarize and provide suggestion/recommendation to improve utilization to target LGUs. 	<ul style="list-style-type: none"> Seminar for disseminating suggestion/recommendation is held.

To analyze what is the most suitable technology for each LGUs, LGUs' help in **providing information is appreciated.**
e.g. income and expenditure of SWM (Actual and future forecast)

III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)

2. Gas Ventilation System

- Vertical piping system placed in the landfill to collect gas for treatment or productive use as an energy source;
- Positive Point:** Allows for the escape and avoid build-up of methane and other gases in the landfill.
- Negative Point:** Regular inspection of pipes (leachate collection and gas vents) to ensure efficiency of system. Prone to obstruction and damage.

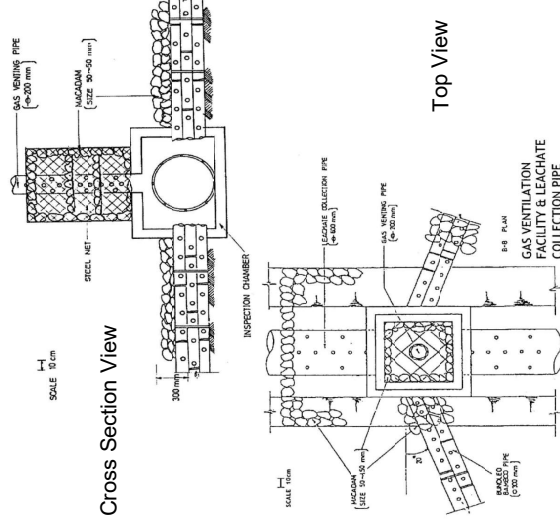


III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)

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Dominican Republic



III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)



Pakistan

III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)



China

III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

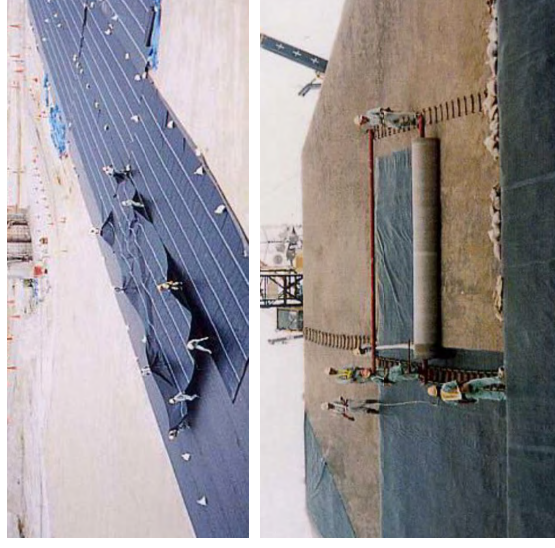
SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)



III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)



3. Surface Liner Facility

- A system of clay layers and/or geosynthetic membranes used to contain leachate.
- Positive Point: Reduce or prevent contaminant flow to groundwater.
- Negative Point: May be prone to damage or breakage due to passage of equipment or other factors.

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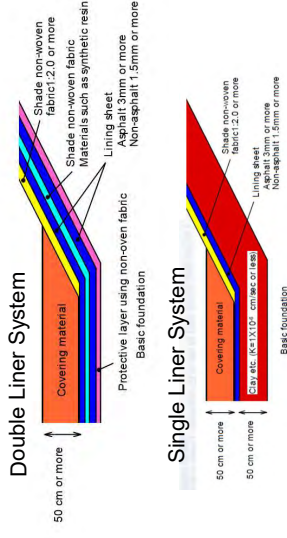
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5. Landfill

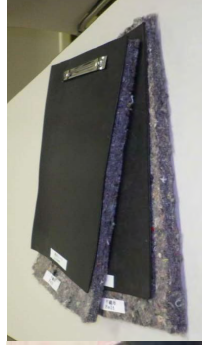
SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)

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Lining Sheet



Non-woven fabric

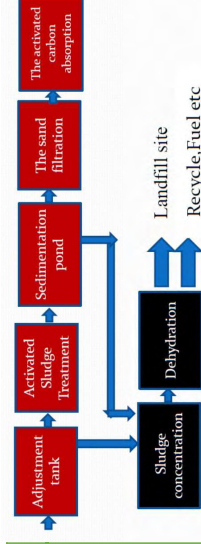
III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)

4. Leachate Treatment Facility

- Collects leachate for storage, treatment and discharge
- **Positive Point:** Facilitates treatment of landfill wastewater to be able to meet effluent discharge and water quality standards.
- **Negative Point:** Will incur additional costs in overall waste management.



III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)

5. Daily Soil Cover

- A daily soil cover placed over the waste at the close of each day's operations
- **Positive Point:** Protects wastes from long-term contact with the environment.
- **Negative Point:** Soil will take up space in landfill and reduce its overall capacity.



Daily Soil Cover (flat)

Daily Soil Cover (slope)

III. Example of “Good practice/Good technology” of other SWM technologies

5. Landfill

SEMI-AEROBIC LANDFILL (FUKUOKA METHOD)

5. Daily Soil Cover

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RA 9003	(a) Same day covering soil	10cm	15.24 cm (6 in.)
	Incineration residue	15-20cm	
	Incombustible big shape waste	30-50cm	
	(b) Intermediate Covering	Expose a relatively long period of time	50cm (20 in.)
	(c) Final Covering	Planting of low tree	60 cm (24 in.)
		Planting of high tree	more than 1 m (33 in.)

Collection and Transportation Practices

In waste management systems, the area collection-transportation plays a central role.

It cause for 60 to 80% of the total costs of waste disposal and therefore there are significant saving possibilities on improvements in its organization and implementation.

Engr. Glory Rose C. Manatad
Cebu City Environment and Natural Resources
Office (CCENRO)
September 3, 2020

Collection Methods

Backyard Collection

- collectors going to the backyards
- emptying the garbage cans into large carts or containers, and
- carrying these to the waiting truck.

This system was not only expensive in dollar cost to the community, but it was expensive in terms of the extremely high injury rate to the collectors.



Curbside Collection

Some communities in the US have adopted a volume-based fee system to pay for solid waste collection and specify the containers that must be used. In a volume-based fee system, residents are offered cans in three sizes— such as 30-, 60-, or 90-gallon (110-, 230-, and 340-liter) cans. The fee for refuse service is based on the size of can used.



Multiple Compartment Collection

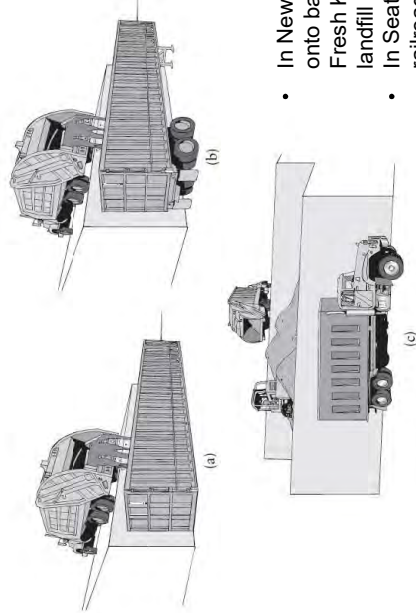
Some communities initiate collection programs where the residents separate the materials and placed them into different containers. For example, bottles and cans go in one container, newspaper in a second, and mixed paper in the third. This eliminates the need to sort newspaper, which is the most common recyclable (by weight) and shifts the cost of sorting to the waste generator.

When Los Angeles shifted to a commingled container method, the recycling rate increased by 40%. ("Single Stream Recycling: The Future Is Now," 2000, Recycling Today 38, n. 1:79)



Manual collection VS. Collection with vehicles equipped with "can snatchers."

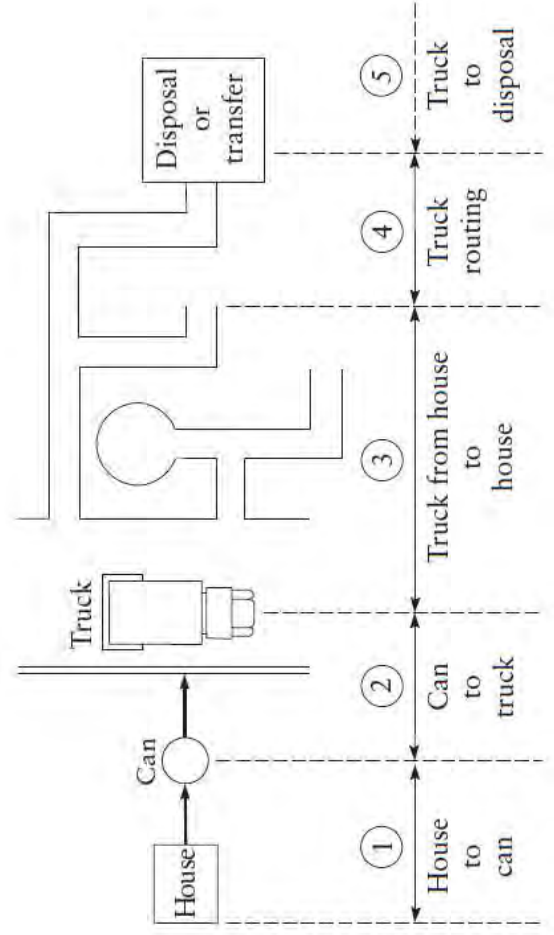
When the waste disposal unit is remote to the collection area, a **transfer station** is employed.



Sometimes a transfer station is required regardless of distance to a landfill. To minimize the traffic and air pollution impacts at a landfill.

- In New York City, solid waste was transferred onto barges, which then moved the refuse to Fresh Kills Landfill on Staten Island until the landfill closed in 2001.
- In Seattle, solid waste is transferred to railroad shipping containers that are then placed on a rail car for shipment to eastern Oregon.
- On a much smaller scale, residents in rural areas such as the unincorporated area of San Diego County bring their waste to transfer stations with 40-yd³ (30-m³) roll-off bins, which are then hauled to the disposal site.

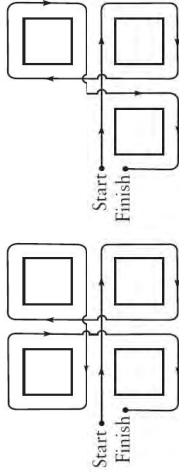
General Collection-Transfer-Transportation Scheme



Thing to consider in transporting solid waste: Truck Routing

The objective is to minimize deadheading (and transportation cost), which is passing a collection point again after a previous pickup.

The assumption is that if a route can be devised that has the least amount of deadheading possible, it is the most efficient collection route.



Model Country: Singapore

GENERAL WASTES:

Type A Waste - furniture, electrical appliances, construction, and renovation debris, cut tree trunks and branches, bulky waste, non-putrefiable waste, recyclable waste (excluding food waste), digested sludge that has been dewatered from water reclamation plants.

Type B Waste - domestic refuse, food waste and market, waste with a high organic content and which is putrefiable.

Type B.1 Waste – Used cooking oil

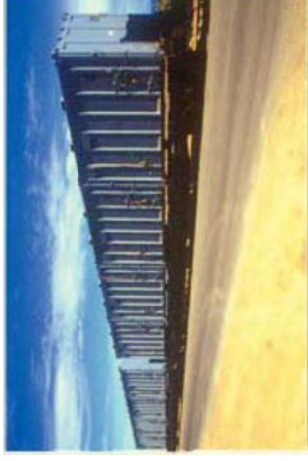
Type C Waste – sludge, waste from grease interceptors, sewage, sludge and other waste from water-seal latrines, sewage treatment plants, septic tanks, etc.

Wastes can be:

1. Incinerable
2. Non-incinerable waste, and
3. Recyclable

Other countries employ:

1. Waste transport by rail
2. Waste transport by ship



Licensed garbage waste collector

It is an offence under the Environmental Public Health Act (EPHA) and the Environmental Public Health (General Waste Collection) Regulations to operate a waste collection business without a valid license.

There are four classes of General Waste Collector Licenses:

1. Class A license – Type A waste only
2. Class B license – Type B waste only
3. Class B.1 license – Type B.1 waste only

A general waste collector may apply for or hold more than one class of license at any one time.

Collection and Transportation of General Waste:

1. The general waste collector shall only use those vehicles and equipment approved under the license.

- General waste collectors are to inform the client/ general waste generators (e.g. commercial and trade premises, food establishments, industrial premises, households)
- The general waste collectors are to regularly remind the general waste generators to segregate incinerable waste, non-incinerable waste and recyclables at source. The general waste collector may require the general waste generator to use separate containers for separate storage of the segregated waste.
- The general waste collector shall ensure that the vehicles and equipment that he uses to store, collect and transport waste are suitably designed, kept clean, and maintained in good working condition at all times.

For Type C waste:

- Must acquire certification from National Environment Agency in Singapore
- Class C general waste collectors shall dispose Type C waste at Public Utilities Board's (PUB) **Water Reclamation Plants**

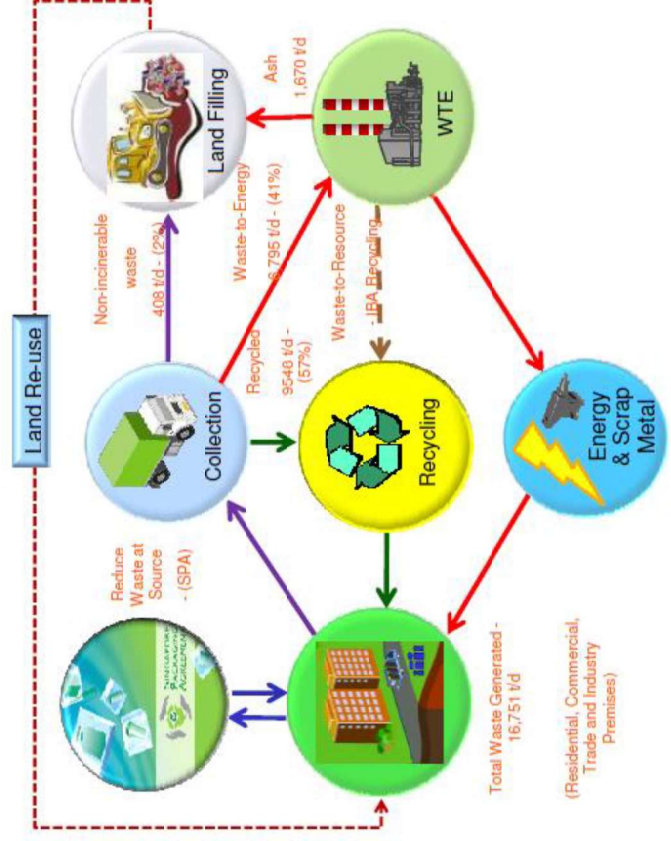
2. Separate Disposal of Incinerable Waste, Non-incinerable Waste and Recyclables

- General waste collector shall provide necessary receptacles for the waste generators to separate their waste into incinerable waste, non-incinerable waste and recyclables, and shall ensure wastes are segregated. No hazardous wastes.

