Second Focus Group Discussion (FGD)

Development of the National Strategy to Reduce Short-Lived Climate Pollutants (SLCP) from Municipal Solid Waste (MSW) in the Philippines

November 6-8, 2018, Tagaytay City, Philippines

This report is prepared and submitted by IGES to CCAC-MSWI

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List of Acronyms

AFR	Alternative Fuel and Raw Materials
BAT	Best Available Technology
BC	Black Carbon
BEP	Best Environmental Practice
CCAC	Climate and Clean Air Coalition
CCC	Climate Change Commission
CCD	Climate Change Division
CGE	Core Group of Experts
DA	Department of Agriculture
DENR	Department of Environment and Natural Resources
DILG	Department of Interior and Local Government
EMB	Environmental Management Bureau
EQT	Emission Quantification Tool
FGD	Focus Group Discussion
GHG	Greenhouse Gas
IEC	Information, Education, Campaign
IGES	Institute for Global Environmental Strategies
INDC	Intended Nationally Determined Contribution
JICA	Japan International Cooperation Agency
LCA	Life Cycle Assessment
LGU	Local Government Unit
MERV	Monitoring, Evaluation, Reporting and Verification
MMDA	Metro Manila Development Authority
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MSWI	Municipal Solid Waste Initiative
MSWM	Municipal Solid Waste Management
NDC	Nationally Determined Contribution
NICCDIES	National Integrated Climate Change Database Information and Exchange System
NSWMC	National Solid Waste Management Commission
RA	Republic Act
SDG	Sustainable Development Goals
SLCP	Short-Lived Climate Pollutants
SLF	Sanitary Landfill
SMART	Specific, Measurable, Attainable, Realistic, Time-bound
SWMD	Solid Waste Management Division
TESDA	Technical Education and Skills Development Authority

Introduction

The Department of Environment and Natural Resources (DENR) - Environmental Management Bureau (EMB) through its Climate Change Division (CCD) and Solid Waste Management Division (SWMD), and the multi-agency National Solid Waste Management Commission (NSWMC), in coordination with the Climate Change Commission (CCC), has been involved in developing the National Strategy to reduce Short-Lived Climate Pollutants (SLCP) from the Municipal Solid Waste (MSW) Sector with technical assistance from the Institute for Global Environmental Strategies (IGES) under the Climate and Clean Air Coalition (CCAC).

This national SLCP strategy could be the first of its kind in Asia; existing ones are the SLCP strategies of Canada, Mexico, and California, which cover all sectors to address SLCPs. Since the Philippines intends to develop a national SLCP strategy that is specific for the MSW sector, this document could be the first in the world for specific focus on the waste sector.

The development of the national strategy is a multi-stakeholder participatory process executed by DENR/NSWMC. A core group of experts (CGE) provides inputs into the strategy composed of experts from NSWMC Committee on Climate Change/SLCP, CCC, DENR/EMB, select local government units (LGUs), IGES/CCAC, and others including academia and research institutions. To date, a series of consultation workshops and trainings has been organized, including the first national awareness workshop on SLCP on November 23, 2017 in Quezon City, and the (international) regional training workshop on measuring and mitigating SLCP from Municipal Solid Waste Management (MSWM) on April 2-4, 2018 in Bacolod City.

The Philippine government is currently preparing a roadmap for its INDC/NDC and has so far institutionalized its Philippine Greenhouse Gas (GHG) Inventory, Management, and Reporting System. For the waste sector, the SLCP strategy development process quantifies climate pollutants through a life cycle analysis (LCA) perspective. It encompasses other sources such as waste collection and recycling of non-biodegradables. Another value-added is the analysis of the black carbon (BC) emissions from MSWM. The first focus group discussion (FGD) was conducted in September 2018, where results were then consolidated for the development of the first draft of the national strategy.

As a follow through, the second FGD on the development of the national strategy to reduce SLCPs from the MSW sector was conducted on November 6-8, 2018. It aimed at achieving the following:

- Bring together the CGE to provide technical expertise and revisit the results of the 1st FGD – SLCP reduction gains, remaining challenges, opportunities, potential measures and the initially identified SLCP reduction measures;
- Analyze the proposed measures and finalize the baselines and targets for the overall outcome and key strategies to reduce SLCPs from the MSW sector;
- Identify actions per strategic measure to initially translate strategies into activities;
- Subject the strategies to the analysis of factors and prioritization based on agreed criteria;
- Identify measurement, evaluation, reporting, and verification (MERV) requirements; and
- Gather main contents to revise the document and prepare the second draft of the National Strategy to Reduce SLCPs from MSW.

Methodology and Approach

A combination of plenary and breakout sessions was organized: the former for the presentation of the draft national strategy so that the CGE would be able to provide technical expertise on the proposed measures while the latter was administered to generate inputs of specific activities/actions in support of the strategic measures and prioritization of strategies. Recapitulation exercises were also conducted to generate feedback from the participants regarding the previous sessions and hold process checks.

The second FGD was carried out over three days and by the end of the FGD, the participants agreed on the next steps and set a schedule for the public consultation on November 28, 2018.

Participants and Facilitators

The second FGD on the development of the national strategy to reduce SLCPs was attended by 24 participants representing the CGE from NSWMC CCC, DENR, DA, DILG, MMDA, TESDA, pilot LGU partners, academia, private sector, and IGES-CCAC. Commissioner Crispian Lao of NSWMC joined the group on the last day of the FGD.

Overall facilitation was carried out by Engr. Voltaire Acosta, consultant from IGES with co-facilitation from Ms. Maria Delia Cristina Valdez and Ms. Liz Silva from the DENR-EMB as well as technical backstopping support from Dr. Rajeev Singh of IGES.

Preliminaries

Prayers and singing of the national anthem were rendered, followed by opening remarks from Ms. Rita Regalado and Dr. Rajeev Singh.

On behalf of Commissioner Crispian Lao of the National Solid Waste Management Commission, ***Ms. Rita Regalado*** formally welcomed the participants to the second FGD on the development of the national strategy for SLCP reduction from MSWM. She hoped that the experience from the first FGD will inspire everyone to deliver and participate. She encouraged cooperation in the breakout sessions to have a better identification of baselines and targets in SLCP reduction from MSWM.

Dr. Rajeev Singh from IGES thanked the EMB team for making the workshop possible. Dr. Singh highlighted some key points on the importance of SLCP mitigation.

- Can reduce global warming by about 0.6 degrees Celsius by 2040-2050;
- Can help to keep average global temperature to no more than 1.5 to 2 degrees Celsius above pre-industrial levels this century, and meet the temperature goals in the Paris Agreement with adoption of global action to reduce CO2 together;
- Can avoid an estimated 2.4 million premature deaths annually from outdoor air pollution and greatly reduce impacts on health from indoor exposure;
- Can avoid annual losses from four major crops of more than 30 million metric tons; and
- Can help buy time in addressing the more important and longer-term greenhouse gas (GHG) emissions.

Thus, Dr. Singh emphasized that the DENR-EMB through the CCD and SWMD, and the NSWMC, in coordination with the CCC had been involved in developing the strategy with technical assistance from CCAC-IGES. The strategy could be the first of its kind in Asia and in the world with specific focus on the MSW sector. The development of the national strategy is aligned with RA 9003 and would assist the country in addressing commitments made in relation to the Paris Agreement, SDG goals, and INDC/NDC goals.

Dr. Singh then presented the objectives of the second FGD and hoped for an interactive discussion towards the finalization of the draft national strategy.

The welcome remarks were then followed by an introduction of participants and setting of expectations. Two questions were posted for the expectations setting; responses are as follows:

Table 1. Expectations from the Participants

What will cheer you up in the second FGD?	a. Chocolate b. Workshop c. Always smiling participants d. Free-flowing activities e. Democratic discussions f. Ice breakers g. Interactive discussions
What are you most excited about the second FGD?	a. Final result b. Action plans c. Black Carbon reduction d. SLCP reduction implementation e. Tools, if any f. Integration of SLCP reduction in national plan g. Approval of SLCP Strategy by the higher-ups h. International linkages i. Food j. Pasalubong k. To be the first strategy in Asia and the world in MSW

Plenary Session

1. **Presentation of the Results of the First FGD on National Strategy SLCP Reduction**
   Ms. Liz Silva, Climate Division of DENR-EMB

Ms. Silva presented the outputs from the first FGD conducted in September 2018. The workshop results fed into the draft national strategy which was put together by Engr. Voltaire Acosta, consultant from IGES.

After the presentation of the outputs, the plenary was opened for discussion. Below are key points of clarification raised during the open plenary.

a. The following issues and concerns should be elaborated further:
   - The issue of lack of resourcefulness (APP Office), hence measures to solve local financing can be developed accordingly.
   - The concern on willingness-to-pay or -sell by food industry/establishments especially pertaining to participation in the business model.
   - The failure to include financing as one of the issues on proper waste disposal in landfill management (although it is identified as a crosscutting consideration).

