



janoschka

Solid Waste Management and Sustainability in the Flexible Packaging Industry

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Founding President, Philippine Alliance for Recycling and Materials
Sustainability





Outline of presentation

- Climate Change & The Law on Ecological Solid Waste Management RA9003 (as amended by RA11898 EPR ACT of 2022)



- Solid Waste at a glance
- How industries can be Climate Smart
- EPR compliance options



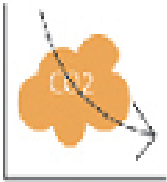
Climate Change

THE KEY ELEMENTS OF THE PARIS AGREEMENT

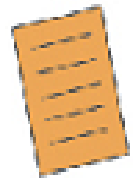
A text with universal scope, adopted by 195 countries



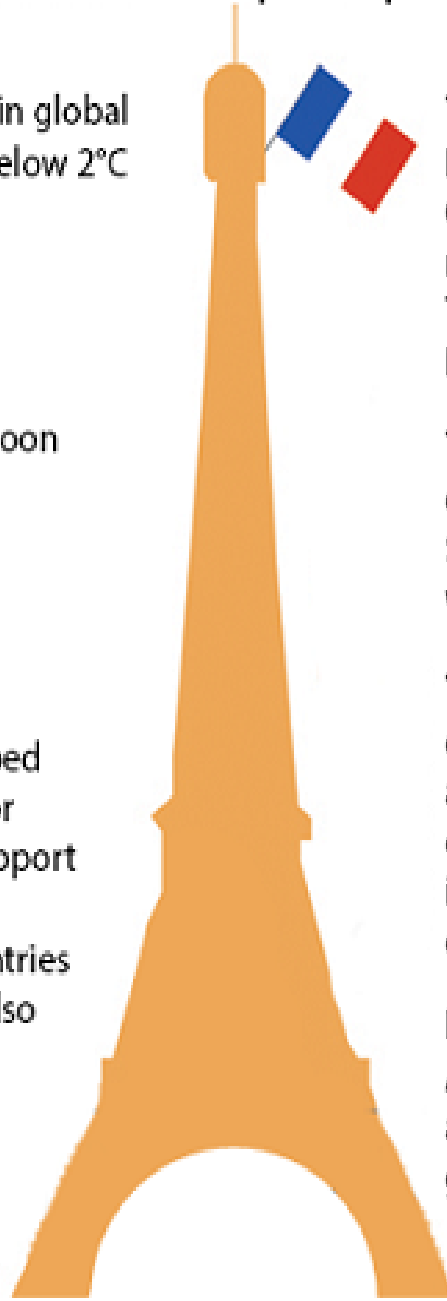
The aim: to keep the increase in global average temperature to well below 2°C and to 1.5°C if possible.



The objective: to level off greenhouse gas emissions as soon as possible.



The principal: to differentiate between developed and developing countries. Developed countries must lead the way for reduction of emissions and support developing countries in implementing this. Other countries with the ability to do so may also contribute their support on a voluntary basis to achieve this target.



The means: Countries must submit Intended Nationally Determined Contributions (INDCs) which are revised upwards every 5 years. The 1st report is due in 2023. North-South technology transfer.



The financing: from 2020, rich countries must contribute at least \$100 billion per year. This amount will be reviewed in 2025.



The new mechanism: loss and damage. Measures must be taken to avert, minimize and address the concrete effects of climate change, in order to help the most vulnerable countries.



Entry into force: 2020 if the Agreement is ratified by 55 countries accounting for 55% of global greenhouse gas emissions.



COP21 MAJOR OUTCOMES

5 Key Elements of the Paris Agreement

Every 5 years countries
STRENGTHEN CLIMATE ACTIONS

ADAPTATION
is a central pillar to help world's most vulnerable

LONG-TERM GOAL
to achieve net zero emissions

ENHANCED TRANSPARENCY
to ensure commitments are met

CLIMATE FINANCE
to support developing countries

10,000 New Climate Initiatives

187
COUNTRIES
shared national climate action plans

127+
MILLION HECTARES
of degraded land in Africa and Latin America to be restored

400+
CITIES TO SET TARGETS that could cut urban emissions in half

\$1T
IN SOLAR INVESTMENTS to be mobilized by new global alliance

114+
COMPANIES will use Science Based Targets to set emissions-cutting goals

20
COUNTRIES to double clean energy R&D

These substantial climate actions will transform the world and drive us toward a safer, climate-resilient future.