Incinerable waste → incineration plants

Non-incinerable waste → transfer station

Recyclable waste → recycling facilities



Public Education & Community Participation

- School Recycling Corner Programme (100%)
- Annual Recycling Week
 - Residents, Companies, Schools, Grassroots organizations, Government agencies, and Non-Governmental Organisations
 - Launched 3R booklet cum exhibition
 - Recognition to communities
 - E-waste take back



Domestic and Trade Waste

• Provide infrastructure for recycling

- National Recycling Programme
 - all households have access to recycling receptacles (bins/bags)
 - >4,100 public recycling bins

• 63% of households participate



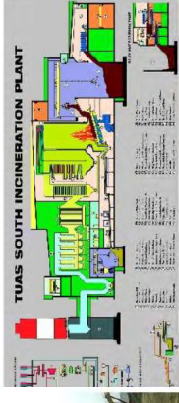
Incineration

Cost-effective disposal in land-scarce situations:

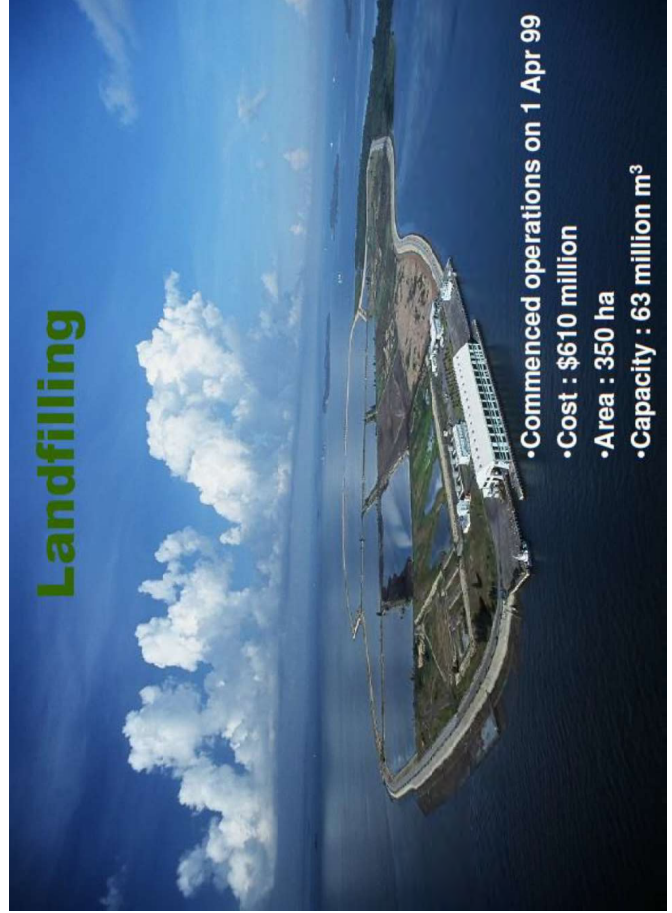
- volume of refuse can be reduced by 90%
 - only 10% landfill space required
- energy can be recovered for power generation
- scrap metal can be recovered for recycling

Industrial and Commercial Waste Recycling:

- Wood (207,400 tonnes, 72% recycled)
- Horticultural Waste (93,500 tonnes, 39%)
- Used Slag (418,600 tonnes, 99%)
- C & D Waste (1,150,700 tonnes, 98%)
- Ferrous Metal (806,200 tonnes, 92%)



Landfilling



- Commenced operations on 1 Apr 99
- Cost : \$610 million
- Area : 350 ha
- Capacity : 63 million m³

References:

- Solid Waste Engineering, William A. Worrel and P. Aarne Vesilind
- Solid Waste Management in Singapore, 2nd Regional 3R Forum in Asia, Kuala Lumpur, Malaysia, October 4-6, 2020
- Code of Practice for Licensed General Waste Collectors, National Environment Agency, Singapore

PROJECT ACTIVITY : 3rd SUB-GROUP MEETING FOR PROJECT OUTPUT 4 (ENHANCEMENT OF NATIONAL GOVERNMENTS' AND TARGET LGU'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTION/ RECOMMENDATION FOR THE OTHER SWM TECHNOLOGIES THAN WTE IS ENHANCED)

DATE/TIME : 3 September 2020, 9:00AM - 11:30AM (Philippine Time)

VENUE : Video Conference through Microsoft Teams

Agenda Topics	Issues/Discussions/Actions	Comments/Agreements/Timelines	Required Actions/Responsible Agency/Person
<p>1.) Call to Order/Meeting Objectives/ Acknowledgement of Attendees and Adoption of Agenda (Ms. Elvira Pausing)</p>	<ul style="list-style-type: none"> Ms. Elvira Pausing of EMB-SWMD-PMO commenced the 3rd subgroup meeting for Project Output 4 when quorum was reached and all presenters for the meeting have signed in. Ms. Pausing presented the agenda and asked the subgroup members if anything else needed to be discussed. Ms. Pausing acknowledged the presence of all meeting attendees, and welcomed Engr. Editha Peros as the new head of LGU Cebu CENRO. 	<ul style="list-style-type: none"> Agenda was moved for adoption with no comments and modifications from the participants. 	
<p>2.) Review of the previous discussions from the last Sub-group meeting (Ms. Kyoko Kimura, JET)</p>	<ul style="list-style-type: none"> Ms. Kimura presented the brief review of the last subgroup meeting for OP4, and discussed each of the activities for the benefit of the new subgroup 4 members. Ms. Kimura also shared the expected outputs for today's meeting per last meeting's discussions. 		
<p>3.) Presentations/Discussions on some examples of "Good practices/ Good technologies" of other SWM technologies in third world countries under Activity 4-3 Intermediate treatment facility/3R (Engr. Reynaldo L. Esguerra, DOST-ITDI)</p>	<ul style="list-style-type: none"> Engr. Esguerra presented good practices and good technologies on intermediate treatment facilities/3R. The following examples were tackled in the discussion: <ul style="list-style-type: none"> Model Wart Initiative, National Green Tribunal (NGT) in Delhi, India URENCO Refuse Paper and Plastic Fuel in Hanoi, Vietnam Rayong Waste-to-Energy Facility in Rayong, Thailand 	<ul style="list-style-type: none"> For all presenters, Ms. Flerida Chan raised a question on the cost of the technologies and its applicability and sustainability in the Philippine context. Mr. Kosaka requested for updates on the Model Wart Initiative in India, mentioning that a project he was involved in in Ho Chi Minh City encountered problems with coordinating with communities near the facility, 	<ul style="list-style-type: none"> Engr. Esguerra mentioned that cost information can be accessed through consultations with his colleagues, and shall be shared with the team once gathered. Engr. Esguerra will follow up on the status of the New Dehli Model Wart Initiative and get back to Mr. Kosaka.

<p>3.) Presentations/Discussions on some examples of “Good practices/ Good technologies” of other SWM technologies in third world countries under Activity 4-3 Sanitary Landfill (Engr. Elisa Madrazo/ Engr. Lakandiwa Orcullo, LGU Davao City)</p>	<ul style="list-style-type: none"> ○ District Model of Waste as a Resource in Suan Luang District in Bangkok, Thailand ○ Waste-to-Energy Project for the rice milling sector in Cambodia ○ FORWARD Black Soldier Fly (BSF) Upcycling of Urban Organic Solid Waste in Sidoarjo, Indonesia ○ Bokashi composting of food waste from restaurants and hotels in Fraser’s Hill, Malaysia 	<p>and with the handling of the high influx of waste generated daily. Mr. Kosaka went on to suggest that local government needs to set up the whole municipal solid waste management system before launching the full-scale source segregation such as composting/biogas facility.</p>	
	<ul style="list-style-type: none"> ● Engr. Orcullo presented good practices and good technologies on sanitary landfill management, focusing particularly on Semi-aerobic landfill implemented in Fukuoka City, Japan. 	<p>➤ For all presenters, Ms. Florida Chan raised a question on the cost of the technologies and its applicability and sustainability in the Philippine context.</p> <p>➤ Engr. Orcullo mentioned that the Semi-aerobic landfilling technology is already being observed in their landfilling site, proving its applicability in the Philippine setting, though implementation can still be improved to really align with the specifics of the technology.</p> <p>➤ Mr. Kamishita asked Engr. Orcullo on what the difficulties does Davao LGU have in its current operations, to which Engr. Orcullo expressed his concern on the implementation of the technology. The location of the SLF was also a problem in that hauling trucks found it</p>	<p>➤ Provide cost information on the implementation of the good practices/ technologies presented, and give insights in its applicability and sustainability in the context of Davao.</p>

<p>3.) Presentations/Discussions on some examples of “Good practices/ Good technologies” of other SWM technologies in third world countries under Activity 4-3</p> <p>Collection Method (Engr. Glory Rose C. Manatad, LGU Cebu City)</p>	<ul style="list-style-type: none"> ● Engr. Manatad presented good practices and good technologies on collection and transportation methods. The following examples were tackled in the discussion: <ul style="list-style-type: none"> ○ Different collection methods ○ General Collection- Transfer-Transportation Scheme ○ Key considerations in Truck Routing 	<p>difficult to drive through the terrain going to the SLF.</p> <ul style="list-style-type: none"> ➤ Mr. Kamishita asked Engr. Orcullo on his suggestion to other LGU’s that are considering the same setup. Engr. Orcullo strongly suggests for other LGU’s to adopt the same technology. ➤ Mr. Kamishita also asked if the new SLF in Davao is going to be a semi aerobic one as well, and Engr. Orcullo confirmed that the new landfill will work under the same technology. ➤ Mr. Kamishita asked Engr. Orcullo, and the rest of the attendees if they know of other semi-aerobic SLF in the Philippines. Engr. Orcullo mentioned that aside from the one they have in Davao, he is not aware of other ones that may exist elsewhere, so Ms. Pausing stepped in and delegated the task to SWMD-PPS to come up with a list of other semi-aerobic landfills in the Philippines. 	<ul style="list-style-type: none"> ➤ SWMD-PPDS will be providing JET with the information on other semi-aerobic landfills in the Philippines.
		<ul style="list-style-type: none"> ➤ For all presenters, Ms. Florida Chan raised a question on the cost of the technologies and its applicability and sustainability in the Philippine context. ➤ Mr. Higashinakagawa asked about what good points are and are not applicable in Cebu. Engr. Manatad suggested that the city 	<ul style="list-style-type: none"> ➤ Provide cost information on the implementation of the good practices/ technologies, and give insights in its applicability and sustainability in the context of Cebu City.

<p>3.) Presentations/Discussions on some examples of “Good practices/ Good technologies” of other SWM technologies in third world countries under Activity 4-3 Collection and Transportation Method, Information, Education and Communication Campaigns (Ms. Andrei Mallare, JET)</p>	<ul style="list-style-type: none"> ○ Singapore as model country for waste collection and transportation 	<p>invest in garbage trucks with can snatchers to make collection more efficient. ➤ Additionally, Mr. Higashinakawaga noted that the routing of hauling trucks can be improved guided by the insight that Engr. Manatad presented.</p>	
<p>4.) Presentation on the proposed format to consolidate the Good Practices and Technologies (Ms. Iku Sato, JET)</p>	<ul style="list-style-type: none"> ● Ms. Andrei Mallare presented good practices and good technologies on collection and transportation methods, and IEC campaigns The following examples were tackled in the discussion: <ul style="list-style-type: none"> ○ Trash per-bag fee Collection Program in Taipei, Taiwan ○ Participatory Solid Waste Management in Phangkon Municipality, Sakon Nakhon Province, Thailand ○ Taipei Lantern Festival in Taiwan ● Ms. Sato presented the booklet that will be used as a guide for summarizing the good practices and good technologies gathered by the members of the subgroup. ● Ms. Sato also followed up on the LGU’s to submit the files that JET needs: <ul style="list-style-type: none"> ○ Cebu City to share the excel file ○ Quezon City to share the excel and ppt file 	<p>➤ For all presenters, Ms. Florida Chan raised a question on the cost of the technologies and its applicability and sustainability in the Philippine context. ➤ Ms. Mallare mentioned that the exact cost information on the presented practices were not available at the moment. However, the campaigns to lessen waste generation and to handle waste disposal more responsibly is something that LGU’s must really consider implementing given that all the cited practices mentioned that IEC campaigns were key to the success of their strategies.</p>	
<p>4.) Presentation on the proposed format to consolidate the Good Practices and Technologies (Ms. Iku Sato, JET)</p>	<ul style="list-style-type: none"> ● Ms. Sato presented the booklet that will be used as a guide for summarizing the good practices and good technologies gathered by the members of the subgroup. ● Ms. Sato also followed up on the LGU’s to submit the files that JET needs: <ul style="list-style-type: none"> ○ Cebu City to share the excel file ○ Quezon City to share the excel and ppt file 	<p>➤ Mr. Christian Perez suggested adding the criteria/basis that was used to determine the selected examples. ➤ Ms. Florida Chan suggested to include the period when the technologies were implemented, and the status of these good practices. ➤ Engr. Esguerra suggested to cite the sources of the research</p>	<ul style="list-style-type: none"> ● Cebu City shall share the excel file summary of their research on Collection and Transportation to JET ● Quezon City shall share the excel and powerpoint files of their research on IEC to JET ● JET shall revise the format to incorporate the following items: <ul style="list-style-type: none"> ○ Criteria/ basis for choosing the example ○ Implementation of each

		<p>➤ Ms. Sato responded positively on all the additions, and these shall be added in the revised format of the summary.</p>	<p>example (from planning to execution)</p> <ul style="list-style-type: none">○ References used in the research
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<p>5.) Wrap-up, Required Actions, and Agreements</p>	<ul style="list-style-type: none"> ● Ms. Andrei Mallare of JET wrapped up the earlier discussions and reiterated the arrangements and timelines as agreed. ● From the presentation of Ms. Mallare, the following discussions and agreements were defined: <ul style="list-style-type: none"> ○ Quezon City LGU has prepared their research for this output, but is still waiting for approval before sending to JET. ○ JET has scheduled an on-boarding meeting with Engr. Peros of Cebu City on September 16, 2020. ○ Mr. Kamishita shared with the subgroup that JET will not be allowed to go back to the Philippines until the end of March 2021 (tentative) per JICA memo. With this, he gave a heads up to the subgroup that the next ITWG and JCC meetings will most likely be conducted online. 	<p>➤ No clarifications and/or alterations raised by the subgroup members.</p>	
<p>6.) Way forward, Schedule of the next meetings</p>	<ul style="list-style-type: none"> ● Ms. Kyoko mentioned that the analysis phase will now commence to determine the most suitable practices and technologies in the context of the Philippines. ● The next activity, Activity 4-5, which is the conduct of seminars to disseminate the findings of the precious activities, is scheduled in April 2021. 		<p>➤ Subgroup members are tasked to summarize their research, and provide insights on what technologies and practices best suited in the Philippines, and suggestions on how they can be designed to be more fit to our context.</p>
<p>7.) Other Matters</p>	<ul style="list-style-type: none"> ● There be no other matters to be discussed, Ms. Pausing adjourned the meeting by extending her appreciation to all the subgroup members and other participants who joined the meeting. 		