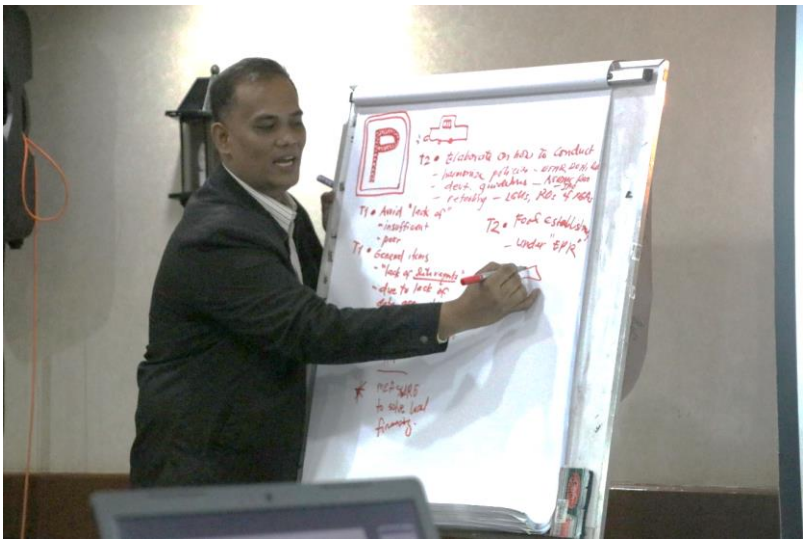
b. The following proposed measures should be clarified as "how-to is":
   - The conduct of workshops/retooling to harmonize government policy on open burning, would entail the development of guidelines for harmonization. Thus, elaboration of the measure should address the questions regarding who will develop such guidelines and what form will they take.
   - Market prices for recovered resources cannot be fixed since these are driven by various market forces. However, the setting of standards for recycled waste and improving recycling facility would drive higher prices for recyclables.

c. Added "as needed" in the establishment of barangay MRFs or a mini-MRF in every *purok* since it would depend on the situation of LGUs and their local budget.
   - Suggestions for the strategy:
     i. For barangays that have existing junkshops, they can serve as MRFs instead of establishing one.
     ii. There is a resolution patterned through an MMDA policy and adopted by the NSWMC, which outlines how junkshops can be considered as MRF.

d. Be conscious on the use of "lack of"; "insufficient" or "inadequate" are the proper terms.
e. Rephrase the issue on high amount of data. This is in relation to the EQT and inventory that underwent a lot of assumptions due to lack of data, hence the result was only based on expert judgement.
f. Develop strategies that will encompass all issues on awareness.
g. Reword "waste to energy to replace conventional energy resources" to "encourage/promote the use of WTE in addition to conventional energy resources"

2. Development of Results Chain

Engr. Voltaire Acosta, Consultant, IGES



Engr. Acosta facilitated the discussion and finalization of the overall goal as well as the expected outcomes and strategies to achieve outcomes, including intermediate or contributory, and cross-cutting considerations. Inputs and revisions were directly made onto the document[1]. Below are some key points that emerged during the discussion:

- Parameters should be set in order to define the knowledge management (KM) strategy for SLCPs reduction in MSWM.
- Clustering of proposed strategic measures can be done in the finalization of the national strategy.
- It was deemed unnecessary (as far as this Strategy to reduce SLCPs in the MSW sector is concerned) to put focus on vertical "strategies" such as KM, financing, incentives, etc. This is to avoid duplication with the National SWM Strategy, which is being updated by NSWMC and DENR/EMB at present. Nevertheless, such identified crosscutting "strategies" could be featured as crosscutting "considerations" in the SLCP strategy document.
- Some of the strategic measures may be "downgraded" or re-classified and can be included as initial list of activities for the future Action Plan.
- Revisit the assumptions in the Cost-Benefit Analysis Study for the solid waste sector to set SMART targets.

- Align the targets with other national plans, i.e., Philippine Development Plan, National Solid Waste Management Strategy, etc.

3. Analysis of Influencing Factors (Management Tool)

Ms. Maria Delia Cristina Valdez, SWMD-EMB
Engr. Voltaire Acosta, Consultant, IGES

Ms. Valdez presented the factor analysis tool during the plenary

[1] See Annex 4 for the final draft national strategy based on comments, suggestions, and recommendations.

workshop. The tool used was a type of management guide that analyzes the influence of one factor to others. Results would later fall under one of the four categories:

- Factors that are difficult to influence but have great influence on others
- Factors that cannot be influenced and cannot influence others.
- Factors that can be influenced but cannot influence others.
- Factors that can influence others but can also be easily influenced.

After the presentation, Engr. Acosta facilitated the discussion of how the strategic outcomes may influence each other. The group rated each strategic outcome either *2 having the highest influence and 0 having no or low influence*. The illustration below summarizes the results of the discussion.

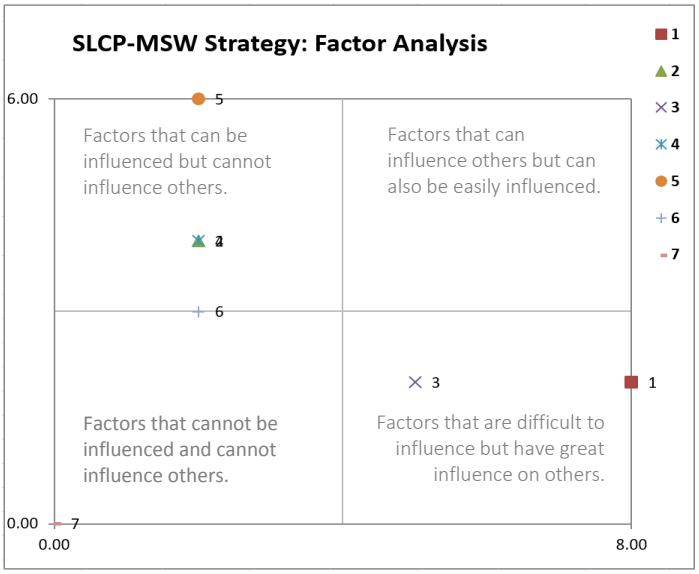


Figure 1. Analysis of Influencing Factors

It can be seen in the above illustration that biodegradables management (strategic outcome 1) cannot be influenced by other factors but has great influence to others. Dumpsite burning (strategic outcome 2) can be easily influenced but cannot influence other factors. The use of low-polluting vehicles (strategic outcome 7) falls is deemed dormant, which can neither influence nor influence others. Meanwhile household burning (strategic outcome 6) can be categorized as a factor that may or may not be influenced but cannot influence other actions.

Note that the first six strategies are directly related to solid waste, but since the life cycle approach was adopted, vehicles are included but they do not have so much influence on other strategic outcomes.

4. Target Setting

The table below details the proposed targets for each strategic outcome until 2040. *See Annex 5 for the revised strategies, sub-strategies, and targets based on the comments, suggestions and recommendations.*

Table 2. Proposed Targets

Strategic Outcome and Targets	Baselines		Proposed Targets		
	2010	*2018*	*2025*	*2030*	*2040*
1. Implement comprehensive and strategic biodegradables management programs **- HH, commercial/industrial/institutional, market/trading post** **- Design of composting/anaerobic digestion facilities; market for compost** **Increase the dimension of bio by __& by ____**			*align with CBA/NDC		
2. Promote SWDS gas capture, recovery and/or utilization during operation, closure and rehab. **- electricity gen., flaring, eco-efficient soil cover, with leachate recirculation, dumpsite closure SLF establishment** **Increase the tons of SWDS gas (CH4) captured and/or utilized by __% by ___.** **Increase the number of SWDS with flaring by __& by ___. (supporting only)**			*align with CBA/NDC		
3. Implement comprehensive and strategic recyclables management programs **- improve logistics** **- enhance MRF capacities** **- support development of local recyclers, markets** **- enhance recovery of paper, metals, plastic, glass** **Increase the diversion of recyclables by ___ % by ____.**	*baseline/computation from JICA study	40%	50%	55%	60%
4. Support the use of source-separated, low-economic value non-biodegradable waste fractions, including composites, for resource and energy recovery **- logistical and infra support for non-sellables** **- expand use of AFR in cement manufacturing** **4.1 Support to other alternative technologies** **Increase in the use of Alternative Fuels and Raw Materials (AFRs) to ___ tpd by ____.**					

5. Adopt and implement BAT/BEP to prevent and control open burning at SWDS **- prevention of SWDS fires** **- fire-suppression at SWDS** **Increase waste diversion by _____ by year _____ thereby reducing volume of waste disposed to SWDS.**	69.35 million tons /20 years (calculations for cross-checking)		60%	65%	75%
6. Adopt and implement BAT/BEP to prevent and control open burning at backgrounds communal areas **- engage public support against OB** **- increase residual waste collection coverage and frequency** **Decrease the amount of waste burnt at backgrounds by 50% by 2030 (by decreasing uncollected waste from 10% of gen. in 2010 to 5% by 2030**	Collected = 90% 15% IS 85% LGU 76.5% of generated			50%	
7. Use low-polluting waste collection vehicles and optimize MSW collection routing **7.1 Optimize segregated collection and transport of waste using low polluting vehicles and machineries** **- develop optimal routing techniques** **- regular PM for old vehicles or modernization of fleets** **Reduce fuel consumption per ton of waste collected by ___ % by ___.**				5%	10% subject to fund availability
8. Energy generation from waste – biogas, recyclables **- develop enabling environment to enable environments**				30%	50%

The proposed targets where then subject to discussions. The table below summarizes the suggestions and recommendations not only for the proposed targets but on the draft national strategy in general. A key change was that strategic outcome 4 was combined with strategic outcome 7, and revised to *"Encourage the utilization of recovered/capture gas from anaerobic digesters and SWDS for energy generation, whenever feasible"*. Succeeding changes were made directly onto the document[2].