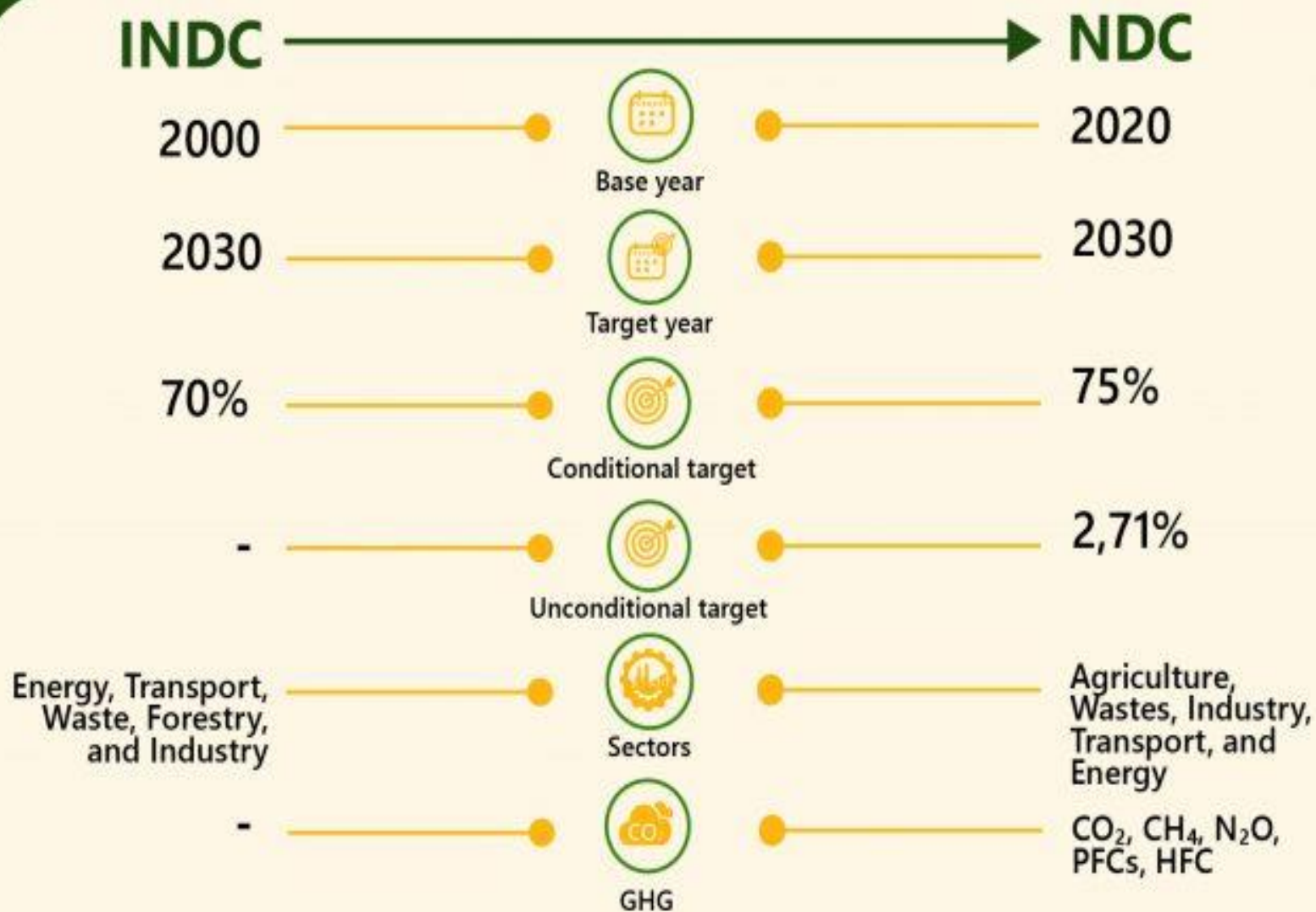
First NDC of the Philippines



Country profile:



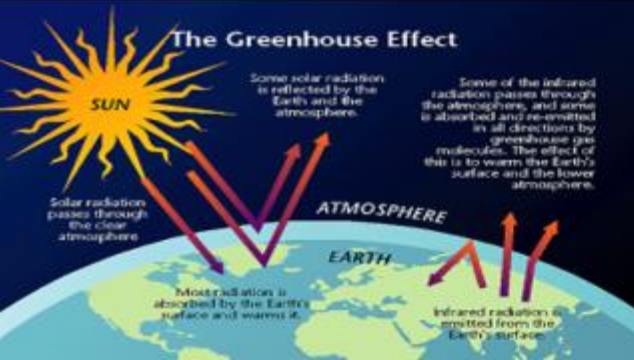
More infographics:



YOU CONTROL CLIMATE CHANGE.



TURN DOWN. SWITCH OFF. RECYCLE. WALK. **CHANGE**



Climate Change and the Philippines

- Reviewing the Science
- Detecting the Changes
- Impacts on the Philippines
- Responses

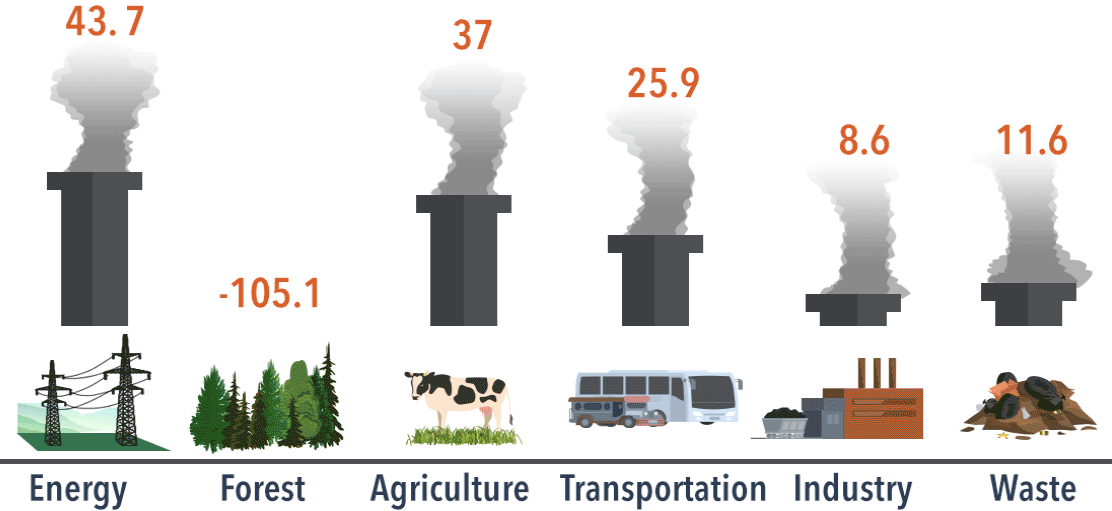
Department of Environmental Science
Ateneo de Manila University
Head, Regional Climate Systems
Manila Observatory