添付資料11-5: 成果4サブグループ会議

11-5-4 : 4th SG4

TECHNICAL COOPERATION PROJECT (TCP) FOR THE CAPACITY DEVELOPMENT ON IMPROVING SOLID WASTE MANAGEMENT THROUGH ADVANCED/INNOVATIVE TECHNOLOGIES

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4

ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/ RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES OTHER THAN WASTE-TO-ENERGY (WTE)

25 March 2021, Thursday, 9:00 AM (via MS Teams)

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

TENTATIVE AGENDA

1. Call to Order/Meeting Objectives/ Acknowledgement of Attendees and Adoption of Agenda by EMB-SWMD, PMO
2. Review of the previous Sub-group meeting by JET
3. Technical presentation and discussion points by JET
 - Good practices of SWM technologies and introduction of Activity 4-4: Summary and Provision of Suggestion/Recommendation to Improve Utilization of other SWM Technologies to Target LGUs
 - Short presentation on the BAT/BEP Guidelines
4. Wrap-up/Required Actions/Agreements/Timelines by JET
5. Schedules of the next Sub-group meetings by EMB-SWMD-PMO
6. Other matters

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

LIST OF PARTICIPANTS

NO	NAME	AGENCY/OFFICE	CONFIRMED
CONCERNED GOVERNMENT AGENCIES			
1	Engr. Reynaldo L. Eguerra	DOST-ITDI	
2	Ms. Ruby de Guzman	DOE-REMB	Representative: Ms. Gemmalyn Galang
	Mr. Romeo M. Galangam		
	Ms. Charisse Jane Pascual		✓
3	Mr. Carlo Mari Crisregjenald C. Tan	DILG NAPOLCOM CENTER	✓
4	Ms. Maria Clarisol L. Agas	NEDA-IPG	
	Mr. Aldwin U. Urbina		
	Mr. Gilbert V. Kintanar, Jr.		
5	Kevin Gilbert M. Manzano	PPP Center	
	Ms. Justine E. Padiermos		✓
	Ms. Aislyn Janelle L. Yao		

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

LIST OF PARTICIPANTS

NO	NAME	AGENCY/OFFICE	CONFIRMED
LOCAL GOVERNMENT UNITS			
6	Mr. Vincent Ferdinand Paul G. Vinarao	LGU Quezon City	
	Mr. David John Vergara		✓
7	Engr. Editha Peros	LGU Cebu City ENRO	
	Engr. Glory Rose Manatad		✓
8	Atty. Dwight Tristan Domingo	LGU Davao City ENRO	
	Engr. Elisa Madrazo		✓
	Engr. Lakandiwa Orcullo		✓

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
 ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY
 ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM
 TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
EMB Central Office			
9	Engr. Marcelino N. Rivera, Jr.	EMB-EQMD (Central Office)	
	Ms. Consolacion P. Crisostomo	EMB-PP added (Central Office)	Representative: Ms. Belly Cabesno
	Dr. Fatima Anneglo Molina	EMB-ERLSD (Central Office)	
	Atty. Carmelo R. Segui	EMB-Legal Division (Central Office)	
	Engr. Jundy del Socorro	EMB-AQMS (Central Office)	✓
	Engr. Wyona Kay Rativo	EMB-AQMS (Central Office)	
PROJECT COORDINATORS			
10	Director Angelito V. Fontanilla	DENR-FASPS (Central Office)	
	Mr. Eddie Abugan	DENR-FASPS (Central Office)	
	Ms. Marianica Philina Obmerga	DENR-FASPS (Central Office)	✓

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
 ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY
 ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM
 TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
EMB-SWMD-Project Management Office (PMO)			
	Ms. Nelle A. Dimer	EMB-SWMD-PMO (Central Office)	
	Ms. Rodeith Antonio	EMB-SWMD-PMO (Central Office)	✓
13	Engr. Roxanne Barcenas	EMB-SWMD (Central Office)	✓
	Engr. Jedidiah Mangubat	EMB-SWMD (Central Office)	✓
	Ms. Kris Morada	EMB-SWMD (Central Office)	✓

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
 ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY
 ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM
 TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

LIST OF PARTICIPANTS

NO.	NAME	AGENCY/OFFICE	CONFIRMED
PROJECT COORDINATORS			
11	Ms. Maria Delia M. Valdez	EMB-SWMD-PMO (Central Office)	
	Ms. Elvira S. Pausing	EMB-SWMD-PMO (Central Office)	✓
JICA EXPERTS TEAM			
	Mr. Takahiro Kamishita		✓
	Ms. Kyoko Kimura		✓
	Mr. Satoshi Higashinakagawa	JET	✓
12	Ms. Nikole Andrei Louise Mallare		✓
	Ms. Eric Cea		✓

4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
 ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY
 ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM
 TECHNOLOGIES OTHER THAN WTE

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PROPOSED SCHEDULE OF MEETINGS for CY 2021

PROJECT OUTPUT	JAN	FEB	MAR	APRIL	MAY	JUNE
OP 1				07	12	
OP 2				14		
OP 3					19	
OP 4			25			10
ITWG				26		
JCC		09				
PMO	20	10	03	07	05	02



4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4
ENHANCEMENT OF THE NATIONAL GOVERNMENT'S CAPACITY TO IDENTIFY
ISSUES AND PROVIDE SUGGESTIONS/RECOMMENDATIONS FOR OTHER SWM
TECHNOLOGIES OTHER THAN WTE

25 March 2021, Thursday, 9:00 AM (via MS Teams)

ADJOURNMENT





4th Sub Group Meeting for

Output 4: Enhancement of The National Government's Capacity to identify issues and provide suggestions/recommendations for other SWM technologies other than WTE

25th March 2021 (Thursday) 9:00 a.m.

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies

1. Discussions on the technical examples of "Good practices/Good technologies"

- Thanks to all of you who have been collecting technical examples. With your help, we have created a technical example document with additional examples from JET research.
- If you have any comments, please contact me during the presentation or after the SG meeting.
- For Activity 4-4, we will be assessing the gathered technologies on how they can be adopted considering the regional characteristics of each LGU.
- We will continue to add to the technical example document as needed.

Refer to Technical Example Document

Agenda

1. Discussions on the technical examples of "Good practices/Good technologies"
2. Starting of Activity4-4
3. Schedules of the next Sub-group meetings

2. Starting of Activity 4-4

Activity 4-4

Summarize and provide suggestion/recommendation to improve utilization of other SWM technologies to target LGUs.

- Activity 4-4 will be started with the evaluation of the technical examples. However, additional examples may be added to the technical example document as needed.
- LGUs are expected to evaluate the technical examples in each waste management stage (theme) from the following perspectives:
 - ✓ Technical viability
 - ✓ Economical feasibility
 - ✓ Cultural acceptability
 - ✓ Environmental soundness

2. Starting of Activity 4-4

Example of Evaluation of Technology

Technical Example1 Earthworm compost	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> food waste should be collected separately. it is necessary to secure a supplier or site for the use of compost. 	<ul style="list-style-type: none"> acceptable 	<ul style="list-style-type: none"> Residents may complain about pests and odors. 	<ul style="list-style-type: none"> acceptable
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Need to introduce a system to separate and collect food waste. For use in suburban areas with farmland. 	---	<ul style="list-style-type: none"> Secure a location away from private homes. 	---

- In Activity 4-4, the goal is for the C/P to be able to evaluate every technology, taking into account the characteristics of the LGU.

Target LGUs. Let's try by next meeting!

Each LGU is expected to evaluate each technology from the four aspects, considering the regional characteristics and resource availability in each LGU, using the format above.

JET will then organize individual meetings with the LGUs to discuss the results of the preliminary evaluations that each LGU has done.

2. Starting of Activity 4-4

[Example 2] Cost recovery of SWM: 1-2. No Segregation – No Sticker – No Collection Policy

1-2	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> Collector need to check the sticker and segregation situation. 	<ul style="list-style-type: none"> It is take a time to check the sticker and segregation situation 	<ul style="list-style-type: none"> Need to understanding of residents 	<ul style="list-style-type: none"> Uncollected waste may pollute the surrounding area.
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Give a lecture to collector. 	<ul style="list-style-type: none"> It is recommended to use clear bags that are easy to see what is inside, etc. 	<ul style="list-style-type: none"> Hold briefing sessions for residents. Sell the sticker at places where residents can easily stop by. 	<ul style="list-style-type: none"> Combine with Door – to – Door collection.

[Example 3] Collection and transportation :2-1 Door – to – Door Collection

2-1	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> In an area with narrow roads, large trucks cannot access there. 	<ul style="list-style-type: none"> It is take a time to pick up waste from each household 	<ul style="list-style-type: none"> Acceptable 	<ul style="list-style-type: none"> Acceptable
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Combine with smaller size vehicle 	<ul style="list-style-type: none"> It is recommended to use clear bags that are easy to see what is inside, etc. 	---	---

2. Starting of Activity 4-4

[Example 4] Intermediate treatment /3R : 3-11. Waste Bank

3-11	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> Regulations on target of recyclable product categories, weighing methods, recording methods, etc. Secure the recyclers to cooperate 	<ul style="list-style-type: none"> Expenses related to the establishment of a waste bank Labor costs 	<ul style="list-style-type: none"> Waste bank should be installed in a location that is easily accessible to local residents Antifire measures for recyclable products 	<ul style="list-style-type: none"> Keep recyclable products clean. (PET bottles and cans soiled with food and drink are a cause of foul odors and pests. These wastes cannot be stored outside because they form a pool of water and become a hothbed for mosquitoes.)
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Formulate the guidelines Identify the recycler 	<ul style="list-style-type: none"> Secure a certain number of customers so as not to make a deficit in initial cost and operation cost. 	<ul style="list-style-type: none"> Install the waste bank in a place where people can easily gather, such as near a government office. 	<ul style="list-style-type: none"> Only accept the washed recyclable products Secure a storage place indoors

[Example 5] IEC:5-1 Requirement to attend SWM course

5-1	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> Secure the teacher of SWM course 	<ul style="list-style-type: none"> Labor costs of the teacher of the SWM course Expenses related to the implementation of the SWM course 	<ul style="list-style-type: none"> Obligation of the target person to participate in the SWM course 	<ul style="list-style-type: none"> Acceptable
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Formulate the manual of the SWM course 	<ul style="list-style-type: none"> Secure a budget for implementing the SWM course or collect tuition fees when obtaining a license 	<ul style="list-style-type: none"> Identify the target person to participate in the SWM course and formulate the rules of participation obligation 	---

3. Schedules of the Sub-group meeting for OP4

Beginning of June 2021

- Meeting with each target LGU and JET (1st time)
- Review and discussion of the Evaluation of Technology prepared by target LGUs

Beginning of August 2021

- Meeting with each target LGU and JET (2nd time)
- Review and discussion to finalize Evaluation of Technology prepared by target LGUs

Beginning of October 2021

- All SG members
- Target LGUs to give a presentation on the results of the Evaluation of Technology

Beginning of December 2021

- All SG members
- Summarize and provide suggestions/recommendations for target LGUs and other LGUs

For Activity 4-5, target LGUs will give a presentation on the seminar.



Contents of Today's Presentation

1. Explanation of Contents of BAT/BEP Guideline
2. Explanation of Case Study Results (Not be presented at previous SG meeting or ITWG meeting)
3. Summarize of Result
4. Further step

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies

25th March 2021 (Thursday)

Output 1-1 *"Preparation of BAT/BEP Guidelines"*

1

Table of Contents of BAT/BEP Guideline

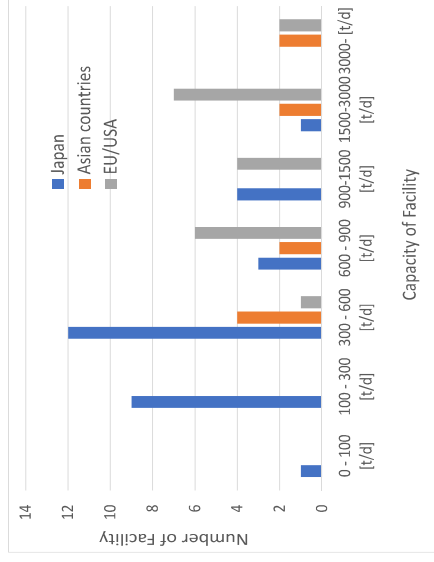
- 1. Introduction**
 - 1.1 Background and Objectives
 - 1.2 Scope of Case Studies
 - 1.3 Type of Combustion Technology
- 2. Case Studies**
 - 2.1 Survey Contents of Studies
 - 2.2 Technical Aspects of Case Studies
 - 2.2.1 Capacity of WtE Facility
 - 2.2.2 Required Area of Facility
 - 2.2.3 Target Waste
 - 2.2.4 Energy Recovery Process
 - 2.2.5 Environmental Pollution Control
 - 2.2.6 Ash Treatment and Disposal
 - 2.3 Institutional and Financial Aspects of Case Studies
 - 2.3.1 Project Implementation
 - 2.3.2 Financial Aspects
 - 2.3.3 Citizen Participation
- 3. Summary**
 - 3.1 Summary of Case Studies
 - 3.2 Findings
- Appendixes**

Introduction

- Select the BAT/BEP cases through internet or magazine related to solid waste management
- Collect the detail information including technical, institutional, financial and historical information based on the research format
- Implement Questionnaire survey to WTE operator/manager for data which are not available in the secondary sources.
- Collected data is analyzed quantitatively or qualitatively and highlight some good practices for future reference to consider WtE projects in the Philippines.

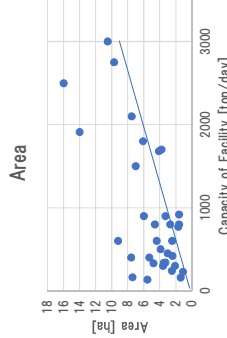
Introduction

- Most of selected facilities are 100 [t/d] to 3000 [t/d]
- Generally, there are large capacity of incinerator in Europe or China due to large collection area or population.
- In Metropolitan Tokyo, the waste generation is totally 12,000 t/d but the largest capacity WtE facility is 1800 t/d due to waste disposal principles in their jurisdiction.
- Most case of incinerators are 300 to 900 t/d and in Bangkok (500 to 1000 t/d) and Cantho city (400 t/d) in cases of south east Asia.