[2] See Annex 4 for revised draft national strategy based on comments, suggestions, and recommendations.

Table 3. Strategic Outcomes vis-a-vis Targets

Strategic Outcomes	Recommendations
1. Biodegradables Management	• Change "food industry" to commercial/industrial/institutional • Include food waste management program • On 1.1 add a. Promote backyard composting whenever feasible • On item 1.1a, change "kitchen" waste to "food" waste • Under mother strategy include "Note: following existing relevant guidelines"
2. Gas Capture	• On 2.1 include a discussion on RE Law and offtake price
3. Recyclables Management	• Update the recycling industry development study (use the JICA study as starting reference) • Extract baseline from the JICA study and other any available documents • Compare consumption patterns and market • Baseline result using JICA study – 41% (2008); Aluminium – 47% (2008); Glass – 48% (2008) ; Iron/Steel – 39% (2008); Plastic – 35.37% (2008). Thus, the total baseline for 2008 is 40% and this baseline data was used to compute and set target for 2025, 2030 and 2040 • On 3.1 include the development of business models for LGUs and the private sector to improve recovery rates and coverage • On 3.3 increase the linkages with the source and recyclers • On 3.5 promote a shift to recyclable products ○ Evaluate the use of materials of fast food chains and what materials can be substituted • Document all assumptions and put references on the target setting

4. AFR	• On 4.2 a. develop clear-cut standards/safeguards for the AFR from MSW
	• On 4.2 c. encourage the use of low pollution emitting waste collection vehicle for non-sellable and non-biodegradables
	• On 4.2 d. collaborate with cement manufacturing industry to enhance coverage of AFR
	• On 4.2 e. encourage LGUs to enter into agreement with Cement Manufacturing Assn. of the Phil. (CEMAP)
	• On 4.3 explore the possibility of chemical recycling in the Philippines
	  ○ But take note that currently there is no baseline so it is difficult to put targets on the residuals
	  ○ Focus more on the recyclables
	• On 4.4 include Waste to Energy (WTE) and refer to NSWMC guidelines and the pending bill on WTE.

5. BAT-BEP SWDS	• Change target to: Increase waste diversion by _____ by year _____ thereby reducing volume of waste disposed to SWDS • Burning can be only controlled if there is a disposal system in place • Ask EMB on enforcement • On 5.2 b. collaborate with BFP and LDRRMO and host barangays in the monitoring of fire incidences and suppression at SWDS
6. BAT-BEP Community	• On 6.1 c. develop social marketing and IEC campaigns for public awareness on environment and health impacts of open burning • On 6.2 d. encourage LGUs to pass ordinances to enforce RA 9003's prohibited acts: open burning • 50% is not achievable by 2020 since building a disposal facility would take up to 3 years.
7. Use of low-polluting waste collection vehicles	• On 7.1 b. develop technical guidelines on vehicle route optimization • On 71. C. capacitate LGUs and contractors/haulers on vehicle route optimization to reduce costs and emissions • Focus also on waste collection efficiency – recyclables, bio, etc.

	• On fuel, note that preventive maintenance is an upfront expense that the government cannot afford
8. Energy Generation from Waste (to be combined with Strategy 4: AFR)	• On WTE, there is a need to know the exact volume of waste to build the facilities • 8a. review of the RE Law based on categories • 8b. offtake price discussions • 8c. from technologies: biogas digesters, mechanical-biological treatment (MBT)
9. General Comments/Suggestions	• Align the timeline of the targets with the final NDCs • Year 2020 might not be a good year to target, 2025 & 2030 might be better timelines to work on something • Terminologies should be consistent

Breakout Session

The participants were divided into two groups to work on two breakout sessions, *1) identification of actions/activities in support of the strategic measures and 2) prioritization of strategies based on agreed criteria.* The same groupings worked on each breakout session.

Breakout Session 1: Identification of Actions/Activities in support of Strategic Measures including Crosscutting Measures

The first group was assigned to take on strategic outcomes 1 to 3, and the second group was assigned with strategic outcomes 4 to 7. Results were then presented back to the plenary so the other participants could raise clarifications/suggestions. Below is a summary from the open plenary.

Clarifications/Additions for Group 1

- Island or far-flung areas were not yet considered in the activities during the group's discussion.
- Added action to 1.2: Subject compost products to quality analysis to increase market value *viz* return on investment.
- Support for local recyclers is not specific to junk shops since they are monitored and handled by the LGUs; rather it is for the end-activities of local recyclers.

Clarifications/Additions for Group 2

- Added 6.2 (a) and (b) under strategic outcome 6.
- In the previous discussion, the agreement was to leave the discussion on WTE since there is a guideline and proposed bill in the Congress.
- A market development study is also applicable to other strategic measures.
- The Euro 4-compliant was transferred to 7.3.
- Guidelines on MRF were not yet adopted.

Breakout Session 2: Prioritization of Strategies

The two groups were tasked to prioritize both strategic outcomes and measures based on the set criteria; urgency (*viz* public source delivery); significance (*viz* waste sector goals/ RA 9003 implementation); benefits (positive impacts) on BC emission reduction; and co-benefits in terms of economic, social, environmental, adaptation/resilience, transformational change. The rating can be given as 3 being the highest priority and 0 being the lowest.

Table 4. Prioritization of Overall and Sub Strategies

Strategies	Urgency			Significance			Benefit (Emission Reduction)			Co-Benefits		
	G1	G2	Ave	G1	G2	Ave	G1	G2	Ave	G1	G2	Ave
1. Biodegradable Management	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**2.5**
1.1. Household kitchen and yard waste management program	3	3	3	3	3	3	3	3	3	2	3	2.5
1.2. Enhance supporting *policies/activities* for the increase in biowaste processing/treatment capacities and coverage	2	2	2	3	3	3	3	3	3	2	1	1.5
1.3. Market and trading post for biowaste management	2	3	2.5	3	3	3	3	3	3	2	3	2.5
1.4. Enhance supporting policies/activities for the increase in biowaste processing/treatment capacities and coverage	3	3	3	3	3	3	3	3	3	2	3	2.5
2. Gas Capture	**2**	**1**	**1.5**	**3**	**1**	**2**	**2**	**3**	**2.5**	**2**	**3**	**2.5**
2.1. Methane recovery with electricity generation at biggest SWDS	1	1	1	2	1	1.5	1	3	2	2	3	2.5
2.2. Methane recovery and flaring of gas at bigger SWDS	1	1	1	2	1	1.5	1	3	2	1	1	1
2.3. **Eco-efficient/methane-oxidizing soil cover at smaller dumpsites**	2	3	2.5	2	2	2	1	3	2	2	3	2.5
2.4. Develop supporting policies/activities for the operations of SLFs and closure and rehabilitation of SWDS	3	1	2	3	3	3	1	1	1	2	3	2.5
3. Recyclables Management	**2**	**2**	**2**	**3**	**2**	**2.5**	**2**	**2**	**2**	**3**	**3**	**3**
4.1. Improve logistics to enhance collection of recyclables from the waste stream	2	3	2.5	3	2	2.5	2	2	2	3	3	3
4.2. Enhance capacities of MRFs to receive, sort,	2	2	2	3	3	3	2	2	2	2	3	2.5

and pre-process recyclables												
4.3. Support the development of local recyclers, recycling industries and markets	2	1	1.5	3	2	2.5	1	2	1.5	2	3	2.5
4. AFR	**1**	**1**	**1**	**2**	**1**	**1.5**	**1**	**2**	**1.5**	**2**	**3**	**2.5**
4.1 Provide logistical and infrastructure support to enable future resource and energy recovery of non-sellable non-biodegradables	0	1	0.5	2	1	1.5	1	2	1.5	2	3	2.5
4.2. Expand the use of AFR in cement manufacture	1	1	1	1	1	1	1	2	1.5	1	3	2
5. BAT-BEP SWDS	**2**	**3**	**2.5**	**2**	**3**	**2.5**	**3**	**3**	**3**	**3**	**3**	**3**
5.1. Capacitate LGUs on the prevention of surface and deep-seated fires at SWDS	1	3	2	1	3	2	3	3	3	3	3	3
5.2. Suppress surface and deep-seated fires at SWDS using appropriate fire-fighting techniques	1	3	2	1	3	2	3	3	3	3	3	3
6. BAT-BEP Community	**2**	**3**	**2.5**	**2**	**3**	**2.5**	**3**	**3**	**3**	**3**	**3**	**3**
6.1 Engage public support against backyard burning	2	3	2.5	2	3	2.5	3	3	3	3	3	3
6.2 Increase residual waste collection coverage and frequency to lessen open burning	2	3	2.5	2	3	2.5	3	3	3	3	3	3
7. Waste Collection	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**3**	**3**	**3**	**3**	**3**
7.1. Develop optimal waste vehicle collection routing techniques/schemes	3	1	2	3	1	2	3	3	3	3	3	3
7.2. Develop optimal transfer and transport schemes	3	1	2	3	1	2	3	3	3	3	3	3
7.3. Use less polluting vehicles/machineries	2	1	1.5	3	1	2	3	3	3	3	3	3

As can be seen in the table, an very similar rating was given to both CH4 and BC reduction, but the strategic outcome 4 *(on support the use of source-separated, low-economic value non-biodegradable waste fractions for resource and energy recovery)* has the lowest rating in terms of urgency, significance, and benefits. Moreover, there is a big difference in ratings for strategic outcome 7, as the first group gave 2 for urgency and significance while the second group gave 1 to both criteria.