EMISSIONS THROUGH THE YEARS

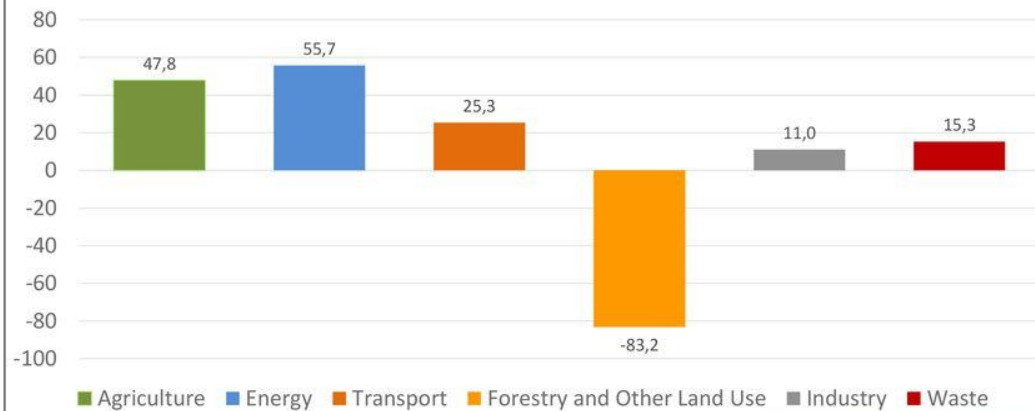
2000

SECTORS



Sectoral Emissions

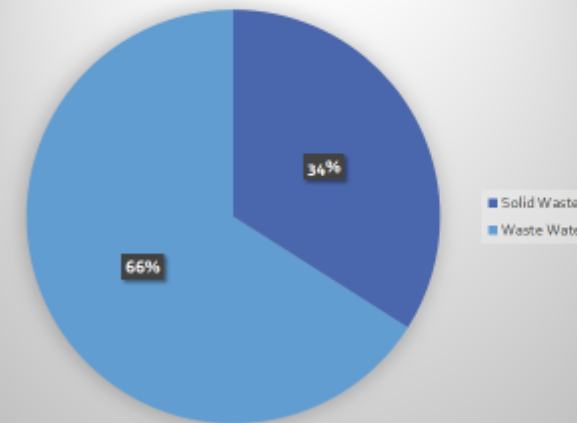
2010 Base Year GHG Emissions and Removals (MtCO₂e)



Source: USAID B-LEADERS Philippines Mitigation Cost-Benefit Analysis (November 2015)

GHG EMISSIONS FROM WASTE SECTOR

% Contributions per Waste Sub-sector



Category	2010	
	Emissions	%
Solid Waste	4,700	34%
Solid Waste Disposal	4,100	29%
Biological Treatment of Solid Waste (Composting)	200	2%
Open Burning	400	3%
Wastewater Handling	9,100	66%
Domestic Wastewater	8,700	63%
Industrial Wastewater	400	3%
TOTAL	13,800	100.0%



Ondoy



Peping



Pedring's Fury

EFFECT OF NATURAL CALAMITIES

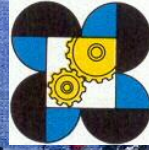


HABAGAT



Dumpsites

Photo courtesy of DOST-ITDI



WASTE DISPOSAL CHALLENGES

...an estimated 150,000 residents of Metro Manila know the **sight and smell of garbage** as an integral part of their daily lives.

PAYATAS

Payatas Tragedy 2000

On July 10, 2000 218 residents of Payatas died after a huge mountain of trash caved in

2011 trashslide, Baguio



POLLUTING OUR OCEANS



Credit: Kakuko Yoshida

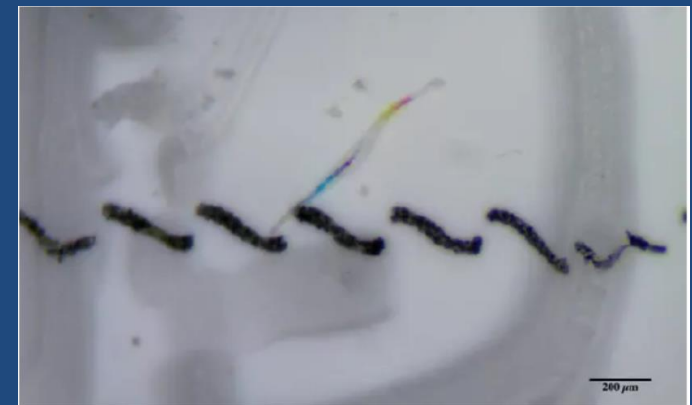
Marine litter is 'any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment'.

Microplastics range in size, but are commonly defined as plastic particles of less than 5mm diameter (for monitoring and assessment purposes)

Source:

- UNEP (1995). Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
- UNEP (2009). Marine litter: A global challenge, Nairobi.
- UN Environment Programme (2016) Marine Litter Legislation: A Toolkit for Policymakers.
- GESAMP (2019). Report and Studies No. 99 Guidelines for The Monitoring and Assessment of Plastic Litter in the Ocean

Presentation Source: Kakuko Nagatani-Yoshida, UN Environment Regional Office for Asia and the Pacific



A colourful microfibre of plastic found in bottled water. Photograph: Abigail Barrows

Marine Debris

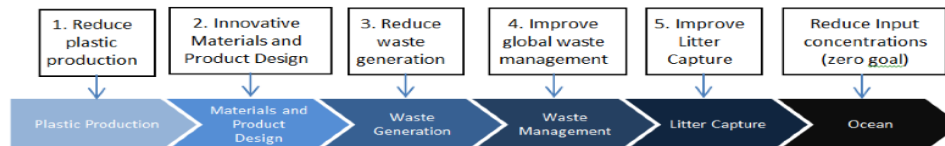


Plastic Waste Inputs from Land into the Ocean



United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea
Seventeenth Meeting, 13 - 17 June 2016
Jenna Jambeck, PhD, Associate Professor of Environmental Engineering, University of Georgia