Area and Size of Incinerators

- Land area depends on the capacity of facility and the both relations seems to have proportionality.
- The range of the relationship is wide due to the reason of land availability or type of WtE facility, etc.
- The compact design of WtE facility will be implemented but the cost of civil work will increase



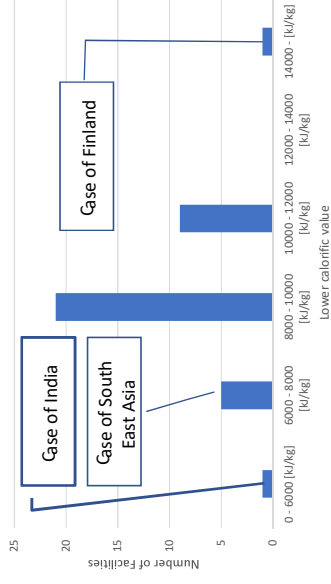
At least, approximately 2 - 4 [ha]/1000 [ton/day] will be necessary.



The case of Iwakuni city in Japan, (25 m stack height)

Waste Characterization (Lower calorific value)

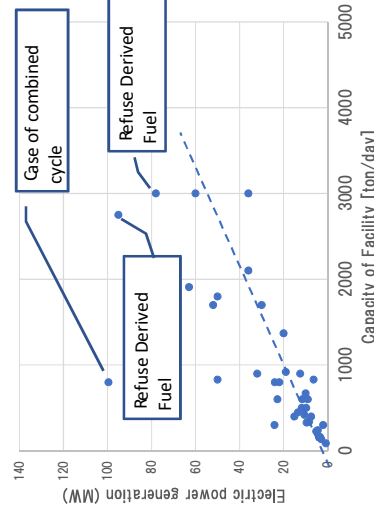
- In most of WtE facilities, the average lower calorific value is around 8,000 to 10,000 [kJ/kg]
- However, there are some facilities which can receive the waste of less than 6,000 [kJ/kg] or more than 14,000 [kJ/kg]



Basically, around 6,000 to 14,000 [kJ/kg] is acceptable for WtE facility.

Energy Recovery (as Power Generation)

- Electric power generation basically depends on the capacity of WtE
- However, pressure or temperature of the entrance of turbine generator or the utilization of surplus heat energy such as combined cycle affects the electric power generation



- Basically, the rate of electric power generation per capacity is approximately 20MW/1000 [ton/day].
- However, it may depend on the energy recovery technique.

Energy Recovery (as Power Generation)

Item	Technology	Explanation
- Optimum heat exchange	- Reduction of boiler exit temperature - Lower air ratio	- Lower temperature economizer cause large amount of heat exchange in the process - Process control will maximize combustion efficiency to control optimum air ratio and exhausted gas circulation
- Effective utilization of steam	- No utilization of steam for reheating of exhausted gas after cooling	- Wet exhausted gas treatment system or prevention of white fume need reheating of exhausted gas
- Increase of the efficiency of steam turbine system	- Introduction of high temperature and pressure boiler - Integration with fossil fueled fired power plant (external superheating)	- Increasing steam pressure and temperature will allow greater energy to be recovered in the steam turbine. - Utilization of exhausted gas from fossil fuel power generation will cause the increase of energy efficiency

Residual handling (material recycle, utilization after treatment, disposal)

- Normally, the ratio of fly ash and bottom ash occupy respectively 20 wt% and 80 wt% of total ash
- Bottom ash**
- Collection of ferrous material by magnetic separator
- Utilization of bottom ash as cement aggregate
- Utilization of bottom ash as construction material after its melting, baking, aging, etc
- If not, disposal in municipal waste landfill site or hazardous waste landfill site.

Fly ash

- Normally, disposal in municipal waste landfill site after stabilization normally or hazardous waste landfill site
- In case of Japan, some LGUs implement ash melting for utilization as roadbed material, etc

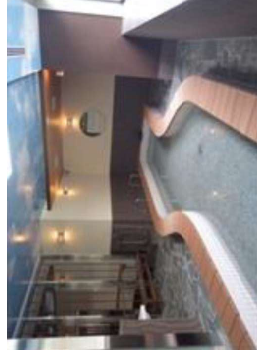


Energy Recovery (as Thermal Utilization)



Utilization of surplus heat after utilization of electric power generation

- District heating
- Hot bath for community
- Botanical garden
- Hot water pool, etc



Environmental Pollution Abatement Process

Exhausted Gas Standard

Japan (Shinkoto)	Japanese Law	Facility standard	Actual
NOx [ppm]	250	60	36 - 41
HCl [ppm]	430	15	<2
SO2 [ppm]	Area basis	20	<1
Particulates [mg/Nm3]	80	0.02	<0.001
Mercury [ug/Nm3]	50	-	<5
DXNs [ug/Nm3]	0.1	-	<0.00005

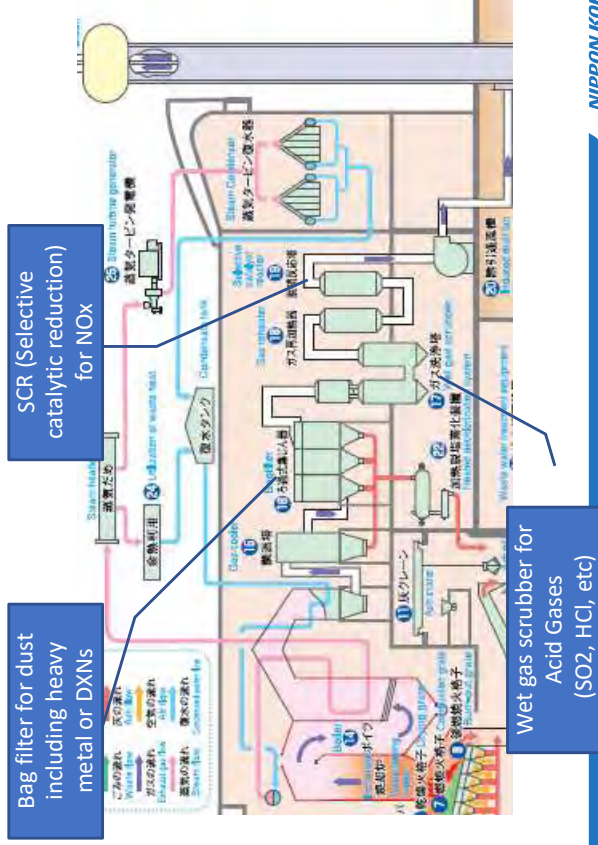
France (Isseane)	EU & French Law	Facility standard
NOx [ppm]	87.7	28.5
HCl [ppm]	5.5	2.2
SO2 [ppm]	15.7	7.5
Particulates [mg/Nm3]	9	1.3
Mercury [ppm]	45	13.1
DXNs [ppm]	0.09	0.03

Note: exchange into O2 (12%)

- In both cases of Japan and EU, WtE facilities stipulates the facility standard which is stricter than national law (or EU Directive)
- The actual emission value of exhausted gas is stricter than the facility standard

Environmental Pollution Prevention Process

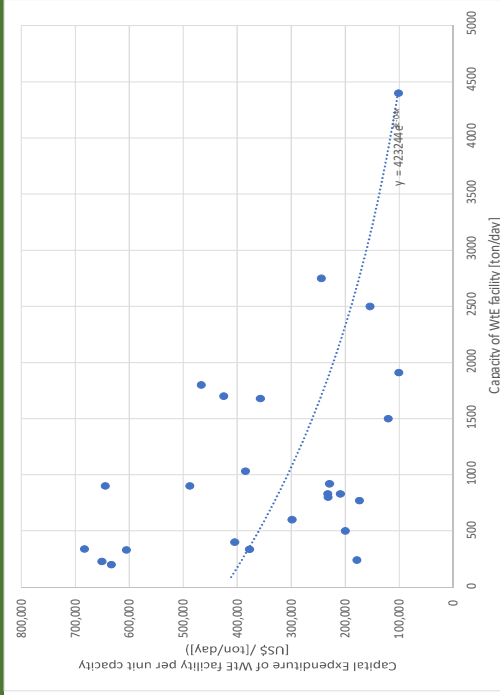
An example of Air Pollution Prevention Techniques



Project Implementation Scheme

- 1) Financial Scheme
 - In Japan, WtE facilities are usually built under the public-build and operation scheme. The ratio of the projects utilizing Public Private Partner (PPP) scheme is relatively low.
 - In EU and USA, PPP scheme is applied for some facilities, and mainly Design Build Operate (DBO) or Build Operate Transfer (BOT).
- 2) Development approach
 - Solicited approach is mostly applied in both EU and Japan. In the case of EU and Japan, governments have clear master plan of SWM. Therefore, the specification for the bidding document is clear.
 - In case of Asian countries except Japan, the development approach is not clear, however, most of the successful projects seem to apply solicited approach because the project is clearly understood by the governments.
- 3) Implementation Schedule
 - According to available data from cases in Europe and Japan, it takes 2-3 years for planning, 1-2 years for designing, and 2-4 years for construction.
 - Operation and maintenance period of DBO contract, most of cases are range from 15 to 20 years.

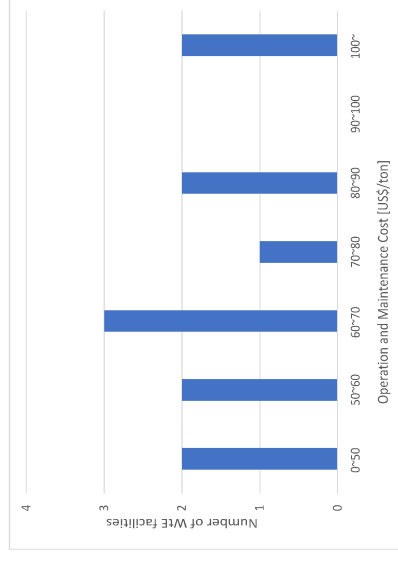
Financial Aspect (Capital Expenditure)



- The capital expenditure is from 100,000 US\$ to 700,000 US\$ per ton/day.
- The capital expenditure per capacity tends to depend on the capacity of WtE facility.

Financial Aspect (Operation and Maintenance Cost)

- The OPEX of incineration is approximately 50 to 100 US\$ / ton. There are two cases of more 100 US\$, which will include overhaul maintenance cost.
- There is no identification of significant differences between the costs of DBO projects and Public Build and Own projects.



Citizen Participation

- Citizen participation is an essential part of the smooth implementation of WtE project.
- As part of the process of EIA in most of countries, public hearing and public consultation meeting are held during the planning and/or design stage.
- In EU, USA, and Japan, environmental monitoring reports including the relevant information of WtE operation, especially air quality monitoring of exhaust gas or water quality monitoring of wastewater, if it is discharged, is regularly released.
- WtE facilities provide facility tours for public or environmental education. The examples of facility tour, environmental education area, air quality monitor in a WtE facility are shown in



Utilization of BAT / BEP Guideline

Institutional/Financial Aspect

Item to be considered	Summarization (tentative)
Investment cost	Cost is capital expenditure is from 100,000 US\$ to 700,000 US\$ per ton/day
Operation and maintenance cost	Cost is around 50 to 100 US\$ / ton
Planning/Design/Tender/Construction/Operation Period	Planning(2 – 3 years), Design (around 1 – 2 years), Construction (2 – 4 years), More than five years from planning to operation commencement Operation (15 to 20 years)
Solicited or unsolicited	Most of case studies of good practice are solicited projects

For future introduction of WtEs in the Philippines
Refer this BAT/BEP for the preparation of the plan or technical specification of WtE facility

Utilization of BAT / BEP Guideline

Technical Aspect	Item to be considered	Summarization (Tentative)
Capacity	WtE capacity shall be designed by the waste collection amount and/or MSWM system of LGU, (one LGU or clustering LGUs)	
Area size	The smallest area size is around 1 ha	
Lower calorific value	Around 6000 to 14000 [kJ/kg] is acceptable for WtE facility	
Energy recovery (electric power)	The relationship between electric power generation and the capacity of WtE facility is approximately 20MW/1000 [ton/day].	
Energy recovery (heat recovery)	Utilization of surplus heat for various purpose (community heat provision, hot water)	
Residual (incineration ash and fry ash) handling or utilization	- Separation of ferrous and non-ferrous metal - Utilization of road construction material or cement ingredient	
Air pollution control method/standard	Many facility utilize own standard stricter than national standard (for public acceptance, etc)	

For future introduction of WtEs in the Philippines



Refer this BAT/BEP for the preparation of the plan or technical specification of WtE facility

Summarization of Progress

- 60 case studies have been collected but some data collection is difficult.
- Case studies has been analyzed and the result has been summarized and main finding has been described.

Further Step

- Please provide the comments of BAT/BEP Guidelines until the end of March
- Especially, it will be better to summarize to utilize easily for the Philippines side.
- PMO implement the supplemental questionnaire survey and the additional data may be collected

Maraming salamat po !

PROJECT ACTIVITY : 4th SUB-GROUP MEETING FOR PROJECT OUTPUT 4 (ENHANCEMENT OF NATIONAL GOVERNMENTS' AND TARGET LGU'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTION/ RECOMMENDATION FOR THE OTHER SWM TECHNOLOGIES THAN WTE IS ENHANCED)

DATE/TIME : 25 March 2021, 9:00AM - 11:15AM (Philippine Time)

VENUE : Video Conference through Microsoft Teams

Agenda Topics	Issues/Discussions/Actions	Comments/Agreements/ Timelines	Required Actions/Responsible Agency/Person
<p>1.) Call to Order/Meeting Objectives/ Acknowledgement of Attendees and Adoption of Agenda (Ms. Elvira Pausing, EMB-SWMD-PMO)</p>	<ul style="list-style-type: none"> ● Ms. Elvira Pausing of EMB-SWMD-PMO commenced the 4th subgroup meeting for Project Output 4 when quorum was reached and all presenters for the meeting have signed in. ● Ms. Pausing presented the agenda and asked the subgroup members if anything else needed to be discussed. ● Ms. Kris Morada of EMB-SWMD-PMO was called on to acknowledge the presence of participants. 	<ul style="list-style-type: none"> ■ Agenda was moved for adoption with no comments and modifications from the participants. 	
<p>2.) Review of the previous Sub-group meeting (Ms. Kyoko Kimura, Ms. Iku Sato, JET)</p>	<ul style="list-style-type: none"> ● Ms. Kyoko Kimura of JET thanked the subgroup for their participation in the collection of technical examples that JET compiled in a consolidated document. ● Through the contributions, JET was able to find supplementary research to enrich the insight and understanding of the given technologies. ● The compiled technical document (Draft Booklet for Good practice and Good technology) was presented, discussing one example for each category- Cost recovery of SWM, Collection and Transportation, 3R, IEC, and landfill management- emphasizing how the reports were summarized in the template by discussing 		