Lastly, both rankings showed high scores on climate benefits and co-benefits criteria, but some key observations are as follows:

a. Flaring does not have many co-benefits other than climate benefits;
b. Co-benefits on food industry and biowaste management program are low perhaps since this is not yet in place; and
c. There are more co-benefits on BC control measures than those of methane.

The two outputs were then processed by Ms. Liz Silva to generate the average rating for the strategic outcomes and put in a graphical representation to show which strategic outcomes were highly prioritized.

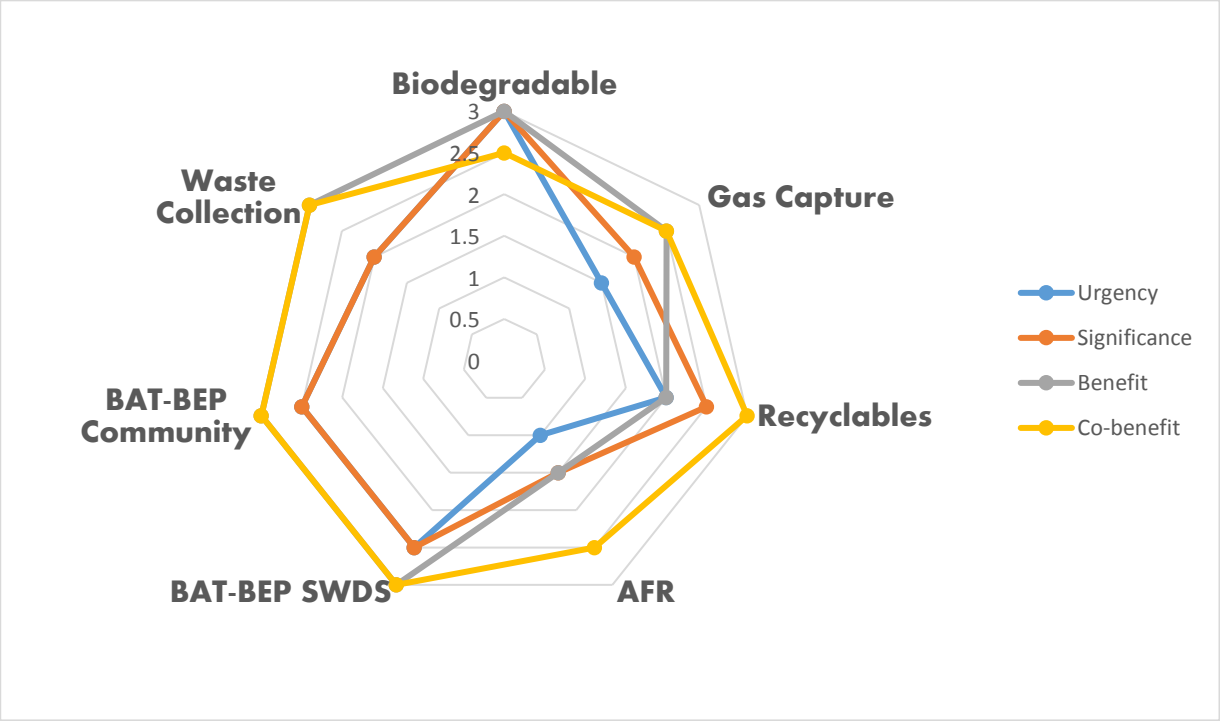


Figure 2. Average Prioritization Scores for each Overall Strategic Outcome

The graph shows that only biodegradable management received the average highest score (3) for urgency, significance, and climate benefits. The other strategic outcomes received on average between 1 to 2.5 scores for the different criteria. It can also be noted that 3 of the strategic outcomes rated highest scores for the climate benefit and co-benefits criteria.

Feedback from Recapitulation Exercises

Ms. Silva facilitated the recapitulation of the previous session in the second and third day of the workshop. Feedback from the participants are as follows:

Table 5. Feedback from the Recapitulation

Recap Questions	Feedback from the Participants
For Day 1, September 06, 2018	
What challenged you in Day 1?	• Differentiation of a strategy from action outcome. • Emission reduction per strategy. • Disaggregation or aggregation of strategies: big/small, crosscutting • Hard to decide the targets – xx% • Which baseline data to use?
What did you feel most proud of?	• Contributions of participants • Nearing completion • Able to review the first FGD outputs
What is one thing I am committed today?	• Committed to the work today
For Day 2, September 07, 2018	
What are your best impressions from yesterday's discussion?	• Factor analysis • Rating of strategies according to criteria and teamwork in deciding the points • Weighting of strategies; reasons and justifications; non-biased/non-influencing results • Understand the relationships strategies to one another; How one strategy affect/influence others • Short-listing & strategies with corresponding actions • Active participation • Climate and co-benefits scored the highest

Way Forward

The following are key agreements from the discussion:

1. The crosscutting strategies will only be mentioned in the document (as crosscutting considerations) but no targets need to be set since these will be elaborated in the initiative to update the National Solid Waste Management Strategy. The crosscutting considerations can feed in the updating of the sectoral strategy.
2. CGE (and stakeholders) shall set the sectoral targets, which is within the scope of their expert judgment for sectoral matters; IGES/CCAC will help in deriving/converting it into SLCP reduction targets.
3. Baseline to consider:
    a. AFR from MSW in 2010-06 (0 baseline)
    b. SWM Burning in 2010
    c. Burned = 2.4% of generated
        - At scenario 3: open burning will be eliminated
4. The targets are not yet final as those need to be reviewed in the public consultation.
5. Provide the additional/modified assumptions for baselines calculations to Dr. Nirmala Menikpura of IGES before the public consultation.
6. Calculate incremental (in addition to scenario-based) CH4/BC reduction targets based on vetted sectoral targets (before/after PubCon).

After the second revision of the draft national SLCP strategy, there will be a public consultation on November 28, 2018, targeting 70 participants from key stakeholders and members of the NSWMC. The meeting for the adaption of the National Strategy on SLCP Reduction from MSW by NSWMC is tentatively scheduled on December 7, 2018.

Message from the Climate Change Commission

Ms. Sandee Recabar, Division Chief, Implementation and Oversight Division

On behalf of the Climate Change Commission, Ms. Recabar gave recognition to the solid waste sector for always being active in the activities of CCC. Since the beginning of the Commission's (CCC) work in mitigation, it has been in partnership with the solid waste sector on GHG inventories, with EMB and NSWMC both being very active in the crafting of INDC prior to the Paris Agreement.

She also thanked EMB for the opportunity as it paved the way to better understanding of the sector. The Commission is looking forward to strengthening collaboration with the sector especially considering that CCC is currently finalizing the NDC. The Commission, particularly Sec. de Guzman, is very keen on including the SLCP sector text in the NDC.

The work of the sector in developing its MERV is another opportunity to collaborate given that CCC is handling the national MERV. A national platform called NICCDIES has already been set up to generate data on mitigation, hence it would be good to know how MERV on SLCPs can be linked or integrated into NICCDIES.

Closing Remarks

Dr. Rajeev Singh of IGES thanked Com. Lao of NSWMC for attending the last day of the FGD and for providing recommendations to further refine the draft national strategy and its corresponding targets. He also thanked the participants for actively participating and for clearing their schedules just to attend the FGD. He also thanked EMB staff for supporting and organizing the activities. He ended by stating that he was looking forward to seeing everyone at the upcoming public consultation.

Ms. Sandee Recabar of the Climate Change Commission thanked the organizers for the invitation to participate in the FGD. She shared that the Commission has learned a lot from the discussions and hoped to continue collaborating with the sector especially during the finalization of NDCs.

Commissioner Crispian Lao of NSWMC thanked all the participants for actively participating and sharing their time in the FGD. He looked forward to the future engagements of the sector, specifically on finalizing the strategy during the public consultation.