Mitigation Strategies



1. Industry-led or reduce demand
2. Green Engineering, Circular Economy
3. Reusable items, Sharing/Collaborative Economy
4. Context-sensitive Solid Waste management Infrastructure
5. Litter Capture and Clean-up



Marine Debris

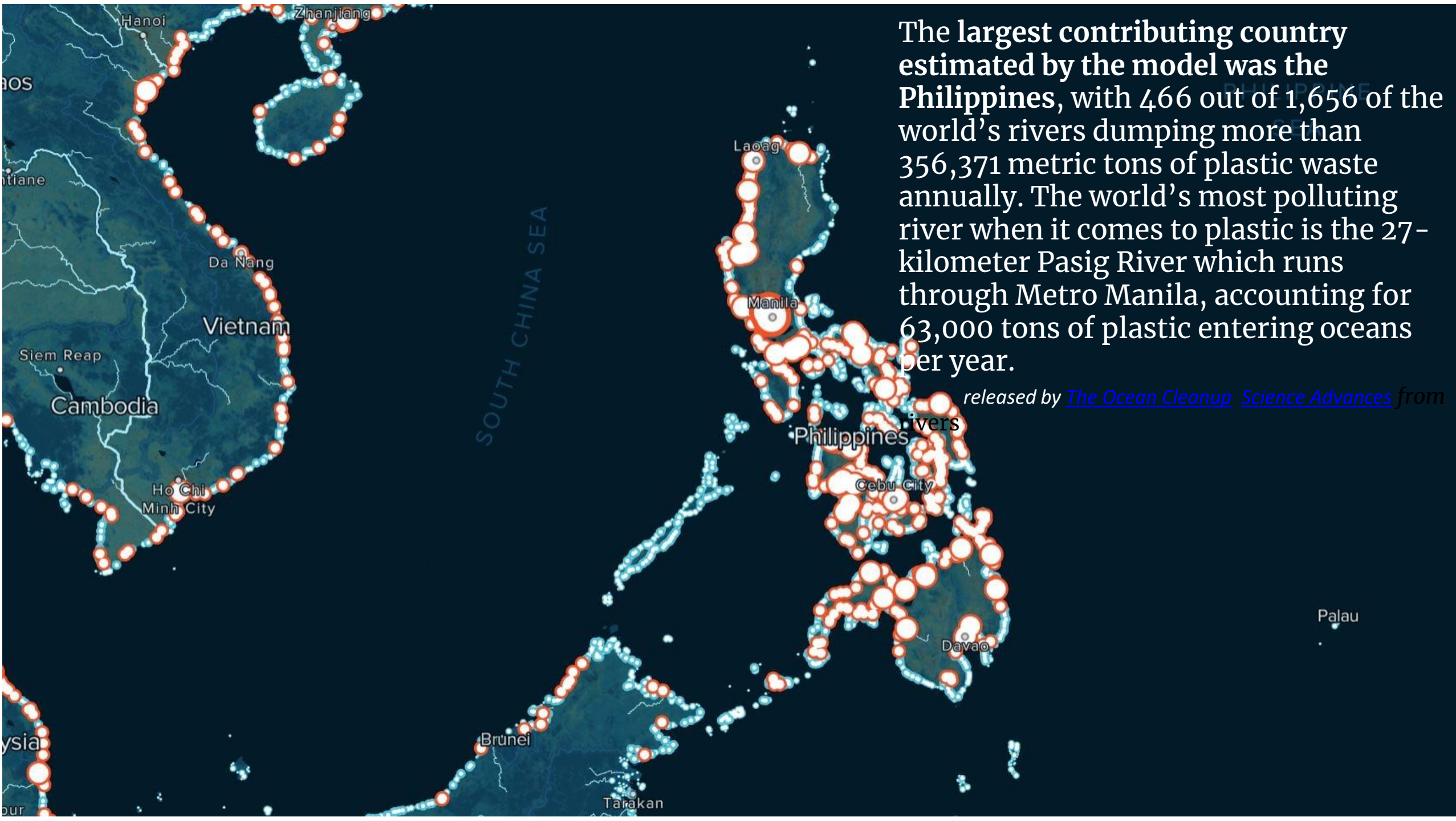
At-A-
Glance



Table 1. Waste estimates for 2010 for the top 20 countries ranked by mass of mismanaged plastic waste (in units of millions of metric tons per year). Econ classif., economic classification; HIC, high income; UMI, upper middle income; LMI, lower middle income; LI, low income (World Bank definitions based on 2010 Gross National Income). Mismanaged waste is the sum of inadequately managed waste plus 2% littering. Total mismanaged plastic waste is calculated for populations within 50 km of the coast in the 192 countries considered. pop., population; gen., generation; ppd, person per day; MMT, million metric tons.