<p>3.) Technical presentation and discussion points by JET: Good practices of SWM technologies and introduction of Activity 4-4 (Ms. Kyoko Kimura, Ms. Iku Sato, JET)</p>	<p>the outline and good points of the identified technologies.</p> <ul style="list-style-type: none"> ● Ms. Kyoko continued the discussion by introducing Activity 4-4 as a continuation of Activity 4-3. ● The template of the Evaluation of Technology form was presented to discuss how the LGUs will assess the technologies gathered based on its technical viability, economic feasibility, cultural acceptability and environmental soundness, considering the characteristics of their corresponding LGU. Several examples were provided on how the form is used, using the examples presented previously. ● Ms. Kyoko underscored that the goal of Activity 4-4 is for the LGUs to identify the best technologies to be implemented in their jurisdiction, guided by this multi-aspect assessment form. With this, an immersive participation from the LGUs is expected. 	<ul style="list-style-type: none"> ■ In order to have a more detailed discussion on the LGUs outputs, JET will meet with the LGUs individually starting in June and in August, and collect the comments and discussion with SG members on October, to arrive at a final output by December. ■ Ms. Marla Agas of DILG raised a concern on the use of plastic bags for storage of waste, mentioning that local regulations may be in conflict with that, and ends by giving a reminder that LGUs must be mindful of their practices in the assessment of the technologies to avoid conflicts. 	<ul style="list-style-type: none"> ■ [JET] Resend the Evaluation of Technology template along with the compiled technical examples to the LGUs. ■ [LGUs] Prepare Evaluation of Technology for the technical examples. First draft to be sent at the end of May. ■ [JET and LGU] Set a meeting date for June discussion on the first draft of assessment.
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		<ul style="list-style-type: none"> ○ Ms. Kyoko acknowledged the concern and noted that the example shown in the slide is more for the purpose of discussing the use of the Evaluation form, and that it is up to the LGUs to incorporate their practices. ▪ Ms. Agas further suggests that the LGUs can note how they can adopt the technologies better such as entering into MOUs to overcome the technical challenges, etc. <ul style="list-style-type: none"> ○ Ms. Kyoko raises that the objective of Activity 4-4 is more of assessing the technologies. ▪ Engr. Elisa Madrazo of Davao City LGU raised that since JET has already been to Davao to observe their SWM practices, Engr. Madrazo proposes for JET to provide evaluations to the current practices of Davao City instead of them providing assessments to these new technologies. <ul style="list-style-type: none"> ○ Due to difficulties in internet connectivity, Ms. Kyoko proposed to move the discussion on this matter through email. ▪ Ms. Agas asked who will be involved in the evaluation other than the LGUs. <ul style="list-style-type: none"> ○ Ms. Kyoko responded that only LGUs will be involved in the evaluation at the start but will be
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<p>4.) Brief explanation of BAT/BEP Guideline (Mr. Higashinakagawa, JET)</p>	<ul style="list-style-type: none"> ● Mr. Higashinakagawa thanked the participants for the opportunity to present a brief discussion on the BAT/BEP guideline for OPI. ● Mr. Higashinakagawa presented the template used to collate the insights in the case studies. From the collected 60 examples, a summary on the technical specifications was prepared that can be 	<p>presented to the rest of the subgroup by October.</p> <ul style="list-style-type: none"> ○ Ms. Agas raised if stakeholders from environmental NGOs can be involved in the assessment. ○ Ms. Kyoko would like for the LGUs to do the assessment first. Discussion with the other subgroup members will be facilitated in the October and December meetings, and finally, subgroup members will give a presentation about the result of OP4 to the other LGUs and the stakeholders at the seminar in line with Activity 4-5. ▪ Mr. David Vergara clarified his understanding of the requirement. <ul style="list-style-type: none"> ○ Ms. Kyoko replied by saying that the deadline of submission of the first draft of the Evaluation of Technology is at the end of May, and JET shall review the output for discussion during the June meeting with each LGU. 	
		<ul style="list-style-type: none"> ▪ The deadline for the comments has been tentatively set on March 31, 2021, where OPI subgroup members are encouraged to give insights on the document for further improvement. 	<ul style="list-style-type: none"> ▪ [JET] Provide BAT/BEP Guidelines to the target LGUs including Davao LGU

	<p>used as a guideline for the WtE facilities to be put up in the Philippines.</p>	<ul style="list-style-type: none"> ▪ Ms. Belly Cabeso of EMB-PPDD asked what the calorific value of residual waste in the Philippines is. <ul style="list-style-type: none"> ○ Mr. Higashinakagawa mentioned that the value depends on the area in the Philippines, and should be detailed in the WACS report of the LGUs. ○ Mr. Kosaka replied that the low calorific value for QC is 4000-4500 kJ/kg. ○ Ms. Cabeso further inquired about the basis of the low calorific value in the report (14,000kJ/kg) and whether WtE facilities will be required to find out the calorific value of the feed before putting up a facility. ○ Mr. Higashinakagawa replies that a waste characterization study is needed to be conducted in order to determine the appropriate specifications of the facility in the design stage. ▪ Ms. Pausing raised a suggestion on the provision of the financial mechanism/strategies used to put up facilities. <ul style="list-style-type: none"> ○ Mr. Higashinakagawa expressed that that item is included in the questionnaire to obtain this information, though it was generally difficult to gather this 	<ul style="list-style-type: none"> ▪ [OPI SG members] Provide comments to the BAT/BEP Guideline.
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		<p>information except in the case studies in Japan.</p> <ul style="list-style-type: none"> ○ Mr. Higashi acknowledged that some examples of financial mechanism will be added in the BAT/BEP Guidelines. ▪ Engr. Madrazo asks about how fly ash and bottom ash are managed based on international practices. ○ Mr. Higashinakagawa presented the insights from the BAT/BEP guidelines, discussing that bottom ash is used as construction material, while fly ash is stabilized and then sent to landfill sites. ○ Mr. Higashi proposed to share the BAT/BEP Guidelines with the target LGUs including Davao LGU which is not included in the member of SG1.
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<p>5.) Wrap-up, Required Actions, and Agreements (Ms. Andrei Mallare, JET)</p>	<ul style="list-style-type: none"> ● Ms. Andrei Mallare of JET wrapped up the earlier discussions and reiterated the arrangements and timelines as agreed. <ul style="list-style-type: none"> ■ [JET] Resend the Evaluation of Technology template along with the compiled technical examples to the LGUs. ■ [LGUs] Prepare Evaluation of Technology for the technical examples. First draft to be sent at the end of May. ■ [JET and LGU] Set a meeting date for June discussion on the first draft of assessment. ■ [JET] Provide BAT/BEP Guideline to Davao LGU ■ [OP1 SG members] Provide comments to the BAT/BEP Guideline. ■ [JET] Provide BAT/BEP Guideline to Davao LGU ● [OP1 SG members] Provide comments to the BAT/BEP Guideline 	<ul style="list-style-type: none"> ■ No clarifications and/or alterations raised by the subgroup members 	
<p>6.) Way forward, Schedule of the next meetings</p>	<ul style="list-style-type: none"> ● The proposed schedule of subgroup meetings, ITWG and JCC meetings for 2021 was presented by SWMD-PMO. ● Mr. Kamishita acknowledged the proposal and will give feedback and confirmation of the dates after consultation with JET. 		

<p>7.) Other matters</p>	<p>Ms. Roxanne Barcenas also shared updates on the dissemination of the BAT/BEP letters issued to the implementing body of the WtE facilities in the case study where they were asked to validate and supply the missing information. Of the 22 contacted companies, only 3 have replied.</p> <p>Ms. Pausing asked Mr. Higashinakagawa on the timeline of this activity to which he replied that PMO can try to contact them until March 31, 2021, and whatever information gathered until then will be incorporated in the BAT/BEP guidelines.</p>		
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添付資料11-5: 成果4サブグループ会議

11-5-5 : 5th SG4

OUTLINE OF DISCUSSION

(Based on Draft Booklet-Good Practices and Technologies other than WTE)

- I. Cost Recovery of SWM
- II. Collection and Transport
- III. Intermediate Treatment / 3Rs
- IV. Landfill
- V. Information, Education and Communication
- VI. Waste Analysis and Characterization Study

EVALUATION SUMMARY OF SUITABLE SWM TECHNOLOGIES OTHER THAN WTE.

-DAVAO CITY LGU



I. Cost Recovery of SWM

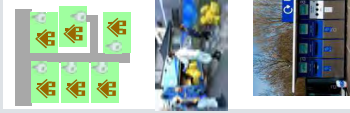
1. Charge on a waste bag designated by local Government (Japan, USA, Portland, Taiwan and other countries)
2. No Segregation –No Sticker -No Collection Policy (Bayawan City, Negros Oriental, Philippines)
3. Volume-based Fee System Using Designated Garbage Bags (South Korea and other countries)
4. SWM cost allocated from general taxpayer (Japan)
5. Garbage Fee Collection Attached to Public Utility Service Fee/Bill (Olongapo City, Philippines)
6. Sale of Recyclables (Makati City, Philippines)

Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect

OTHER SOURCES OF INCOME FOR SWM IN DAVAO CITY: SWM Certificate, Penalty from Violators, Special Collection and Landfill Tipping Fees

II. Collection and Transport

1. Door to door Collection (Japan and other countries)
2. Station collection for recyclable wastes (Japan and other countries)
3. Installation of Mini Recycling Centers (Bristol, UK)
4. Recycling Drop-off Sites (Bristol, UK)



SIMILAR TECHNOLOGIES AND SYSTEMS IN DAVAO CITY



RECYCLABLE STORAGE BOXES IN VARIOUS BRGYs.

Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Applicable conditions for introducing practice/technology	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect

Brgy. MRFs & Proposed Central MRF

III. Intermediate Treatment/3Rs

9. Promotion of Recycle – Refuse derived paper and plastics densified fuel (Hanoi, Vietnam)
10. Promotion of Recycle – Waste bank (Bank Sampah)
11. Promotion of Recycle – Act on Promoting Green Procurement (Japan and Taiwan)
12. Promotion of Recycle – Smart mobile waste transfer centers (Istanbul, Turkey)

Refuse derived paper and plastics densified fuel			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Lack of processing facility	Open for private proposals	Acceptable
Applicable conditions for introducing pre/techno/technology	Private sector funding	Needs cooperation of market demand	Acceptable
Concerns about introducing pre/techno/technology	Not all recyclables have market demand	Private sector funding	Acceptable
Applicable conditions for introducing pre/techno/technology	Define materials that have market value	Private sector funding	Acceptable
Act on Promoting Green Procurement			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Smart Mobile Waste Transfer Centers			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable



SIMILAR TECHNOLOGIES AND SYSTEMS IN DAVAO CITY

EXECUTIVE ORDER 301
ESTABLISHING A GREEN PROCUREMENT PROGRAM FOR ALL DEPARTMENTAL AGENCIES OF THE EXECUTIVE BRANCH OF GOVERNMENT

signed in March 29, 2004 by former President Gloria Macapagal Arroyo.

III. Intermediate Treatment/3Rs

13. Promotion of Reuse – Tax Break for Repair (Sweden)
14. Promotion of Reuse – Resource recycling and Reuse Act (Taiwan and other countries)

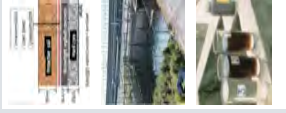
Tax Break for Repair			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Lack of recycling systems and careful planning, legislation, and consultation with various stakeholders	Open for private proposals	Acceptable
Applicable conditions for introducing pre/techno/technology	Learn from the experiences of those who adapted the system	Private sector funding	Acceptable
Resource Recycling and Reuse Act			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Lack of recycling systems and careful planning, legislation, and consultation with various stakeholders	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Learn from the experiences of those who adapted the system	Needs cooperation of the government	Acceptable



IV. Landfill

1. Fences, retaining walls (Japan and other countries)
2. Daily Soil Cover (Japan)
3. Leachate Collection Pipes of Semi-aerobic landfill (Japan and other countries)
4. Gas Ventilation System of Semi-aerobic landfill (Japan and other countries)

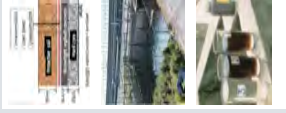
Fences, retaining walls			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Daily Soil Cover			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Leachate Collection Pipes of Semi-aerobic landfill			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Gas Ventilation System of Semi-aerobic landfill			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable



IV. Landfill

5. Surface Lining System (Japan)
6. Holding Basin and Regulating Pond for Leachate (Japan)
7. Leachate Treatment Facility (Japan)

Surface lining system			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Holding basin and Regulating pond for leachate			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable
Leachate Treatment Facility			
Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing pre/techno/technology	Costs of soil and covering technology	Needs cooperation of the government	Acceptable
Applicable conditions for introducing pre/techno/technology	Costs in adapting the technology	Needs cooperation of the government	Acceptable



V. Information, Education and Communication

Requirement to attend SWM course	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
1. Promotion of SWM to Private Companies (Santiago City, Phils.)	Concerns about introducing practicetechnology Applicable conditions for introducing practicetechnology	Acceptable	Other attendees to the SWM course for compliance purposes only Actual compliance to proper SWM is still low Strengthen, enforcement and monitoring.	Acceptable
2. Promotion of Segregation – Leaflet explaining waste segregation (Mandaue City, Phils.)	Leaflet explaining waste segregation	Economic aspect Acceptable	Cultural aspect Low compliance despite the leaflets. Strengthen compliance with assistance and enforcement.	Acceptable
3. Promotion of Segregation – Application for waste Segregation	Application for waste segregation	Economic aspect Acceptable	Cultural aspect Low compliance despite the leaflets. Strengthen compliance with assistance and enforcement.	Acceptable



SIMILAR APPLICATIONS IN THE CITY



Attendance to SWM Orientation (C.O. 0361-10)

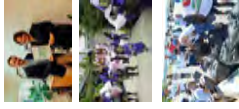
All establishments are required to annually secure a Solid Waste Management Certificate.

Requirements:

- Solid Waste Management Plan & Program in accordance with the guidelines to be issued by the Department of Environment and Natural Resources.
- Budget for implementation of such plan and program;
- Attendance to the solid waste management orientation;
- Payment of P500.00 prescribed certificate fee.