Annexes

Annex 1: Participants List

Name	Agency	Position	Day 1	Day 2	Day 3
1. Maria Krishna Santos	DENR-EMB SWMD	Dev. Com. Specialist	✓	✓	✓
2. Giovanni Mintas	DENR-EMB SWMD	PSO	✓	✓	✓
3. Elbe Balucanag	LGU South Cotabato	Supervising EMS	✓	✓	✓
4. Ferdinand Bautista	LGU-Maragusan	MENRO	✓	✓	✓
5. Mary Cris Base	TESDA	Sr. TESD S	✓	✓	✓
6. Rita O. Regalado	MFG	Company Representative	✓	✓	✓
7. Eugenia Briones	DA-BSWM	SC-SDAS	✓	✓	✓
8. Maecarel Canoreo	LGU-San Carlos	Clerk-LGU	✓	✓	✓
9. Petra Aguilar	DENR-EMB	Supervising EMS	✓	✓	✓
10. Aleya Arca	DILG	PDO II	✓	✓	✓
11. Sandee Recabar	CCC-CCO	PO V	✓	✓	✓
12. Toni Rose Dee	DA	Agri II	✓	✓	✓
13. Ma. Cecilia Garcia	DENR-EMB	A.Ai VI	✓	✓	✓
14. Rodeth Antonio	DENR-EMB SWMD	Monitoring Officer	✓	✓	✓
15. Liz Silva	DENR-CCD	SRS II	✓	✓	✓
16. Ma Delia Valdez	DENR	SEMS	✓	✓	✓
17. Rajeev Kumar Singh	IGES	Researcher	✓	✓	✓

18. Crispian Lao	NSWMC	Vice Chairperson			✓
19. Voltaire Acosta	IGES	Consultant	✓	✓	✓
20. Desiree Pinca	MMDA	PDO II	✓	✓	✓
21. Ellice Dane Ancheta	CCC	PMO I	✓	✓	✓
22. Aries Roda Romalloda	CPU	Dept. Chair	✓	✓	✓
23. Paolo Versara	DA	SRS II	✓	✓	✓
24. Kristine Lawina	DA	Agri II	✓	✓	✓
25. Marliou Sarong	CLSU	Project Technical Staff	✓	✓	✓

Annex 2: Program Agenda

2nd Focus Group Discussion

Days Hotel, Tagaytay City * 6-8 November 2018

AGENDA

Time	Activity / Topic	Discussant
Tuesday, 06 November 2018		
7:00a	Assembly at DENR, Quezon City for travel to Tagaytay City	
11:00a	ARRIVAL at Days Hotel, REGISTRATION, and CHECK-IN	
12:00n	*LUNCH*	
1:00p	**Opening ceremonies** • Prayer and National Anthem • Welcome Remarks • Introduction of Participants • Levelling off Expectations	• Benny D. Antiporda, USec for SWM and LGU Concerns, DENR • Dr. Rajeev Singh IGES/CCAC-MSWI • Ms. Liz Silva, CCD-EMB
1:15p	**Presentation of the Results of the 1st FGD** • Issues and Concerns in ESWM Implementation vis-à-vis SLCP Reduction • Gains, Remaining Challenges, Opportunities, and Potential Measures • (Initially Identified) Strategies (per functional element and crosscutting), Baselines and Targets, and Co-Benefits	• Ms. Maria Delia Cristina Valdez, SWMD-EMB and Ms. Liz Silva, CCD-EMB
1:45p	***Plenary Workshop A1:* Development of Results Chain** • Identification and finalization of the: ▪ overall goal and expected outcomes ▪ strategies to achieve outcomes, including intermediate or contributory, and crosscutting strategies ▪ (initially identified) baselines and targets	• *Facilitated by* Dr. Rajeev Singh and Engr. Voltaire Acosta IGES/CCAC-MSWI
3:00p	*PM Break*	
3:15p	**Comparative Analysis of Strategies/Measures and Targets** • Measures and targets from 1st FGD • Measures and targets from other Projects, Plans, and Programs (PAPs) of the Philippine government, incl. SNAP • Guiding Principles	• Engr. Voltaire Acosta Consultant, IGES
3:30p	***Plenary Workshop A2:* Finalization of Strategies, Baselines and Targets** • Open Forum	• *Facilitated by* Ms. Maria Delia Cristina Valdez, SWMD-EMB Ms. Liz Silva, CCD-EMB

Time	Activity / Topic	Discussant
	• Agreement on MSW sector/SLCP reduction strategies, targets	
04:45p	**Closing of Day 1; Expectations for Day 2**	
Wednesday, 07 November 2018		
08:00a	**Preliminaries** • Recapitulation • Overview of Day 2 Agenda	• *Facilitated by* Ms. Liz Silva, CCD-EMB
8:30a	***Breakout Session A:*** **Identification of Actions/Activities in support of Strategic Measures, incl. Crosscutting** • Identification of the list of actions/activities to implement each strategy, in sequence • Clustering and prioritization of actions per strategy	• *Facilitated by* Ms. Maria Delia Cristina Valdez, SWMD-EMB Ms. Liz Silva, CCD-EMB
09:30a	**Group Presentation and Plenary Discussion** • Presentation of Results • Clinique of workshop outputs	• *Facilitated by* Dr. Rajeev Singh and Engr. Voltaire Acosta IGES/CCAC-MSWI
10:00a	*AM Break*	
10:15a	**Prioritization of Strategies based on Criteria** • Revisiting the prioritization criteria identified from 1st FGD • Agreement on criteria and ranking system	• Engr. Voltaire Acosta Consultant, IGES
10:30a	***Breakout Session B:*** **Prioritization of Strategies** ▪ Mechanics and Expected Outputs ▪ Grouping / Assignment of strategic measures	• *Facilitated by* Ms. Maria Krishna Santos and Ms. Rodeth Antonio, SWMD-EMB
12:00n	*LUNCH*	
1:00p	**Group Presentation and Plenary Discussion** • Presentation of Results • Clinique of workshop outputs	• *Facilitated by* Dr. Rajeev Singh and Engr. Voltaire Acosta IGES/CCAC-MSWI
1:45p	***Plenary Workshop B:*** **Analysis of Influencing Factors (Management Tool)** • Factors that can be influenced but cannot influence others. • Factors that cannot be influenced and cannot influence others. • Factors that can influence others but can also be easily influenced. • Factors that are hard to influence but have great influence on others.	• *Facilitated by* Engr. Voltaire Acosta IGES/CCAC-MSWI
3:00p	*PM Break*	
3:45p	***continuation …*** • Continuation of factor analysis • Analysis and presentation of results	• *Facilitated by* Engr. Voltaire Acosta IGES/CCAC-MSWI
04:45p	**Closing of Day 2; Expectations for Day 3**	

Time	Activity / Topic	Discussant
Thursday, 08 November 2018		
08:00a	**Preliminaries** • Recapitulation • Overview of Day 3 Agenda	• *Facilitated by* Ms. Liz Silva, CCD-EMB
08:30a	**Presentation of the 1st draft of the Strategy document** ▪ Walkthrough of the 1st (Oct 2018) draft of the National Strategy to Reduce SLCPs from the MSW Sector in the Philippines ▪ Gathering of comments and suggestions	• Engr. Voltaire Acosta, IGES
09:00a	**Plenary Discussions on the remaining Contents of the Strategy Document** ▪ Baseline on SWDS fires ▪ MERV of SLCP measures (GHGI, MAs, MOI) plus co-benefits ▪ SNAP activities	• *Facilitated by* Dr. Rajeev Singh / Engr. Voltaire Acosta
10:00a	*AM Break*	
11:30a	**Way Forward** (PubCon: Nov 28?; Review by NSWMC: Dec 8?)	• Ms. Delia Valdez SWMD-EMB
11:50a	**Closing Remarks**	• Comm. Crispian Lao Vice Chair, NSWMC • Mr. Albert A. Magalang, Chief, CCD-EMB and CCAC Focal Point • Dr. Rajeev, IGES
12:00n	*LUNCH and CHECKOUT*	

Annex 3: Individual Output for Breakout Session 1: Identification of Actions/Activities in support of Strategic Measures including Crosscutting Measures

Group 1 Output: (Added items are in RED and BLUE Font)

Strategic Outcomes (with corresponding target)
> Strategic Measures (may have specific targets)
> Strategic Actions (initial list for future action planning)

1. Implement comprehensive and strategic **biodegradable waste management programs [CH4]**:
   Target: Increase the diversion of biodegradables by ___ % by ____.

   1.1 Biodegradable waste management program per sector

   1.1a Household kitchen and yard waste management program **[CH4]**

   a. Promote communal/sitio/barangay/barangay cluster-level biodegradable waste processing facilities to complement centralized aerobic composting/anaerobic digestion facilities
   b. Multi-level documentation of existing best practice models for the source separation, segregated collection and processing of household kitchen and yard wastes
   c. Establish new systems/cooperation models as guide for LGUs including frequency and dedicated collection resources (human or mechanized)
   d. Explore Public-Private Partnership (PPP) to invest financial sources to sustain this biodegradable waste management program

   1.1b Food industry and establishments biowaste management program **[CH4]**

   a. Institutionalize system (*including specific policy/guidelines*) for systematic segregation, collection, and processing/treatment of biowastes from food processing industries and establishments
   b. Establish and properly operate onsite or offsite centralized aerobic composting/anaerobic digestion facilities
   c. Encourage private waste generators to cooperate, finance sources to invest, and LGUs to recover costs

   1.1c Market and trading post biowaste management program **[CH4]**

   d. Institutionalize system (including specific policy/guidelines) for systematic segregation, collection, and processing/treatment of biowastes from public and private markets and agricultural trading posts, including proper post-harvest management
   e. Establish and properly operate onsite or offsite centralized aerobic composting/anaerobic digestion facilities
   f. Encourage private waste generators to cooperate, finance sources to invest, and LGUs to recover costs

   1.2 Enhance supporting *policies/activities* for the increase in biowaste processing/treatment capacities and coverage **[CH4]**

   a. Develop technical guidelines and capacitate LGUs and the private sector on the proper siting, sizing, design, and operations of aerobic composting and anaerobic digestion facilities
   b. Conduct market studies and develop markets for compost and energy products from MSW, e.g., NGP, non-fruit bearing trees in urban landscaping, organic farming, for eco-efficient soil cover, etc.

c. Subject compost products to quality analysis for package labelling to increase market value viz. return on investment

2. Promote SWDS gas capture, recovery and/or utilization during operation, closure and rehabilitation **[CH4]**

   Target: Increase the tons of SWDS gas (CH4) captured and/or utilized by ___.
   Target: Increase the number of SWDS with flaring by ___% by ___.