Rank	Country	Econ. classif.	Coastal pop. [millions]	Waste gen. rate [kg/ppd]	% plastic waste	% mismanaged waste	Mismanaged plastic waste [MMT/year]	% of total mismanaged plastic waste	Plastic marine debris [MMT/year]
1	China	UMI	262.9	1.10	11	76	8.82	27.7	1.32–3.53
2	Indonesia	LMI	187.2	0.52	11	83	3.22	10.1	0.48–1.29
3	Philippines	LMI	83.4	0.5	15	83	1.88	5.9	0.28–0.75
4	Vietnam	LMI	55.9	0.79	13	88	1.83	5.8	0.28–0.73
5	Sri Lanka	LMI	14.6	5.1	7	84	1.59	5.0	0.24–0.64
6	Thailand	UMI	26.0	1.2	12	75	1.03	3.2	0.15–0.41
7	Egypt	LMI	21.8	1.37	13	69	0.97	3.0	0.15–0.39
8	Malaysia	UMI	22.9	1.52	13	57	0.94	2.9	0.14–0.37
9	Nigeria	LMI	27.5	0.79	13	83	0.85	2.7	0.13–0.34
10	Bangladesh	LI	70.9	0.43	8	89	0.79	2.5	0.12–0.31
11	South Africa	UMI	12.9	2.0	12	56	0.63	2.0	0.09–0.25
12	India	LMI	187.5	0.34	3	87	0.60	1.9	0.09–0.24
13	Algeria	UMI	16.6	1.2	12	60	0.52	1.6	0.08–0.21
14	Turkey	UMI	34.0	1.77	12	18	0.49	1.5	0.07–0.19
15	Pakistan	LMI	14.6	0.79	13	88	0.48	1.5	0.07–0.19
16	Brazil	UMI	74.7	1.03	16	11	0.47	1.5	0.07–0.19
17	Burma	LI	19.0	0.44	17	89	0.46	1.4	0.07–0.18
18*	Morocco	LMI	17.3	1.46	5	68	0.31	1.0	0.05–0.12
19	North Korea	LI	17.3	0.6	9	90	0.30	1.0	0.05–0.12
20	United States	HIC	112.9	2.58	13	2	0.28	0.9	0.04–0.11

*If considered collectively, coastal European Union countries (23 total) would rank eighteenth on the list





The Law on Ecological Solid Waste Management



The Ecological Solid Waste
Management Act of 2000
(Republic Act 9003)
as amended by the
EPR ACT of 2022 (RA 11898)

**AN ACT PROVIDING FOR AN ECOLOGICAL
SOLID WASTE MANAGEMENT PROGRAM,
CREATING THE NECESSARY INSTITUTIONAL
MECHANISMS AND INCENTIVES,
DECLARING CERTAIN ACTS PROHIBITED
AND PROVIDING PENALTIES,
APPROPRIATING FUNDS THEREFOR, AND
FOR OTHER PURPOSES**

INSTITUTIONAL MECHANISM (National Level)



The National Solid Waste Management Commission

- Created under the Office of the President
- EMB of the DENR provides secretariat support
- Composed of ~~14~~ **8 members from the government** and ~~3~~ **5 from the private sector** (as amended under RA11898)

Government Sector:

- | | |
|--------------------------|---------------------------------------|
| • DENR (Chairman) | • DPWH |
| • DILG | • TESDA |
| • DA | • PIA |
| • DTI | • League of Provinces |
| • DOST | • League of Cities |
| • DOH | • League of Municipalities |
| • MMDA | • Liga Ng Mga Barangay |
| • ULAP | |

Private Sector:

- **RECYCLING/COMPOSTING / RECOVERY INDUSTRY**
- **MANUFACTURING/ PACKAGING/OE INDUSTRY**
- **Non-Government Organization x 3**

Private sector representatives shall be appointed by the President for a term of 3 years, and one shall serve as Vice Chairman.

Salient Features of RA 9003

Article 2 Segregation of Wastes

- Section 21. **Mandatory Segregation** of Solid Wastes

Article 3 Collection and Transport of Solid Wastes

- Section 24. Requirements for the Transport of Solid Waste
 - **Separate Collection System**

Article 4 **Recycling Program**



WASTE HIERARCHY



- Avoid Producing Waste
- Minimize the amount of waste produced
- Use Materials repeatedly
- Use Materials to make new products
- Compost Biodegradables
- Hazardous & Infectious Waste Treatment
- Energy Recovery
- Final Disposal in Sanitary Landfill

CONCEPTUAL FRAMEWORK OF RA 9003



Biodegradable
wastes

Recyclable
Wastes

Special
Wastes

Residual
Wastes



Separate
Collection
Schedule or
Use of
Compartmentalized
Vehicle



BARANGAY
MRF

GARDENS/
FARMS

JUNKSHOPS/
RECYCLING PLANT

TREATER

SLF

BARANGAY'S Role

CITY/MUNICIPALITY'S Role

BIO

BIODEGRADABLES

R

E

C

Y

C

L

A

B

L

E

S

PAPER

KITCHEN WASTE

AGRI WASTE

GARDEN WASTE

LIVESTOCK WASTE

Selected White Ledger (SWL)

BOND PAPER

Old Corrugated Cardboards (OCC)

CARTON BOXES

Old (ONP) Newspaper

NEWSPAPERS

Mixed Paper

MAGAZINES

Used beverage cartons (UBC)

JUICE CARTONS

WHITE ENVELOPES

PAPER BAGS & BROWN ENVELOPES

OLD NEWSPRINT / TEXTBOOKS

PAMPHLETS

MILK CARTONS

PLASTICS

1 PET

WATER / BEVERAGE BOTTLE

2 HDPE

BEVERAGE JUGS

3 V

PVC PIPES

4 LDPE

SQUEEZABLE BOTTLES

5 PP

MICRO-WAVABLES

6 PS

PLASTIC TRAYS & CUTLERY

7 Others

WATER DISPENSER BOTTLES (POLYCARBONATE)

COSMETIC OR PERSONAL CARE BOTTLE

PERSONAL CARE CONTAINERS

LINOLEUM

SQUEEZABLE TUBES

PAILS & CHAIRS

PACKING FOAM, STYROFOAM

CDS & OTHER OPTICAL DISCS (POLYCARBONATE)

GLASS

BOTTLES

FLINT / CLEAR

AMBER / BROWN

GREEN

COLORED

FLAT GLASS

CLEAR

TINTED

Mirrors

LOW E-COATED GLASS

CULLETS

Broken glass bottles, sorted by color

Broken flat glass, sorted by color

METALS

ALUMINUM

ALUMINUM CANS

ALUMINUM TRAYS

COPPER

COPPER TUBES

COPPER WIRES

STEEL

STEEL

G.I. SHEETS

TIN

SARDINE CANS

SOUP CANS

This chart gives representative examples and is not meant to be an exhaustive list.
 For more details, refer to the NSWMC website for the updated approved list of recyclables.