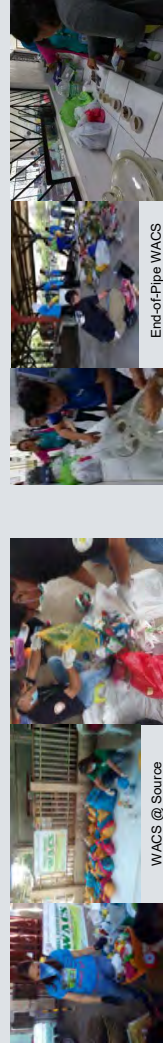
V. Information, Education and Communication

Zero Basura Olympics, "ZBO"	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
4. IEC Event – Zero Basura Olympics (Philippines)	Concerns about introducing practicetechnology Applicable conditions for introducing practicetechnology Spo-GOMI	Acceptable	-Implemented in the City- Annual implementation of Lushaw Awards.	Acceptable
5. IEC Event – Spo-GOMI (Japan)	Concerns about introducing practicetechnology Applicable conditions for introducing practicetechnology Plastics Smart	Acceptable	-Previously implemented in the City- Annual celebration of ECO-Fest.	Acceptable
6. IEC Event – Plastics Smart (Japan)	Concerns about introducing practicetechnology Applicable conditions for introducing practicetechnology	Acceptable	-Implemented in the City through WRF - Engaging participation of various stakeholders.	Acceptable



VI. Waste Analysis and Characterization Study

WACS study with a classification of the community and seasons (ASTM D5231)	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
1. WACS Study with a classification of the community and seasons (Kartal District, Istanbul, Turkey)	Concerns about introducing practicetechnology Applicable conditions for introducing practicetechnology	Other aspects may not be applicable to own setting according to seasons and according to rural and urban category.	Acceptable	Acceptable
2. Statewide Municipal Solid Waste Characterization Study (Indiana, USA)	Characterization Study	Economic aspect Acceptable	Cultural aspect Acceptable	Environmental aspect Acceptable
3. Regular Study and disclosure of WACS data to the public (Japan)	Concerns about introducing practicetechnology Applicable conditions for introducing practicetechnology	Regular study and disclosure of WACS data to the public	Economic aspect Acceptable	Environmental aspect Acceptable



WACS @ Source (Composition, Bulk Density)

End-of-Pipe WACS (Composition, Moisture Content, Ash Content, Combustible Content, Calorific Value)

THANK YOU


- Evaluate the technical examples of the “Good practices and Good technologies other than WTE” from the following perspectives:
 - Technical viability
 - Economical feasibility
 - Cultural acceptability
 - Environmental soundness

1. Cost recovery of SWM


Example: No Segregation – No Sticker – No Collection Policy

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> • Collector need to check the sticker and segregation situation. 	<ul style="list-style-type: none"> • It is take a time to check the sticker and segregation situation 	<ul style="list-style-type: none"> • Need to understanding of residents 	<ul style="list-style-type: none"> • Uncollected waste may pollute the surrounding area.
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> • Give a lecture to collector. 	<ul style="list-style-type: none"> • It is recommended to use clear bags that are easy to see what is inside. etc. 	<ul style="list-style-type: none"> • Hold briefing sessions for residents. • Sell the sticker at places where residents can easily stop by. 	<ul style="list-style-type: none"> • Combine with Door – to – Door collection.

1-1. Charge on a waste bag designated by local government

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> • Introducing the system needs careful planning, legislation, political will and consultation from various stakeholder  	<ul style="list-style-type: none"> • Costs of the waste bags will be an additional burden for the families and even greater burden for low-income families. 	<ul style="list-style-type: none"> • Needs convincing and educating residents of the benefits of the system. 	<ul style="list-style-type: none"> • Will probably result to open dumping and indiscriminate throwing to avoid the costs of waste bag. • Patronizing non-complaint households will compromise the system.
Applicable conditions for introducing	<ul style="list-style-type: none"> • Learn from the experiences of those who adapted the 	<ul style="list-style-type: none"> • Consultation on proper charging is necessary. 	<ul style="list-style-type: none"> • Thorough information, education campaign must 	<ul style="list-style-type: none"> • Consistency will mitigate the problems. Enforcement

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
practice/technology	system.		be made.	of laws.
1-2. No Segregation – No Sticker - No Collection Policy				
	Technical aspect Difficult to implement if collection is done through collection points. (Possibility of tampering and etc.)	Economic aspect How and where to purchase stickers needs to be established including how many.	Cultural aspect Needs convincing and educating residents of the benefits of the system.	Environmental aspect • Will probably result to open dumping and indiscriminate throwing to avoid the costs of stickers • Patronizing non-complaint households will compromise the system.
Concerns about introducing practice/technology				
Applicable conditions for introducing practice/technology	House-to-house collection is preferable to easily verify the stickers.	Careful planning is necessary.	Thorough education campaign must be made.	Consistency will mitigate the problems. Enforcement of laws.
1-3. Volume-based Fee System Using Designated Garbage Bags				
	Technical aspect Introducing the system needs careful planning, legislation, political will and consultation from various stakeholders	Economic aspect Costs of the waste bags will be an additional burden for the families and even greater burden for low-income families.	Cultural aspect Needs convincing and educating residents of the benefits of the system.	Environmental aspect • Will probably result to open dumping and indiscriminate throwing to avoid the costs of waste bag. • Patronizing non-complaint households will compromise the system.
Concerns about introducing practice/technology				
Applicable conditions for introducing practice/technology	Learn from the experiences of those who adapted the system.	Consultation on proper charging is necessary.	Thorough education campaign must be made.	Consistency will mitigate the problems. Enforcement of laws.
1-4. Volume-based Fee System Using Designated Garbage Bins				
	Technical aspect Needs curb collection to be successfully implemented. Not all communities in the Philippines have wide roads.	Economic aspect Costly if every household will buy or will be given a mobile garbage bin.	Cultural aspect Needs convincing and educating residents of the benefits of the system.	Environmental aspect • Will probably result to open dumping and indiscriminate throwing to avoid the costs of waste bag. • Patronizing non-complaint households will compromise the system.
Concerns about introducing practice/technology				

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Applicable conditions for introducing practice/technology	Needs thorough study and planning.	The cost of the bin can be added to the SWM fee charged to the household.	Thorough education campaign must be made.	Consistency will mitigate the problems. Enforcement of laws.
1-5. SWM cost allocated from general taxpayer				
	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City- Acceptable	Allocation for SWM sometimes fall short of the required budget.	The system does not encourage households to generate less wastes.	Implementation of programs depends on the budget.
Applicable conditions for introducing practice/technology		Financial support through PPPs. Other funding initiatives and generating activities.	Implement programs that encourage waste diversion and reduction 	Provide contingency plans.
1-6. Garbage Fee Collection Attached to Public Utility Service Fee/Bill				
	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Proposed to be implemented in the City (On-going study) – Dependent on agreement with the service utility.	Acceptable	Needs convincing and educating residents of the benefits of the system.	Acceptable
Applicable conditions for introducing practice/technology	Needs study and planning. Learn from the experiences of those adopting the system.		Thorough education campaign must be made.	
1-7. Garbage Fee Collection and MRF Rental				
	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Garbage Fee implemented in the City- Needs further information especially on MRF Rental schemes.	Acceptable	Needs educating constituents on the benefits of Garbage Fees.	Acceptable
Applicable conditions for introducing practice/technology			Thorough education campaign must be made.	
1-8. Collection Fee for Tagged Sack of Waste				
	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Introducing the system needs careful planning, legislation, political will and a lot of consultation from various stakeholders	Costs for tagged sacks will be an additional burden for the families and even greater burden for low-income families.	Needs convincing and educating residents of the benefits of the system.	<ul style="list-style-type: none"> Will probably result to open dumping and indiscriminate throwing to avoid the costs of waste bag. Patronizing non-complaint households will compromise the system.
Applicable conditions for introducing practice/technology	Learn from the experiences of those who adapted the system.	Consultation on proper charging is necessary.	Thorough information, education campaign must be made.	Consistency will mitigate the problems. Enforcement of laws.

1-9. Sale of Recyclables

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented by some brgy.s In the City- Not all recyclables have market demand.	Feasibility and sharing of profit needs to be established. (Share of Barangay from the sale of recyclables.)	Needs educating residents on the importance of segregating recyclables.	Recyclables without market value may end up in landfills, accumulate on junkyards or indiscriminately thrown.
Applicable conditions for introducing practice/technology	Define materials that have market value.	Memorandum of Agreement between barangay and contractor/junkshop.	Thorough information, education campaign must be made.	Enforcement of environmental laws.

2. Collection and Transportation

Example: Door – to – Door Collection

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> In an area with narrow roads, large trucks cannot access there. 	<ul style="list-style-type: none"> It is take a time to pick up waste from each household 	<ul style="list-style-type: none"> Acceptable 	<ul style="list-style-type: none"> Acceptable
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Combine with smaller size vehicle 	<ul style="list-style-type: none"> It is recommended to use clear bags that are easy to see what is inside. etc. 	<ul style="list-style-type: none"> --- 	<ul style="list-style-type: none"> ---

2-1. Door-to-Door Collection

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Not all houses are directly facing the street. Others are located on narrow alleys.	Costly. Requires fuel and manpower.	Segregation must be established	Acceptable
Applicable conditions for introducing practice/technology	Utilize carts on alleys or establish collection pts for these areas.	Establish feasibility and planning.	Awareness campaigns	

2-2. Station collection for recyclable waste

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Many communities regard collection points as NIMBY. Collection points have tendency to become nuisance.	Costs for installation of collection boxes. Need to establish market for recyclables.	Needs educating residents on the benefit of this system.	Uncollected Unsorted wastes may pose as nuisance and will accumulate if not collected. Collected unsorted wastes will set a bad precedence to those complying.
Applicable conditions for introducing practice/technology	Maintenance of collection pts.	Can be subsidized by the government. Define Materials that have market value.	Awareness campaigns	Consistency will mitigate the problems. Enforcement of laws.

2-3. Installation of Mini Recycling Centers

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Many communities regard collection points as NIMBY. Collection points have tendency to become nuisance.	Costs for installation of collection boxes. Need to establish market for recyclables.	Needs educating residents on the benefit of this system.	Uncollected Unsorted wastes may pose as nuisance and will accumulate if not collected. Collected unsorted wastes will set a bad precedence to those complying.
Applicable conditions for introducing practice/technology	Maintenance of collection pts.	Can be subsidized by the government. Define Materials that have market value.	Awareness campaigns	Consistency will mitigate the problems. Enforcement of laws.

2-4. Recycling Drop Off Sites


	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Requires the necessary facility and space.	Needs planning to determine financial feasibility	Needs educating residents on the benefit of this system.	Tendency for wastes to accumulate and become

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Applicable conditions for introducing practice/technology	Needs additional information	Needs additional Information	Awareness campaigns	nuisance to community when not properly managed. Proper management. Fast turnover of materials going to recycling and disposal facilities

2-5. Group Collection of Recyclable Waste

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Requires identifying, registering organizations as collectors including presence of requisite facility and supplier contracts.	Requires budget allocation from City as subsidy or incentive for collector organization.	Acceptable	Tendency for wastes to accumulate and become nuisance to community when not properly managed.
Applicable conditions for introducing practice/technology	Needs planning and further study. Learn from the experiences of those adopting the system.	Needs planning and further study. Learn from the experiences of those adopting the system.		Proper management. Fast turnover of materials going to recycling and disposal facilities

2-6. Kitchen waste collection

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Establishing of system: From food waste collection to processing into compost.	Costs in procurement of bins, collection and transport to composting equipment and processing.	Needs educating residents on the benefit of this system.	Tendency to become nuisance if not properly managed 
Applicable conditions for introducing practice/technology	Careful planning on establishment of system.	Can be funded by government and or private sector.	Awareness campaigns	Proper management.

2-7. Food Waste Truck Program

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Establishing of system: From food waste collection to processing into compost.	Costs in procurement of truck, collection and transport to composting equipment and processing.	Needs educating residents on the benefit of this system.	Tendency to become nuisance if not properly managed.
Applicable conditions for introducing practice/technology	Careful planning and establishment of system.	Can be funded by government and or private sector.	Awareness campaigns	Proper management.

2-8. High-tech food waste recycling machines in Seoul

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Establishing of system: From food waste collection to waste processing.	Cost of equipment, collection, transport and processing.	Acceptable	Tendency to become nuisance if not properly managed.
Applicable conditions for introducing practice/technology	Careful planning on establishment of system.	Can be funded by government and or private sector.		Proper management.

2-9. Transfer Station

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Identifying a strategic location for the facility including the areas to be covered.	Costs of facility, trucks and other equipments.	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of Feasibility Study if it's better to just establish another sanitary landfill in the area.	Can be funded by government and or private sector.		

2.10 Transfer Station

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Identifying a strategic location for the facility including the areas to be covered.	Costs of facility, trucks and other equipments.	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of Feasibility Study if it's better to just establish another sanitary landfill in the area.	Can be funded by government and or private sector.		

2-11. Truck Routing

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City- Establishing of routes and mode of collection.	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Careful planning and coordination.			

2-12. Equipping Transporting Vehicles with GPS

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Lack of knowledge on using the system	Costs for installing the technology	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of training on using the system.	Can be funded by government and or private sector.		

2-13. Model Country on waste collection and transportation

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Facilities have to be established (WTE, glass processing facility, etc)	Costs for installing the facilities.	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Work with what is locally available.	Can be funded by government and or private sector.		

3. Intermediate Treatment/3R


Example: Earthworm compost

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> food waste should be collected separately. It is necessary to secure a supplier or site for the use of compost. 	<ul style="list-style-type: none"> acceptable 	<ul style="list-style-type: none"> Residents may complain about pests and odors. 	<ul style="list-style-type: none"> acceptable
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Need to introduce a system to separate and collect food waste. For use in suburban areas with farmland. 	<ul style="list-style-type: none"> --- 	<ul style="list-style-type: none"> Secure a location away from private homes. 	<ul style="list-style-type: none"> ---

Example: Waste Bank

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> Regulations on target of recyclable product categories, weighing methods, recording methods, etc. Secure the recyclers to cooperate 	<ul style="list-style-type: none"> Expenses related to the establishment of a waste bank Labor costs 	<ul style="list-style-type: none"> Waste bank should be installed in a location that is easily accessible to local residents Anti-theft measures for recyclable products 	<ul style="list-style-type: none"> Keep recyclable products clean. (PET bottles and cans soiled with food and drink are a cause of foul odors and pests. These wastes cannot be stored outside because they form a pool of water and become a hotbed for mosquitoes.)
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Formulate the guidelines Identify the recycler 	<ul style="list-style-type: none"> Secure a certain number of customers so as not to make a deficit in initial cost and operation cost. 	<ul style="list-style-type: none"> Install the waste bank in a place where people can easily gather, such as near a government office. 	<ul style="list-style-type: none"> Only accept the washed recyclable products Secure a storage place indoors


3-1. Black Soldier Fly (BSF)

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Lack of Knowledge on technology	Costs for establishing a facility	Residents may perceive the system as unsanitary and potentially health hazard	Acceptable
Applicable conditions for introducing practice/technology	Conduct of training 	May be funded by government and or private sector.	Awareness campaigns.	


3-2. Bokashi composting of food waste from restaurants and hotels

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Lack of Knowledge on technology	Costs for establishing the system.	Acceptable	Improper management may result to odor nuisance in the establishment.
Applicable conditions for introducing practice/technology	Conduct of training.	To be funded by the private sector.		Proper management and training.