   2.1 Develop policies/guidelines on the capture and recovery or utilization whenever possible, of methane from landfill gas [CH4]
      a. Methane recovery with electricity generation at biggest SWDS (>40% CH4 conc.), incl. discussion on FIT, CDM and JCM [CH4 & BC]
      b. Methane recovery and flaring of gas at bigger SWDS (20-40% CH4), incl. how to sustain without energy by-product
      c. Encourage private and LGU facilities to provide funds for methane gas capture and utilization

   2.2 Eco-efficient/methane-oxidizing soil cover at smaller dumpsites (<20% CH4 conc.) based on research and FS
      a. Encourage LGUs to adopt the soil cover system to reduce methane emissions to the atmosphere
      b. Monitor methane emissions through research by tapping HEIs in the area
      c. Strict implementation of gas emission using gas analyzers from agencies concerned

   2.3 Enhance monitoring on the operation of SLFs and closure and rehabilitation of SWDS
      a. A policy review on leachate recirculation (to enhance decomposition) and leachate treatment with methane capture [CH4]; Revisit DAO 2006-09 and DAO 2006-20 on the requirements for leachate management
      b. Continued enforcement for LGUs to close all the remaining dumpsites in the country and their subsequent use of SLFs
      c. Issuance of guidelines on the clustering of LGUs for SLF economies of scale, and proper operations and management

3. Implement comprehensive and strategic recyclables management programs **[BC]**

   Target: Increase the diversion of recyclables by ___ % by ____.

   3.1 Improve logistics to enhance collection of recyclables from the waste stream
      a. Document existing best practice models for the segregated collection of recyclables or establish new systems/cooperation models as guide for LGUs
      b. Review the implementation of the IWS Framework and propose policy solutions to improve IWS and its resource recovery activities
      c. Develop business models for LGUs and the private (formal, semi-formal, informal) sector to improve recovery rates and coverage
      d. Efficient scheduling of recyclables for collections

   3.2 Enhance capacities of MRFs to receive, sort, and pre-process recyclables
      a. Promote the establishment of communal/sitio/barangay/barangay cluster-level MRFs to complement centralized facilities
      b. Develop technical guidelines and capacitate LGUs and accredited junkshops/consolidators on the proper siting, sizing, design, and operations of centralized MRFs and junkshops

3.3 Support the development of local recyclers, recycling industries and markets **[BC]**
   a. Support the development of the local recycling industry (per material type) to complement the export-driven recyclables market
   b. Conduct value chain analysis to improve local value creation
   c. Promote sustainable livelihood programs utilizing potentially recyclable items
   d. Identify options/alternatives to low economic value/potentially recyclable waste fractions and issue corresponding policy/guidelines.

3.4 Enhance enforcement of proper segregation and secondary storage of all recyclable items such as paper, aluminum, metals, plastics and glass from household, food industry and establishments, market, trading posts, malls, hotels and resorts
   a. Document, monitor junkshop operations and traditional haulers on the proper recycling of recyclable wastes
   b. Organize local industry (junkshops, haulers, recyclers, etc.) forums on the segregation and segregated collection of recyclables
   c. Develop models for recyclables collection from islands, far-flung areas, mountainous, etc.

Group 2 Output (Added items are in RED and BLUE Font)

4. Support the use of source-separated, low-economic value non-biodegradable waste fractions for resource and energy recovery **[BC]**
   Target: Increase in the use of Alternative Fuels and Raw Materials (AFRs) to ___ tpd by ____.

4.2 Provide logistical and infrastructure support to enable future resource and energy recovery of non-sellable non-biodegradables
   a. Adopt *guidelines* for storage facilities for materials with low recycling value but with high energy content
   b. Conduct market development study (mapping, type of waste, logistic plan, GHG/SLCP reduction potential, Cost Benefit Analysis)
   c. Encourage the use of low pollution emitting waste collection vehicle for non-sellable non-biodegradable.

4.3 Expand the use of AFR in cement manufacture **[BC]**
   a. Collaborate with cement manufacturing industry to enhance coverage of AFR
   b. Encourage LGUs to enter into agreement with Cement Manufacturing Assn. of the Phil. (CEMAP)

4.4 Other WTE **[BC?]**
   a. Refer to NSWMC Guidelines and the pending bill on WTE.

5. Adopt and implement BAT/BEP to prevent and control open burning at SWDS **[BC]**
   Target: Increase waste diversion by _____ by year _____ thereby reducing volume of waste disposed to SWDS.

5.1 Capacitate LGUs on the prevention of surface and deep-seated fires at SWDS
   a. Adopt BAT/BET guidelines on the prevention of SWDS fires, e.g., gas mixtures, soil cover and other SWDS operational practices by NSWMC
   b. Disseminate *BAT/BEP guidelines* on the prevention of SWDS fires, e.g., gas mixtures, soil cover and other SWDS operational practices
   c. Develop a CAPB Plan

d. MERV the proper operations as well as the closure and rehabilitation of SWDS and provide findings and recommendations. **[BC]**

5.2 Suppress surface and deep-seated fires at SWDS using appropriate fire-fighting techniques
   a. Adopt *BAT/BEP guidelines* on the control/suppression of SWDS fires in cooperation with BFP and LGUs
   b. Collaborate with BFP and LDRRMO and host brgy. in the monitoring of fire incidences and suppression at SWDS

6 Adopt and implement BAT/BEP to prevent and control open burning at backyards/communal areas
Target: Decrease in the amount of waste burnt by 50% by 2030 (by decreasing uncollected waste from 10% of generated waste in 2010 to 5% of gen. waste by 2030).

6.1 Engage public support against backyard burning **[BC]**
   a. Harmonize *policies* on open burning including subsequent issuance of a JAO (DENR, DOH, DA, PIA)
   b. Conduct workshops/retooling (LGUs, Regional offices of concerned government offices)
   c. Develop social marketing and IEC campaigns for public awareness on environment and health impacts of open burning
   d. Encourage LGUs to pass ordinances to enforce RA 9003's prohibited acts: open burning

6.2 Increase residual waste collection coverage and frequency to lessen open burning
   a. Explore alternative efficient collection scheme for far flung and island barangays
   b. Provide or outsource logistic support for collection by the LGU.

7 Use low-polluting waste collection vehicles and **optimize MSW collection routes** and transport schemes **[BC]**
Target: Reduce fuel consumption per ton of waste collected by ___ % by ___.

7.1 Develop optimal waste vehicle collection routing techniques/schemes **[BC]**
   a. Develop *technical guidelines* on vehicle route optimization (Euler tour and heuristic methods)
   b. Capacitate LGUs and contractors/haulers on vehicle route optimization to reduce costs and emissions

7.2 Develop optimal transfer and transport schemes **[BC]**
   a. Develop *technical guidelines* on transfer (operation of transfer stations, when applicable) and transport to reduce fuel consumption (Including inter island collection and transport)
   b. Adopt compaction/bailing based on cost-benefit analysis

7.3 Use less polluting vehicles/machineries **[BC]**
   a. Ensure the regular conduct of preventive maintenance of vehicles/machineries used in the MSW sector and issue corresponding *policy/guidelines* in cooperation with DOTr and LGUs.
   b. Optimize the capacities of vehicles, vehicle types, and machineries to reduce SLCP emissions per ton of waste collected or processed
   c. Modernize fleets based on cost-benefit analysis
   d. [Encourage the use of Euro 4-compliant vehicles to all able haulers/transporters and upgrade vehicles for efficient collection] – *to no. 7?*

Annex 4: Revised Draft of the National Strategy based on Comments, Suggestions, and Recommendations

Strategies (and Actions) to Reduce SLCPs from the MSW Sector in the Philippines
based on FGD outputs, draft as of 12 Nov 2018

Strategic Outcomes (with corresponding target)
> Strategic Measures (may have specific targets)
> Supporting Actions/Activities (initial list for future action planning)

1. Implement comprehensive and strategic biodegradable waste management programs [CH4]:

Target: *Increase the diversion of biodegradables by increasing the percentage of biowaste that is composted or digested to 17.9% by 2025, 24.3% by 2030, and 37.1% by 2040 in comparison to 5% in base year 2010.*

1.3 Implement source-specific biodegradable waste management program

1.1a Household food and yard waste management program [CH4]

e. Promote backyard composting whenever feasible
f. Promote communal/sitio/barangay/barangay cluster-level biodegradable waste processing facilities to complement centralized aerobic composting/anaerobic digestion facilities
g. Multi-level documentation of existing best practice models for the source separation, segregated collection and processing of household kitchen and yard wastes
h. Establish new systems/cooperation models as guide for LGUs including frequency and dedicated collection resources (human or mechanized)
i. Explore PPP to invest financial sources to sustain this biodegradable waste management program

1.1b Management of biowaste from food industry and establishments [CH4]

g. Institutionalize system (*including specific policy/guidelines*) for systematic segregation, collection, and processing/treatment of biowastes from food processing industries and establishments
h. Establish and properly operate onsite or offsite centralized aerobic composting/anaerobic digestion facilities
i. Encourage private waste generators to cooperate, finance sources to invest, and LGUs to recover costs