RESIDUALS

Recyclables not salable in local junk shops or recycling markets should be classified under “residuals with potential for recycling.”

RESIDUALS with POTENTIAL FOR RECYCLING

DOY PACKS, BAGGERS, WRAPPERS

TARPAULIN

DRINKING STRAWS

GROCERY & FOOD BAGS

LEATHER ITEMS

RAGS

SLIPPERS & RUBBER MATS

The volume of residual waste that ends up in our landfills can be greatly reduced by treatment technologies.

RESIDUALS for DISPOSAL

CIGARETTE BUTTS

SOILED TISSUE PAPER

DIAPERS

SANITARY NAPKINS

COATED PAPER

FOOD-CONTAMINATED PAPER

HEAVILY-SOILED PLASTICS

SPECIAL WASTE

HAZARDOUS WASTE

PAINTS & SOLVENTS

USED OILS (MOTOR OIL, COOKING OIL)

DRY CELL BATTERIES

WHITE GOODS (COOKING, WASHING, REFRIGERATION)

CLEANING CHEMICALS

HOUSEHOLD HEALTHCARE WASTE

LAPTOP, GADGET BATTERIES & POWER BANKS

CONSUMER ELECTRONICS & TOOLS (TVs, RADIOS)

PESTICIDE & HERBICIDE CONTAINERS

BUSTED LIGHTS

INDUSTRIAL & VEHICLE BATTERIES

LT / TELCOM GADGETS & PERIPHERALS

HAZARDOUS wastes are covered under Republic Act 6969 (Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990) and its related policies, such as Department Administrative Order 2013-22. Industrial, commercial and institutional establishments that generate hazardous waste must be registered with DENR-EMB and obtain the necessary permits.

HEALTHCARE WASTE from HOSPITALS

EXPIRED PILLS & MEDICINES

SYRINGES

SURGICAL GLOVES

OLD MEDICAL DEVICES WITH MERCURY

Healthcare waste must be properly disposed of by hospitals, clinics and other health institutions. Guidelines for their proper disposal are covered by the Healthcare Waste Management Manual published by the Department of Health.

BULKY WASTE

BULKY YARD WASTE

RUBBER TIRES

CONSTRUCTION DEBRIS

DEMOLITION DEBRIS

Bulky wastes require separate hauling arrangements with the Local Government Units (for Households) or Contracted Parties (for Commercial, Industrial, and Institutional Sources.) Proper treatment or disposal of waste must be ensured.

A standardized and mandatory guide for Philippine Local Government Units and Solid Waste Management Practitioners based on the WACS Guidelines approved by the National Solid Waste Management Commission, Office of the President, Republic of the Philippines.

Office of the President

NSWMC

IGES

Institute for Global



EXTENDED PRODUCER RESPONSIBILITY ACT OF 2022

The Extended Producer Responsibility Act of 2022 was adopted into law on **23 July 2022** and was deemed effective on **12 August 2022**.

S. No. 2425
H. No. 10696

Republic of the Philippines
Congress of the Philippines
Metro Manila

Eighteenth Congress

Third Regular Session

Begun and held in Metro Manila, on Monday, the twenty-sixth day of July, two thousand twenty-one.

[REPUBLIC ACT NO. 11898]

AN ACT INSTITUTIONALIZING THE EXTENDED PRODUCER RESPONSIBILITY ON PLASTIC PACKAGING WASTE, AMENDING FOR THIS PURPOSE REPUBLIC ACT NO. 9003, OTHERWISE KNOWN AS THE "ECOLOGICAL SOLID WASTE MANAGEMENT ACT OF 2000"

Be it enacted by the Senate and House of Representatives of the Philippines in Congress assembled:

SECTION 1. *Short Title.* – This Act shall be known as the "Extended Producer Responsibility Act of 2022".

SEC. 2. Section 2 of Republic Act No. 9003 is hereby amended to read as follows:

"SEC. 2. *Declaration of Policies.* – It is hereby declared the policy of the State to adopt a systematic,

ESTABLISHMENT OF EPR PROGRAMS

Obligated enterprises shall establish or phase-in EPR programs for plastic packaging to achieve **efficient management of plastic packaging waste, reduced production, importation, supply or use of plastic packaging** deemed low in **reusability, recyclability or retrievability, and plastic neutrality** through efficient recovery and diversion schemes, such as:



Reduction of non-environment friendly packaging products

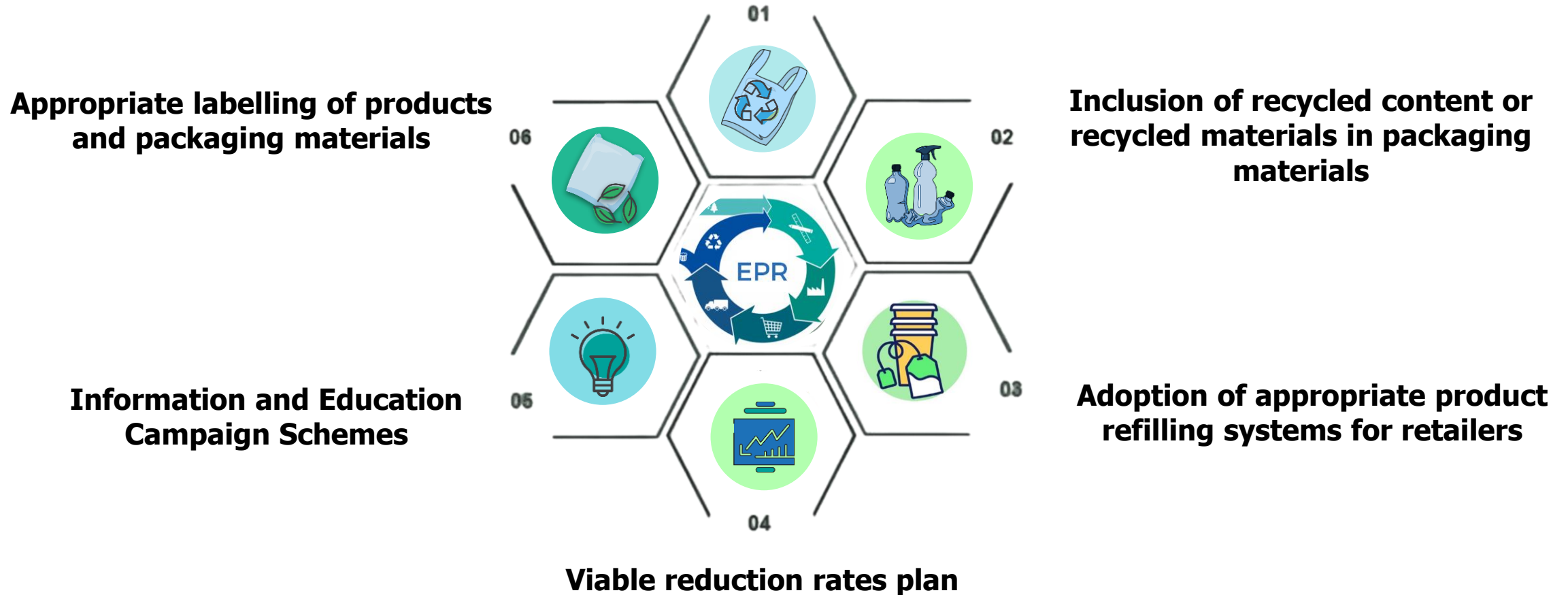


Recovery programs aimed at effectively preventing waste from leaking to the environment

MODES OF EPR PROGRAM

Reduction of non-environment friendly packaging products

Reusable Packaging products or packaging design



MODES OF EPR PROGRAM

Recovery programs aimed at effectively preventing waste from leaking to the environment

Waste recovery schemes
through redemption, buy-back and offsetting

Partnerships
with local governments, communities
and informal waste sectors

Investment
in commercial or industrial waste
diversion or disposal facilities

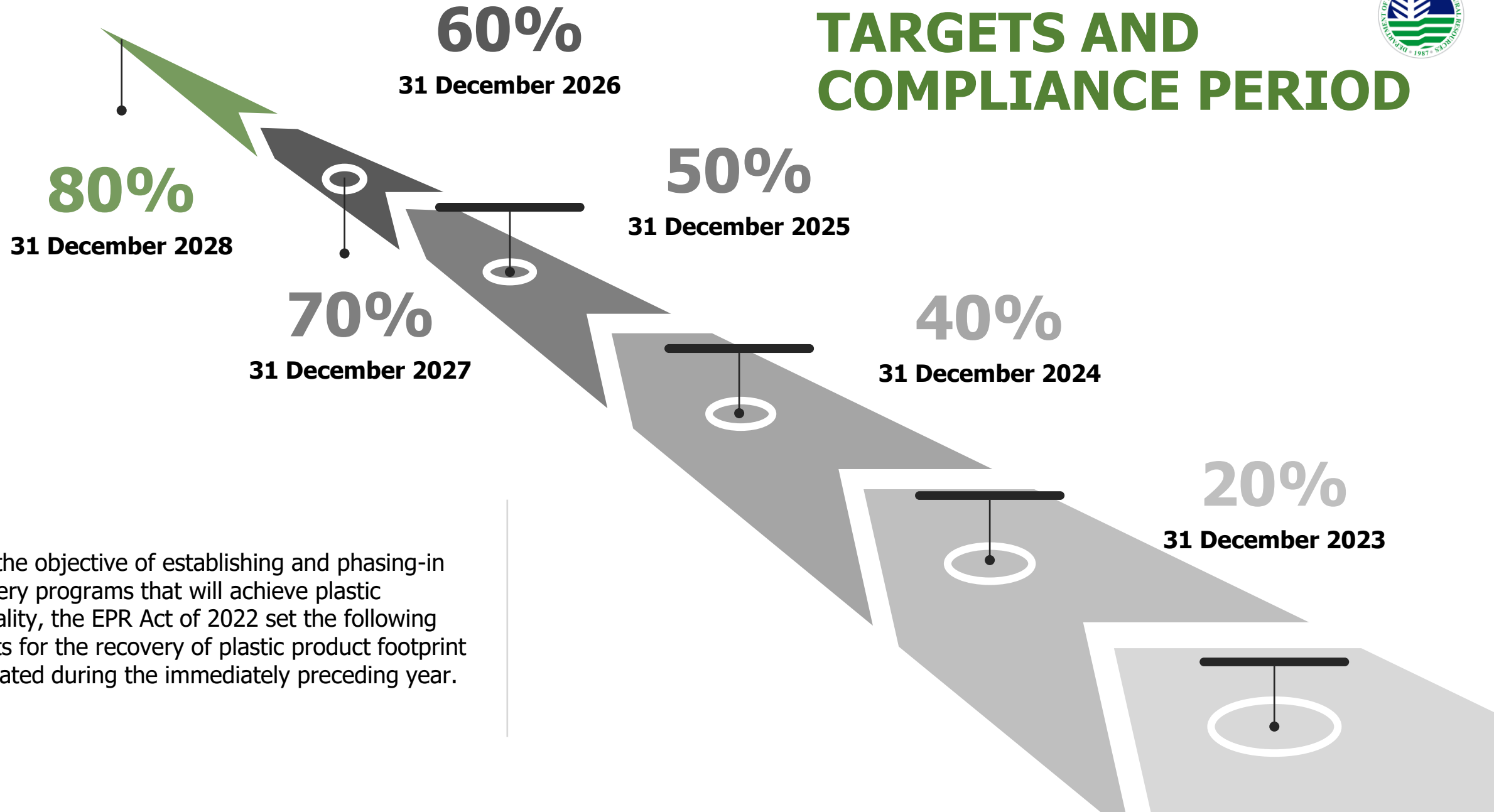


Diversion
of recovered waste

Transportation
of recovered waste to proper diversion
or disposal sites

Waste clean-up
in coastal and public areas

TARGETS AND COMPLIANCE PERIOD



With the objective of establishing and phasing-in recovery programs that will achieve plastic neutrality, the EPR Act of 2022 set the following targets for the recovery of plastic product footprint generated during the immediately preceding year.