3-3. Waste-to-Energy facility utilizing rice husks

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Can be installed only on rice producing areas.	Costs for Gasifiers.	Acceptable	Possible smoke emissions
Applicable conditions for introducing practice/technology	Install on rice producing areas	May be funded by government and or private sector.		Installation of APC 



3-4. Food Waste Recycling

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Lack of  angay composting facilities.	Costs for collecting and transporting	Acceptable	Tendency to become nuisance if not properly managed.
Applicable conditions for introducing practice/technology	Establish linkages with piggeries and private composting facilities	May be funded by government and or private sector.		Proper management.

3-5. Ecobrick Movement

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Sturdiness of ecobrick material may be an issue.	Acceptable	Needs educating residents on the benefit of this system.	Acceptable
Applicable conditions for introducing practice/technology	To be used only on less load bearing structures.		Awareness campaigns	


3-6. Selling of recyclable wastes for tuition fee and school funding

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Identifying participating schools	Not all recyclables have market demand. 	Needs educating students on the benefit of this system.	Acceptable
Applicable conditions for introducing practice/technology	Course the implementation of program through DepEd.	Define materials that have market value.	Awareness campaigns	

3-7. Basuranihan Project

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Not all recyclables have market demand.	Acceptable	Needs educating residents on the benefit of this system.	Acceptable
Applicable conditions for introducing practice/technology	Define materials that have market value.		Awareness campaigns	


	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
practice/technology				
3-8. WISHCRAFT				
Concerns about introducing practice/technology	Technical aspect Identifying participating schools	Economic aspect Not all recyclables have market demand.	Cultural aspect Needs educating students on the benefit of this system.	Environmental aspect Acceptable
Applicable conditions for introducing practice/technology	Course the implementation of program through DepEd.	Define materials that have market value.	Awareness campaigns	
3-9. Plastic for Rice Program				
Concerns about introducing practice/technology	Technical aspect Acceptable	Economic aspect Sustainability issue. Availability of resources.	Cultural aspect Willingness to cooperate will depend on "what's in it for them."	Environmental aspect Acceptable
Applicable conditions for introducing practice/technology		Project to cover a certain period only.	Awareness campaign.	
3-10. Refuse derived paper and plastics densified Fuel				
Concerns about introducing practice/technology	Technical aspect Lack of processing facility.	Economic aspect Costs for establishment of facility.	Cultural aspect Acceptable	Environmental aspect Acceptable
Applicable conditions for introducing practice/technology	Open for Private proposals	Private sector funding.		
3-11. Waste bank (Bank Sampah)				
Concerns about introducing practice/technology	Technical aspect Needs careful planning, and consultation from various stakeholders	Economic aspect Not all recyclables have market demand.	Cultural aspect Needs cooperation of the residents.	Environmental aspect Acceptable
Applicable conditions for introducing practice/technology	Learn from the experiences of those who adapted the system.	Define materials that have market value.	Awareness campaigns	
3-12. Act on Promoting Green Procurement				
	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	(Implemented in the Country through Government procurement Policy) 	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology				

3-13. Smart Mobile Waste Transfer Centers

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Availability and adaptability of Technology.	Costs in adapting the technology	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of Feasibility Study.	May be funded by government or private sector		

3-14. Pant System

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Availability and adaptability of Technology. PE  as very little to no market value at present.	Costs in adapting the technology	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of Feasibility Study. Establish linkages with recyclers.	May be funded by government or private sector		

3-15. Recycle at H&M

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Voluntary initiative of private establishments	Costs in adapting the system.	Cooperation of the consumers	Acceptable
Applicable conditions for introducing practice/technology	Learning from the experiences of those who adapted the system.	May be funded by government or private sector	Awareness campaigns	

3-16. Tax Break for Repair

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Introducing the system needs careful planning, legislation, and consultation with various	Lost in revenue for the government.	Acceptable	Acceptable

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
	stakeholders			
Applicable conditions for introducing practice/technology	Learn from the experiences of those who adapted the system.	Conduct of financial feasibility study.		

3-17. Tax Break for Repair

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
	Introducing the system needs careful planning, legislation, and consultation with various stakeholders	Lost in revenue for the government.	Acceptable	Acceptable
Concerns about introducing practice/technology	Learn from the experiences of those who adapted the system.	Conduct of financial feasibility study.		

3-18. Resource Recycling and Reuse Act

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
	Lack of recycling systems and industries that recycles electronic wastes.	Costs of facilities and technology.	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of feasibility study and possible engagements with the private sector.	May be funded by government or private sector		

3-19. District Model of Waste as a Resource


	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
	-Intention of Community based composting. Implemented by some brgy's in the city. - Needs planning and establishing of systems and facilities.	Costs of facilities and transport vehicles for segregated collection.	Acceptable	Acceptable
Concerns about introducing practice/technology				
Applicable conditions for introducing practice/technology	Conduct of feasibility study and possible engagements with the private sector.	May be funded by government or private sector		

3-20. Model Ward Initiative


	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	- Implemented in the City through Lunhaw Awards -	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology				

4. Landfill

4-1. Fences, retaining walls

	Technical aspect 	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented in the City SLF-	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology				

4-2. Daily Soil Cover

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented in the City SLF- covering of soil is not done on a daily basis due to the 24 hr. operation of the landfill.	Costs of soil and covering operation.	Acceptable	Risk of long term exposure of wastes to the environment if not done properly 
Applicable conditions for introducing practice/technology	Intermittent covering is done	Funded by the City.		

4-3. Leachate Collection Pipes of Semi-aerobic landfill

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented in the City SLF- Tendency of collection pipes to collapse and block the leachate collection and passage.	Costs of Pipes and leachate treatment systems.	Acceptable	Risk of leachate buildup and underground contamination if leachate pipes are damaged.
Applicable conditions for introducing practice/technology	Careful installation and passage by equipment. Regular monitoring of pipes.	Funded by city.		Regular monitoring

4-4. Gas Ventilation System of Semi-aerobic landfill

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented in the City SLF- Tendency of collection pipes to collapse and block the leachate collection and air passage.	Costs of Pipes.	Acceptable	Risk of methane buildup in the landfill if pipes are damaged.
Applicable conditions for introducing practice/technology	Careful installation and passage by equipment. Regular monitoring of pipes.	Funded by city.		Regular monitoring

4-5. Surface lining system

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented in the City SLF- Tendency of surface liners to break/damage.	Cost of liners.	Acceptable	Risk of underground contamination by leachate if liners are damaged.
Applicable conditions for introducing practice/technology	Careful installation and passage by equipment. Installation of protective layer or soil.	Funded by city.		Careful installation and passage by equipment. Installation of protective layer or soil.

4-6. Holding basin and Regulating pond for leachate

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-implemented in the City SLF- Heavy rainfall may overwhelm the system.	Cost of system and operational expenses.	Acceptable	Risk of overflowing to adjacent surroundings.
Applicable conditions for introducing practice/technology	Installation of leachate Treatment System/Facility. Installation of recirculation system.	Funded by city.		Installation of leachate Treatment System/Facility. Installation of recirculation system.

4-7. Leachate Treatment Facility

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Design of appropriate leachate Treatment System.	Cost of system and operational expenses.	Acceptable	Risk of contaminating adjacent aquifers if improperly treated leachate is released.
Applicable conditions for	Seek assistance from JICA	Funded by city.		Installation of appropriate


	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
introducing practice/technology	Experts.			leachate System/Facility. Treatment

5. Information, Education and Communication (IEC)

Example: Requirement to attend SWM course

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	<ul style="list-style-type: none"> Secure the teacher of SWM course 	<ul style="list-style-type: none"> Labor costs of the teacher of the SWM course Expenses related to the implementation of the SWM course 	<ul style="list-style-type: none"> Obligation of the target person to participate in the SWM course 	<ul style="list-style-type: none"> Acceptable
Applicable conditions for introducing practice/technology	<ul style="list-style-type: none"> Formulate the manual of the SWM course 	<ul style="list-style-type: none"> Secure a budget for implementing the SWM course or collect tuition fees when obtaining a license 	<ul style="list-style-type: none"> Identify the target person to participate in the SWM course and formulate the rules of participation obligation 	<ul style="list-style-type: none"> ---

5-1. Requirement to attend SWM course

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City – 	Acceptable	Other attendees to the SWM lecture are only there for compliance purposes only. Actual compliance to proper SWM is still low.	Acceptable
Applicable conditions for introducing practice/technology			Strengthen enforcement and monitoring.	

5-2. Leaflet explaining waste segregation

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City-	Acceptable	Low compliance despite the	Acceptable

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
practice/technology			leaflets.	
Applicable conditions for introducing practice/technology			Continuing campaigns coupled with awareness enforcement.	

5-3. Application for waste segregation

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Availability and adaptability of technology.	Costs in adapting the technology	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct of Feasibility Study.	May be funded by government or private sector		

5-4. Collection bag for used paper

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Creation of demand for used paper.	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Engagement with private sector for establishing of demand.			

5-5. Live Green Conference

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Previously implemented in the City- Part of the annual celebration of Eco-fest.	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology				

5-6. Zero Basura Olympics, “ZBO”

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City- Annual implementation of Lunhaw Awards.	Acceptable	Acceptable	Acceptable
Applicable conditions for				

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
introducing practice/technology				

5-7. Spo-GOMI

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Previously implemented in the City- Part of the annual celebration of Eco-fest.	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology				

5-8. Plastics Smart

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City through WWF -	Acceptable	Concern on Identifying various initiatives and strategies.	Acceptable
Applicable conditions for introducing practice/technology			Engaging participation of various stakeholders.	

5-9. Waste Wise Festival


	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Acceptable	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Establishment of systems: segregation, segregated collection, segregated disposal.			

5-10. Zero Waste Switzerland

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Lack of effort from producers to retrieve wastes from their products in accordance to concept of circular economy.	Acceptable	Acceptable	Acceptable
Applicable conditions for	Engaging cooperation and			

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
introducing practice/technology	participation of various stakeholders especially manufacturers.			

5-11. Seoul Upcycling Plaza Center

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Formulation of concept. Identification of site.	Costs of establishment of museum 	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	List and collect/gather products made from recycled materials.	May be funded by government or private sector		

6. Waste Analysis and Characterization Study (WACS)


6-1. WACS Study with a classification of the community and seasons (ASTM D5231)

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	Other aspects may not be applicable to own setting.	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology	Conduct study according to wet/dry seasons and according to rural and urban category.			

6-2. Characterization Study

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City-	Acceptable	Acceptable	Acceptable
Applicable conditions for introducing practice/technology				

6-3. Regular study and disclosure of WACS data to the public

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
Concerns about introducing practice/technology	-Implemented in the City- 	Acceptable	Acceptable	Acceptable
Applicable conditions for				

	Technical aspect	Economic aspect	Cultural aspect	Environmental aspect
introducing practice/technology				

PROJECT ACTIVITY : 5th SUB-GROUP MEETING FOR PROJECT OUTPUT 4 (ENHANCEMENT OF NATIONAL GOVERNMENTS' AND TARGET LGU'S CAPACITY TO IDENTIFY ISSUES AND PROVIDE SUGGESTION/ RECOMMENDATION FOR THE OTHER SWM TECHNOLOGIES THAN WTE IS ENHANCED)

DATE/TIME : 27 October 2021, 9:00AM - 11AM (Philippine Time)

VENUE : Video Conference through Microsoft Teams

MATERIALS : <https://bit.ly/5thOP4SGMtg>

Agenda Topics	Issues/Discussions/Actions	Comments/Agreements/ Timelines	Required Actions/Responsible Agency/Person
<p>1.) Call to Order/Meeting Objectives/ Acknowledgement of Attendees and Adoption of Agenda (Ms. Elvira Pausing, EMB-SWMD-PMO)</p>	<ul style="list-style-type: none"> ● Ms. Elvira Pausing of EMB-SWMD-PMO commenced the 5th subgroup meeting for Project Output 4 when quorum was reached and all presenters for the meeting had signed in. ● Ms. Pausing presented the agenda and asked the subgroup members if anything else needed to be discussed. ● Ms. Roxanne Barcenas of EMB-SWMD-PMO was called on to acknowledge the presence of participants. 	<ul style="list-style-type: none"> ● Agenda was moved for adoption with no comments and modifications from the participants. 	
<p>2.) Review of the previous Sub-group meeting (Ms. Kyoko Kimura, JET)</p>	<ul style="list-style-type: none"> ● Ms. Kyoko Kimura of JET discussed the Booklet of Good Practices and Good Technology, under Activity 4-3 that was presented in the last 4th Subgroup Meeting. ● The Evaluation of Technology from Quezon City and Davao City were also shared briefly, sharing with the subgroup the progress of their assessments. Ms. Kimura noted that the objective of today's meeting is to hear the feedback of the subgroup on the output of the LGUs in preparation for the next step in Output 4. ● Lastly, Ms. Kimura shared Activity 4-5, where the LGUs will be sharing their final 	<ul style="list-style-type: none"> ● Ms. Kimura presented the timeline of the next steps which include: <ul style="list-style-type: none"> ○ Finalization of Activity 4-4 outputs of LGUs by end of November 2021 ○ Seminar under Activity 4-5 to be tentatively held in June 2022. 	