1.1c Management of biowaste from markets and trading posts [CH4]

a. Institutionalize system (*including specific policy/guidelines*) for systematic segregation, collection, and processing/treatment of biowastes from public and private markets and agricultural trading posts, including proper post-harvest management
b. Establish and properly operate onsite or offsite centralized aerobic composting/anaerobic digestion facilities
c. Encourage private waste generators to cooperate, finance sources to invest, and LGUs to recover costs

1.4 Enhance supporting policies/activities for the increase in biowaste processing/treatment capacities and coverage [CH4]

d. Develop *technical guidelines* and capacitate LGUs and the private sector on the proper siting, sizing, design, and operations of aerobic composting and anaerobic digestion facilities
e. Conduct market studies and develop markets for compost and energy products from MSW, e.g., NGP, non-fruit bearing trees in urban landscaping, organic farming, for EESC, etc.
f. Subject compost products to quality analysis for package labelling to increase market value viz. return on investment

2. Promote gas capture, recovery and/or utilization during operation, and closure and rehabilitation of SWDS ... [CH4]

Target: *Increase the amount of SWDS gas (in terms of CH4, at 50% collection efficiency) captured and/or utilized from 1.77 million m^3 in 2010 to 16.1 million m^3 by 2025 and to 17.1 million m^3 by 2030 and thereafter .*

… including the use of EESC at small SWDS [CH4]

Target: *Increase the amount of SWDS gas (in terms of CH4, at 40% collection efficiency) captured by increasing the percentage of small SWDS that use EESC from none in 2010 to 31% by 2025 and 50% by 2030 and thereafter .*

2.4 Promote gas capture by flaring, with recovery and utilization whenever possible, of SWDS gas with at least 20% methane concentration [CH4]

a. Develop *policies/guidelines* on the capture and recovery or utilization whenever possible, of methane from landfill gas
b. Promote methane capture and flaring of gas at bigger SWDS (20-40% CH4), including how to sustain without energy by-product
c. Encourage private and LGU facilities, and tap international market mechanisms and funds, to sustain methane gas capture and/or utilization

2.5 Apply EESC at smaller dumpsites to capture methane from SWDS gas at <20% CH4 concentrations [CH4]

d. Modify SWDS management policies vis-à-vis use of EESC based on research and FS
e. Encourage LGUs to adopt EESC
f. Monitor methane emissions, including through research by tapping HEIs in the area

2.6 Enhance supporting policies/activities such as continued monitoring of the operation of SLFs and the closure and rehabilitation of SWDS

d. Carry out a policy review on leachate recirculation (to enhance decomposition) and leachate treatment with methane capture by revisiting DAO 2006-09 and DAO 2006-20 on the requirements for leachate management **[CH4]**
e. Continued enforcement for LGUs to close all the remaining dumpsites in the country and their subsequent use of SLFs
f. Issuance of guidelines on the clustering of LGUs for SLF economies of scale, and proper operations and management, including environmentally sound SWDS gas management

3. Implement comprehensive and strategic recyclables management programs (Recycling industry development program per recyclable component) [BC]

Target: *Increase the diversion of recyclables by increasing the percentage of recyclable fractions (paper, plastic, aluminum, iron/steel, and glass) that are recycled to at least 50%, 55%, and 60% by 2025, 2030, and 2040, respectively.*

3.5 Improve logistics / recovery flow to enhance collection of recyclables from the waste stream

e. Document existing best practice models for the segregated collection of recyclables or establish new systems/cooperation models as guide for LGUs
f. Develop business models for LGUs and the private (formal, semi-formal, informal) sector to improve recovery rates and coverage
g. Enhance enforcement of proper segregation and secondary storage of all recyclables such as paper, aluminum, metals, plastics and glass from households, commercial, market, institutional and industrial sources
h. Implement efficient scheduling of the collection of recyclables
i. Develop models for recyclables collection from islands, far-flung areas, mountainous, etc.
j. Transition from informal to a formal system while integrating all players

3.6 Enhance capacities of MRFs to receive, sort, and pre-process recyclables

c. Promote the establishment of communal/sitio/barangay/barangay cluster-level MRFs to complement centralized facilities
d. Develop *technical guidelines* and capacitate LGUs and accredited junkshops/consolidators on the proper siting, sizing, design, and operations of centralized MRFs and junkshops
e. Provide a linkage mechanism between the junkshops/consolidators and the generators
f. Document and monitor the operations and outputs of junkshops and haulers

3.7 Support the development of local recyclers, recycling industries, and markets for recyclables and recycled products [BC]

e. Update the recycling industry development study with JICA 2008 study as starting point
f. Support the development of the local recycling industry (per material type) to complement the export-driven recyclables market
g. Conduct value chain analysis to improve local value creation
h. Promote sustainable livelihood / income generation programs utilizing recyclable items
i. Organize local industry (junkshops, haulers, recyclers, etc.) forums
j. Identify options/alternatives to low economic value/potentially recyclable waste fractions and issue corresponding *policy/guidelines*.

3.8 Shift consumption from single-use disposables to single-use recyclables, whenever possible

e. Promote the use of recycled materials and their products
f. Develop and issue relevant *policy/guidelines*.

4. Implement BAT/BEP to prevent and control open burning at SWDS [BC]

Target: *Reduce the amount of deposited waste that is burned at SWDS (Baseline: 1.73 million tons of deposited waste in 2010) through the closure and rehabilitation of at least 60% of the remaining unmanaged SWDS by 2025 and at least 65% by 2030 and thereafter.*

4.1 Prevent surface and deep-seated fires at SWDS

a. Disseminate *BAT/BEP guidelines* on the prevention of SWDS fires, e.g., gas mixtures, soil cover and other SWDS operational practices
b. Build capacities of LGUs on SWDS fire prevention
c. MERV the proper operations as well as the closure and rehabilitation of SWDS and provide findings and recommendations.

4.2 Suppress surface and deep-seated fires at SWDS using appropriate fire-fighting techniques

c. Disseminate *BAT/BEP guidelines* on the control/suppression of SWDS fires

d. Collaborate with LGUs, BFP, LDRRMO and host barangay in the monitoring of fire incidences and suppression at SWDS

5. Implement BAT/BEP to prevent and control open burning at backyards or communal areas ... [BC]

Target (based on increased waste collection coverage and frequency): *Reduce the amount of waste burnt at backyards by 30%, 50%, and 80% by 2025, 2030, and 2040, respectively, as compared to 1.35 million tons of waste burned at backyards in 2010.*

… by (among others) increasing waste collection coverage and frequency.

Target: *Reduce the amount of uncollected waste from 10% of the generated waste in 2010 to 7%, 5%, and 2% by 2025, 2030, and 2040, respectively.*

5.1 Engage public support against backyard burning

a. Harmonize *policies* on open burning including subsequent issuance of a NSWMC Resolution and/or JAO (DENR, DOH, DA, PIA)
b. Conduct workshops/retooling (LGUs, Regional offices of concerned government offices)
c. Develop social marketing and IEC campaigns for public awareness on environment and health impacts of open burning
d. Encourage LGUs to pass ordinances to enforce RA 9003's prohibited acts: open burning

5.2 Enhance residual waste collection coverage and frequency to discourage backyard burning

c. LGUs to improve coverage areas and increase frequency in waste collection by allocating funds, improving logistics, and/or outsource waste collection services.
d. Explore alternative efficient collection scheme for far-flung and island barangays.

6. Promote the use of low-polluting waste collection vehicles and optimization of MSW collection routes and transport schemes [BC]

Target: *Reduce fuel consumption per ton of waste collected by 3%, 5%, and 10% by 2025, 2030, and 2040, respectively as compared to 8 liters of fuel (95% diesel and 5% gasoline) per ton of collected waste.*

6.1 Establish optimal waste vehicle collection routing techniques/schemes

a. Develop *technical guidelines* on vehicle route optimization (Euler tour and heuristic methods)
b. Capacitate LGUs and contractors/haulers on vehicle route optimization to reduce costs and emissions

6.2 Implement optimal transfer and transport schemes

a. Develop *technical guidelines* on transfer (operation of transfer stations, when applicable) and transport to reduce fuel consumption (Including inter island collection and transport)
b. Adopt compaction/bailing based on cost-benefit analysis

6.3 Use less polluting vehicles/machineries

e. Ensure the regular conduct of preventive maintenance of vehicles/machineries used in the MSW sector and issue corresponding *policy/guidelines* in cooperation with DOTr and LGUs.
f. Optimize the capacities of vehicles, vehicle types, and machineries to reduce SLCP emissions per ton of waste collected or processed
g. Modernize fleets or encourage the use of Euro 4-compliant vehicles subject to FS or cost-benefit analysis

7 Maximize the use of alternative technologies for the resource and energy recovery from captured biogas, including SWDS gas … **[CH4]**

Target: *Increase the amount of captured biogas from digesters and gas from SWDS (in terms of CH4) that are utilized for energy generation from 0% in 2010 to 34% by 2025 and 56% by 2030 and thereafter.*

… and from segregated, low-economic value waste fractions. **[BC]**

Target: *Increase the percentage of low-economic value waste fractions used as AFR in cement kilns and other waste-to-fuel products from 0% in 2010 to 10%, 30%, and 50% by 2025, 2030, and 2040, respectively.*

7.1 Encourage the utilization of recovered/capture gas from anaerobic digesters and SWDS for energy generation, whenever feasible [CH4]

a. Conduct a baseline and mapping study on SWDS, anaerobic digestion, and mechanical-biological treatment (MBT) facilities that may be capable of generating energy from biogas
b. Encourage private and LGU facilities to access the incentives provided by the Philippine Renewable Energy (RE) Act and tap international market mechanisms and funds, to sustain methane gas recovery with utilization

7.2 Maximize the use of alternative technologies to recover resources and energy from segregated, low-economic value non-biodegradable waste fractions such as its use as AFR in cement kilns and other waste-to-fuel options [BC]

a. Adopt *guidelines* for storage facilities for materials with low recycling value but with high energy content, including clear-cut standards and safeguards for the waste to fuels, AFR from MSW, production of hollow blocks and similar alternative products, use in arts and crafts, chemical recycling, etc.
b. Conduct market development study (mapping, type of waste, logistic plan, GHG/SLCP reduction potential, Cost Benefit Analysis)
c. Provide logistical and infrastructure support to enable future resource and energy recovery of (currently) non-sellable non-biodegradables and residuals.
d. Encourage LGUs to enter into agreement with Cement Manufacturing Association of the Philippines (CEMAP), accredited cement manufacturers, and other potential partner organizations.