<p>3a1.) Evaluation Summary of the suitable technology by LGUs under Activity 4-4 - Davao City (Engr. Lakandiwa Orcullo)</p>	<p>assessments to the Evaluation of Technology through a seminar.</p> <ul style="list-style-type: none"> Ms. Kimura ends her presentation with enjoining the subgroup to listen and provide feedback to the LGUs as to how the LGUs can better adopt and implement their chosen technologies. 	<ul style="list-style-type: none"> Engr. Orcullo presented the Evaluation of Technology for Davao City for Activity 4-4, explaining the list of technologies that was found to be the best fit for Davao City, and assessing them in terms of technical viability, economic feasibility, cultural acceptability and environmental impact. 	
<p>3a.) Evaluation Summary of the suitable technology by LGUs under Activity 4-4 - Cebu City</p>		<ul style="list-style-type: none"> From the presentation of Engr. Orcullo, particularly on Intermediate Treatment technologies, Ms. Kimura inquired about how Davao City intends to increase their recycling capacity of organic waste to 15 tons per day. <ul style="list-style-type: none"> Engr. Orcullo responded that they have not yet finalized the technology, and are still weighing between BSF, composting, or other means, but currently favors more mechanical methods for processing the recycling of organic waste. Cebu City was not able to participate in the meeting, but Ms. Mallare of JET shared that Engr. Manatad has confirmed to be currently working on the Evaluation of Technology and is set to send it to JET within the day. Ms. Kimura noted that the presentation of Cebu City will be facilitated in the next subgroup meeting. 	
			<p>[Cebu City] To present their Evaluation of Technology in the 6th OP4 Subgroup Meeting.</p>

3a.) Evaluation Summary of the suitable technology by LGUs under Activity 4-4 - Quezon City		<ul style="list-style-type: none"> ● Quezon City was not able to send participants to the meeting as well, but has allowed for JET to share with the subgroup the Evaluation of Technology they sent last September. ● Ms. Kimura noted that the presentation of Quezon City will be facilitated in the next subgroup meeting. 	[JET] To share the Evaluation of Technology of Quezon City
3b.) Recommendation of Japanese technology (Ms. Iku Sato, JET)	<ul style="list-style-type: none"> ● Ms. Iku Sato presented new technologies being implemented by Japanese Companies that the LGUs may opt to consider in the finalization of their Evaluation of Technology. 		<p>[Quezon City] To present their Evaluation of Technology in the 6th OP4 Subgroup Meeting.</p> <p>[LGUs] To review the Booklet of Waste Management Technology of Japanese Companies and include in their Evaluation of Technology.</p>

<p>4.) Wrap-up, Required Actions, and Agreements (Ms. Andrei Mallare, JET)</p>	<ul style="list-style-type: none"> ● Ms. Andrei Mallare of JET wrapped up the earlier discussions and reiterated the arrangements and timelines as agreed: <ul style="list-style-type: none"> ● Timeline of next steps include: <ul style="list-style-type: none"> ● Finalization of Activity 4-4 outputs by end of November 2021 ● Seminar under Activity 4-5 to be tentatively held in June 2022. ● [Cebu City] To present their Evaluation of Technology in the 6th OP4 Subgroup Meeting. ● [JET] To share the Evaluation of Technology of Quezon City ● [Quezon City] To present their Evaluation of Technology in the 6th OP4 Subgroup Meeting. ● [LGUs] To review the Booklet of Waste Management Technology of Japanese Companies and include in their Evaluation of Technology. 	<ul style="list-style-type: none"> ● No clarifications and/or alterations raised by the subgroup members 	
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5.) Way forward, Schedule of the next meetings

- Ms. Pausing presented the next schedule of meetings for 2021:

PROPOSED SCHEDULE OF MEETINGS
(Last quarter of CY 2021)

PROJECT OUTPUT	OCT	NOV	DEC
PMO (Monthly)	13	02	01
JCC (Semi-annual)		TBD	
ITWG (Quarterly)			
OP 1		04	
OP 2			
OP 3			
OP 4	27		
SEMINAR			TBD
Web-training		7days/2hrs	

- Mr. Kamishita invited the subgroup members to attend the web training this November 2021. The formal invite shall be shared once the program and date has been finalized.
- Mr. Kamishita also noted that since Cebu City and Quezon City are still expected to present their Evaluation of Technology, another OP4 subgroup meeting shall be held in 2021.

添付資料11-5: 成果4サブグループ会議

11-5-6 : 6th SG4



6th Sub Group Meeting for

Output 4: Enhancement of The National Government's Capacity to identify issues and provide suggestions/recommendations for other SWM technologies other than WTE

18th February 2022 (Friday) 9:00 a.m.

The Technical Cooperation Project (TCP) for Capacity Development on Improving Solid Waste Management (SWM) through Advanced/Innovative Technologies Technologies

Review of the previous meeting

- **Output 4:** National Government's and target LGUs' capacity to identify issues and provide suggestion/recommendation for other SWM technologies than WTE is enhanced.
- **Specific activities**
 - 4.1 Grasp the current situation by National SWM strategy and 10 year SWM plan in the target LGUs.
 - 4.2 Identify the current issues for other SWM technologies in the target LGUs.
 - 4.3 Collect the information of "Good practice/Good technology" of other SWM technologies in Japan/third world countries.
 - 6th meeting
 - 4.4 Summarize and provide suggestion/recommendation to improve utilization of other SWM technologies to target LGUs.
 - 4.5 Seminar for disseminating suggestion/recommendation is held.

Review of the previous meeting

□ Schedule of Output4

Activities	Mar/'19 - Mar/'20	Apr/'20 - Mar/'22	Apr/'21 - Mar/'22
4.1			
4.2		Information Collection	Analysis
4.3			Presentation
4.4	situation and issues		
4.5			
Sub-Group MTG	1st ★	2nd ★★ 3rd ★★★ 4th ★★★★ 5th ★★★★★ 6th ★★★★★★	
Main activity	<ul style="list-style-type: none"> • Grasp the current situation and identify the current issues by National SWM strategy and 10 year SWM plan in the target LGUs. 	<ul style="list-style-type: none"> • Collect the information of "Good practice/Good technology" of other SWM technologies in third countries. • Summarize and provide suggestion/recommendation to improve utilization to target LGUs. 	<ul style="list-style-type: none"> • Seminar for disseminating suggestion/recommendation is held.

Agenda

1. Activity 4-4
Summarize and provide suggestion/recommendation to improve utilization of other SWM technologies to target LGUs
2. Guide for activities 4-5

The result of Activity 4-4

The good practices/good technologies collected in Activity 4-3 is referred to.

Target LGUs characteristics to be considered in applying each technology;

The common characteristics of the 3target LGUs:

- (1) One million or more population
- (2) Seeking application of WTE technologies for their SWM

Specific characteristics of each LGU:

- Quezon City: Consists mostly of urban areas with very few rural areas.
- Davao City: Large area, mostly occupied by rural and forest areas. Agriculture and industry in urban areas are existing as well.
- Cebu City: There are urban areas and rural/forest areas.

Activity 4-4

1. Cost recovery of SWM

	Charge on Waste
Applicable sections of the case studies	<ul style="list-style-type: none"> 1-1. Charge on a waste bag designated by local government 1-2. No Segregation –No Sticker -No Collection Policy 1-3. Volume-based Fee System Using Designated waste Bags 1-8. Collection Fee for Tagged Sack of Waste
Technology points	<ul style="list-style-type: none"> • There are many municipalities that use these system, including Japan and the Philippines. • The purpose of introducing the system is not to collect fees, but rather to reduce waste.
Common points to note for LGUs	<ul style="list-style-type: none"> • Costs of the waste bags will be an additional burden for the families and even greater burden for low-income families. • Consultation on proper charging is necessary. • Needs convincing and educating residents of the benefits of the system. • Different types of waste bags were prepared to separate the proper waste to be brought to the WTE facility from other waste. • Since there is a concern that free-riding and illegal dumping will occur, the fee should be an amount that takes into account the acceptability of residents. • Need to consideration, such as free collection of recyclable materials.

Activity 4-4

1. Cost recovery of SWM

	Fee Collection
Applicable sections of the case studies	<ul style="list-style-type: none"> 1-5. SWM cost allocated from general taxpayer 1-6. Garbage Fee Collection Attached to Public Utility Service Fee/Bill
Technology points	<ul style="list-style-type: none"> • A method often used in Other Countries.
Common points to note for LGUs	<ul style="list-style-type: none"> • Consideration of charging fees in conjunction with electricity rates in relation to WTE generation. • Consideration of setting the collection rate by income of the citizens.
Points to note for each LGU	None.

Activity 4-4

2. Collection and transportation

	Pick up place
Applicable sections of the case studies	<ul style="list-style-type: none"> 2-1. Door-to-Door Collection 2-2. Station collection for recyclable waste
Technology points	<ul style="list-style-type: none"> • Door-to-Door and House-to-House system can help beautify the city and raise awareness of segregation by residents. On the other hand, it is not efficient as Station Collection because of taking time to collect. • Station Collection and Curbside Pick-Up are expected to shorten the collection time.
Common points to note for LGUs	<ul style="list-style-type: none"> • For individual collection, set up a trash bin in front of house to prevent scattering by birds and animals. • In urban areas, encourage users to manage their own waste collection sites, such as setting up waste collection points on the premises of condominiums. • In the case of Station Collection, the schedule of waste collection will be shown on a plate to inform residents of the disciplined waste collection.
Points to note for each LGU	<ul style="list-style-type: none"> • In areas with small populations, station collections are often employed for collection efficiency.

Activity 4-4

2. Collection and transportation

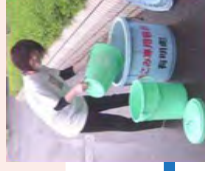
Collection of Recyclable materials	
Applicable sections of the case studies	2-3. Installation of Mini Recycling Centers 2-4. Recycling Drop Off Sites 2-5. Group Collection of Recyclable Waste
Technology points	<ul style="list-style-type: none"> • Mini Recycling Centers are easy to manage when set up inside government offices and public facilities. • In the case of Group Collection, it is necessary to foster a sense of collaboration in the local community. Coordinate with elementary school activities is recommended.
Common points to note for LGUs	• A collection facility for recyclable materials is often constructed into the WTE facility. The targets are clothes, toys, furniture, etc.
Points to note for each LGU	In rural areas, should be collected in groups or by the public.



Activity 4-4

2. Collection and transportation

Organic Waste Collection	
Applicable sections of the case studies	2-6. kitchen waste collection 2-7. Food Waste Truck Program 2-8. High-tech food waste recycling machines
Technology points	<ul style="list-style-type: none"> • As this initiative is based on composting and reuse, methods to prevent other waste from entering the system should be considered. • Business waste is easy to deal with because food waste are generated in large quantities.
Common points to note for LGUs	• Since food waste is low in calories and prevents combustion in the WTE, should be considered ways to reuse it as much as possible.
Points to note for each LGU	• Composting is difficult to implement in urban areas because it requires manpower, space, and time, and it is not possible to treat a large amount of waste at one time, but there is room to consider implementing it in schools and community units.



Shibushi-City, in Japan

Activity 4-4

2. Collection and transportation

Transfer station	
Applicable sections of the case studies	2-9 and 2-10. Transfer Station
Technology points	<ul style="list-style-type: none"> • This facility is effective when the collection area is large and the distance to the intermediate treatment facility or disposal site is large. • It is also expected to reduce the number of collection vehicles and ease traffic congestion. • Consider whether it is necessary or not, based on the amount of waste accepted by WTE and the area of collection.
Common points to note for LGUs	None
Points to note for each LGU	None



Activity 4-4

3. Intermediate treatment/3R

Recycling of Organic Waste	
Applicable sections of the case studies	3-1. Recycles of organic waste Black Soldier Fly 3-2. Bokashi composting 3-3. Waste-to-Energy facility utilizing rice husks 3-4. Recycles of organic waste Food Waste Recycling J-2. Waste biomass torrefaction J-3. Organic Waste Treatment System J-4. Disassembled food waste disposer "Shorio".
Technology points	<ul style="list-style-type: none"> Manual composting methods that do not require machines and methods that use machines are used depending on the conditions. Since food waste is low in calories and prevents combustion in the WTE, should be considered ways to reuse it as much as possible. Some composting methods require more manpower, time, and space. Insects and pest will be a problem for the residents. Need to build consensus with neighbors.
Common points to note for LGUs	<ul style="list-style-type: none"> It is a prerequisite that separate collection is implemented. It is easier to start implementing mainly with business waste. Japanese company technology mentioned above prevents the problem of insects.
Points to note for each LGU	

Activity 4-4

3. Intermediate treatment/3R

Promotion of recycling	
Applicable sections of the case studies	3-6. selling of recyclable wastes for tuition fee and school funding 3-7. Basuranihan Project 3-8. WISHCRAFT 3-9. Plastic for Rice Program 3-10. Recycling Drop off Sites, IEC, Promotion of recycle 3-12. Waste bank
Technology points	<ul style="list-style-type: none"> Provide incentives to residents to collect recyclable materials. Many of the initiatives are resident, but the government is responsible for the selection of recyclers and operating costs.
Common points to note for LGUs	<ul style="list-style-type: none"> If it is a school initiative, it is easy to conduct focus on children.
Points to note for each LGU	None

Activity 4-4

3. Intermediate treatment/3R

Plastic as fuel (RPF)	
Applicable sections of the case studies	3-11. Refuse derived paper and plastics densified fuel
Technology points	<ul style="list-style-type: none"> Solidification of combustible wastes as fuel. In some cases, private companies have entered the recycling industry.
Common points to note for LGUs	<ul style="list-style-type: none"> It is a condition that combustible waste (plastic and paper waste) is brought in a segregated manner. It is necessary to secure a stable place to receive the products.
Points to note for each LGU	<ul style="list-style-type: none"> It is important to secure recipients and should be checked the demand from nearby cement plants that can accept the products.



(GUUN Co.,Ltd Website)

Activity 4-4

4. landfill

Proper Management Landfill	
Applicable sections of the case studies	4-1. Fences, retaining walls 4-2. Daily Soil Cover 4-3. Leachate Collection Pipes of Semi-aerobic landfill 4-4. Gas Ventilation System of Semi-aerobic landfill 4-5. Surface lining system 4-6. Holding basin and Regulating pond for leachate 4-7. Leachate Treatment Facility
Technology points	<ul style="list-style-type: none"> All of these are basic technologies necessary for the proper management of landfill. Each municipality should set its own priorities and try to implement safe landfill management.
Common points to note for LGUs	<ul style="list-style-type: none"> Installation of fences and covering of soil is relatively easy to start. Separate the waste by characteristics, such as hazardous waste (medical waste).
Points to note for each LGU	<ul style="list-style-type: none"> Wastes with different properties, such as business and agricultural wastes, should be dumped in separate areas.

5. Information, education and communication (IEC)

Promotion of Segregation

Applicable sections 5-2. Leaflet explaining waste segregation of the case studies 5-3. Application for waste segregation

Technology points • It is essential to create a collection calendar and inform residents of the items to be sorted and the collection date.

Common points to note for LGUs • Such as bottles and cans, which cannot receive at the WTE facility, municipality should hold explanatory meetings for residents and thoroughly inform them of the situation.

Points to note for each LGU • In Davao, at the grassroots cooperative project, a calendar of waste collection was prepared. Municipality will try to aware to residents until they understand the necessity of the activities.



Waste Classification in Mandaue City



Kawasaki-Shi, Japan

2. Starting of Activity 4-5

Activity 4-5

Seminar for disseminating suggestion/recommendation is held.

- In Activity 4-4, technologies other than WTE were evaluated by each LGU.
- Activity 4-5 is positioned as the culmination of Activities of Output 4
- The following will be presented by each LGU at the Dissemination Seminar.

Presentations at the seminar

➤ Current status and challenges of waste management in LGUs

1. Budget of Waste Management
2. Waste Generation Quantity and Quality
3. Collection and Transportation of Waste
4. Intermediate treatment facility /3R
5. Landfill
6. Education of Waste Management

➤ Future waste management plan based on the consideration of the technologies other than WTE

6. Waste Analysis and Characterization Study (WACS)

Method and Utilization of WACS

Applicable sections 6-1. WACS Study with a classification of the community and seasons of the case studies (ASTMID5231)
6-2. Statewide Municipal Solid Waste (MSW) Characterization Study
6-3. regular study and disclosure of WACS data to the Public

Technology points • Conduct composition surveys four times a year and disclose them to residents.
• Identify the amount of waste generated for each composition of waste and confirm that the municipality's waste management strategy is showing results. Then, LGU can also set new plans.

Common points to note for LGUs • Need to implementation locations and implementers.

Points to note for each LGU • Conducted as part of research at universities and other research institutions