7.3 Enhance supporting policies and implement initiatives to enable resource and energy recovery

a. Review the RE Act and suggest enhancements to RE categories, including a separate one for MSW-based sources, and provide a venue for offtake price discussions
b. Explore other market mechanisms to co-finance projects, e.g., CDM, JCM, etc.

Annex 5: Revised Strategies, Baselines and Targets based on Comments, Suggestions, and Recommendations

Strategies, Baselines and Targets

	Main Strategy	Specific Strategies	SLCP	Target/Goal	Baseline and Assumptions	Targets at YYYY		
					2010	***2025***	***2030***	***2040***
7.	Implement comprehensive and strategic biodegradable waste management programs	1.1 Implement source-specific biodegradable waste management program 1.1a Household food and yard waste management program 1.1b Management of biowaste from food industry and establishments 1.1c Management of biowaste from markets and trading posts 1.2 Enhance supporting policies/activities for the increase in biowaste processing/ treatment capacities and coverage	CH4	Increase the diversion of biodegradable waste by increasing the percentage of biowaste that is composted or digested by YYYY.	5% of all biowaste generated was composted (0% was digested) in 2010 *(*from CBA)*	17.9% *(*from CBA, based on the goal that at least 50% of biowaste is composted or digested by 2050)*	24.3% *(*from CBA based on the goal that at least 50% of biowaste is composted or digested by 2050)*	37.1% *(*from CBA based on the goal that at least 50% of biowaste is composted or digested by 2050)*
8.	Promote gas capture, recovery and/or utilization during operation, and closure and rehabilitation of SWDS	2.1 Promote gas capture by flaring, with recovery and utilization whenever possible, of SWDS gas with at least 20% methane concentration 2.2 Apply EESC at smaller dumpsites to capture methane from SWDS gas at <20% CH4 concentrations 2.3 Enhance supporting policies/activities such as continued monitoring of the operation of SLFs and the closure and rehabilitation of SWDS	CH4	Increase the amount of SWDS gas (in terms of CH4, at 50% collection efficiency) captured and/or utilized by YYYY.	1,771,561 m^3 (or 0.6765% of the 261,879,111 m^3) of methane have been captured by flaring (with or without electricity generation) in 2010 *(*from CBA worksheet)*	16.0 million m^3 (or 3.383% of the 473 million m^3) of methane will be captured *(*from CBA)*	17.1 million m^3 (or 3.141% of the 543 million m^3) of methane will be captured *(*from CBA)*	17.1 million m^3 (or 2.464% of the 694 million m^3) of methane will be captured *(*from CBA)*
	… including the use of eco-			Increase the amount of	0% of small SWDS captured	31% of small SWDS	50% of small	50% of small

	efficient soil cover (EESC) at small SWDS			SWDS gas (in terms of CH4, at 40% collection efficiency) captured through the application of EESC by YYYY.	methane (at 40% collection efficiency) using EESC *(*from CBA worksheet)*	captures methane (at 40% collection efficiency) using EESC *(*from CBA worksheet)*	SWDS captures methane (at 40% collection efficiency) using EESC *(*from CBA)*	SWDS captures methane (at 40% collection efficiency) using EESC *(*from CBA)*
9.	Implement comprehensive and strategic recyclables management programs (Recycling industry development program per recyclable fraction/ component)	3.1 Improve logistics / recovery flow to enhance collection of recyclables from the waste stream 3.2 Enhance capacities of MRFs to receive, sort, and pre-process recyclables 3.3 Support the development of local recyclers, recycling industries, and markets for recyclables and recycled products 3.4 Shift consumption from single-use disposables to single-use recyclables, whenever possible	BC	Increase the diversion of recyclables by increasing the percentage of recyclable fractions that are recycled by YYYY.	Paper recycling rate (642,610 / 1,559,510 tons) = 41.21%* Plastic recyc. rate [(243,267 / (1,261,405 – 574,349 tons)] = 35.37%* Aluminum rec. rate (46,000 tons/97,000 tons) = 47.42%* Iron/Steel rc. rate (1,219,000/3,137,000 tons) = 38.86%* Glass recycling rate (207,154 / 427,192 tons) = 48.49%* *(*based on JICA 2008 Study)*	At least 50% of each recyclable fraction (paper, plastic, metal and glass) is recycled.	At least 55% of each recyclable fraction is recycled.	At least 60% of each recyclable fraction is recycled.

					Note: Recycling trends sometimes decrease, e.g., PPMAI reported around 20% recycling rate for paper in 2017			
10	Implement BAT/BEP to prevent and control burning at SWDS	4.1 Prevent surface and deep-seated fires at SWDS 4.2 Suppress surface and deep-seated fires at SWDS using appropriate fire-fighting techniques	BC	Reduce the amount of deposited waste that is burned at SWDS by ___% by YYYY.	25% of waste that is deposited at unmanaged dumpsites (18,996.6 tpd in 2010) get / is bound to get burned within its lifespan of 20 years = 0.25*6,933,759 = 1,733,430 tons	60% of the remaining unmanaged SWDS have been closed and rehabilitated, hence, negligible chance to burn	65% of the remaining unmanaged SWDS have been closed and rehabilitated, hence, negligible chance to burn	65% of the remaining unmanaged SWDS have been closed and rehabilitated, hence, negligible chance to burn
11	Implement BAT/BEP to prevent and control open burning at backyards or communal areas	5.1 Engage public support against backyard burning 5.2 Enhance residual waste collection coverage and frequency to discourage backyard burning	BC	Reduce the amount of waste burnt at backyards by ___% by YYYY.	323,550.6 tons (~886.44 tpd) or 24% of the uncollected waste was estimated to be burned in 2010.	30% *(*derived values based on the % of waste that remains uncollected)*	50% *(*derived values based on the % of waste that remains uncollected)*	70% *(*derived values based on the % of waste that remains uncollected)*
	… by (among others) increasing			… by decreasing the amount of uncollected	1,348,127.5 tons (~3,693.5 tpd, or 10% of generated	7% of generated waste	5% of generated waste	3% of generated waste

	waste collection coverage and frequency.			waste (as a ___% of generated waste by YYYY).	waste) was uncollected in 2010.	remains uncollected	remains uncollected	remains uncollected
12	Promote the use of low-polluting waste collection vehicles and optimization of MSW collection routes and transport schemes	6.1 Establish optimal waste vehicle collection routing techniques/schemes 6.2 Implement optimal transfer and transport schemes 6.3 Use less polluting vehicles/machineries	BC	Reduce fuel consumption per ton of waste collected by ___% by YYYY.	92,211,775 li of diesel (~252,635 lpd) and 4,853,405 li of gasoline (~13,297 lpd) were estimated to be consumed for the collection and transport of 12,133,147.5 tons of waste (~33,241.5 tpd) in 2010. * Cross-check baseline of 8 li of fuel per ton of collected waste is applicable as 2010 baseline (too efficient?).	3%	5%	10%
13	Maximize the use of alternative technologies for the resource and energy recovery from	7.1 Encourage the utilization of recovered/capture gas from anaerobic digesters and SWDS for energy generation, whenever feasible 7.2 Maximize the use of alternative technologies to recover resources and energy from segregated, low-economic value non-biodegradable waste	CH4	Increase the amount of captured biogas and SWDS gas (in terms of CH4) that are utilized for energy	0% of biogas captured from anaerobic digesters and SWDS was utilized for energy/ electricity generation in 2010	34% *(*from CBA worksheet)*	56% *(*from CBA worksheet)*	56% *(*from CBA worksheet)*

	captured biogas, including SWDS gas, and from segregated, low-economic value waste fractions.	fractions such as its use as AFR in cement kilns and other waste-to-fuel options 7.3 Enhance supporting policies and implement initiatives to enable resource and energy recovery		generation by __% by YYYY.	*(*from CBA worksheet)*			
			BC	Increase the percentage of low-economic value waste fractions used as AFR in cement kilns and other waste-to-fuel products by ___% by YYYY.	0% of segregated, low-economic value waste fractions are utilized as AFR or as other fuels in 2010.	10%	30%	50%

Note: Highlighted in yellow are targets proposed based on extrapolations. Kindly check before the corresponding SLCP emission reductions are calculated.

Annex 6: Some Photos of the Second FGD