FISCAL INCENTIVES

The following incentives may be availed by OEs, PROs, and NGOs that undertake effective solid waste management:



**Tax
Incentives**



Deductions



**Tax and duty exemption of
donations, legacies and gifts**

PUNISHABLE ACTS

The penalty shall be imposed whether or not the noncompliance is the result of:



failure to register



falsification of documents



misdeclaration of generated or recovered footprint



employment of any scheme to **maliciously evade the responsibility** of an enterprise under the EPR Law



tamper its compliance with Section 44-F of the Act.



PENALTIES


Any Obligated Enterprise that fails to register under the EPR Act of 2022 shall be fined as follows:

First Offense	not less than Five million Pesos (₱5,000,000.00) but not exceeding Ten million Pesos (₱10,000,000.00)
Second Offense	not less than Ten million Pesos (₱10,000,000.00) but not exceeding Fifteen million Pesos (₱15,000,000.00)
Third Offense	not less than Fifteen million Pesos (₱15,000,000.00) but not exceeding Twenty million Pesos (₱20,000,000.00) for the third offense and automatic suspension of business permit until the requirement of the EPR Act of 2022, is complied with

STATUS OF IMPLEMENTATION

Submission of EPR Programs

	Obligated enterprises (OEs) refer to product producers that are required to implement an EPR program under this Act	105
	Collectives (7) establishes & implements an EPR program for and only among its members exclusively	49
	Producer Responsibility Organizations (8 PROs) establishes a common platform for EPR programs for its members, but open to affiliates or public	307
	Micro-, Small and Medium-sized Enterprises (MSMEs) MSMEs which exceed total value of assets of all enterprises carrying the same brand, label or trademark for medium enterprises as prescribed by RA 9501	248
Total as of SEPTEMBER 15 2023		709



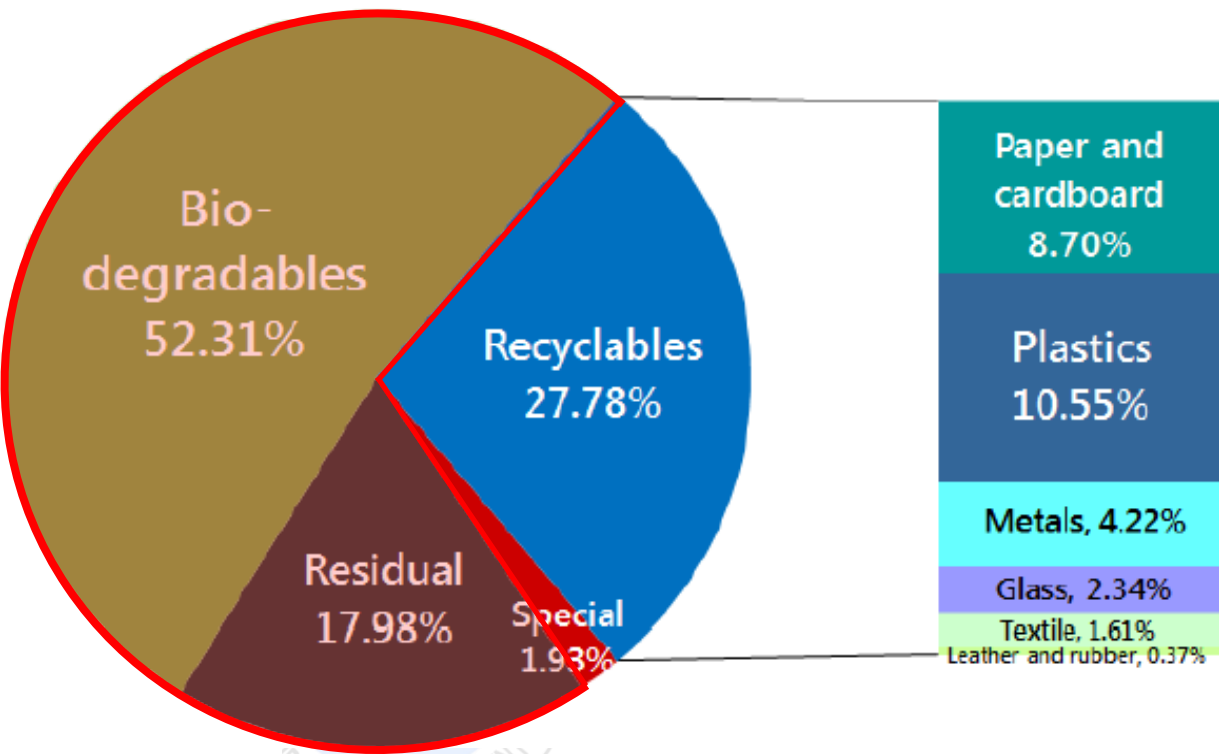
Solid Waste at a glance

Philippine Solid Waste Situation (RA9003)

Indicator	National	Metro Manila
Waste generation 2019 projected	44,610 tons/day	10,078 tons/day
	16,293,802.5 tons/yr	3,680,989.5 tons/yr
Per capita	0.32 – 0.71	0.71



Percentage (%) by weight of MSW fractions in the Philippines



Percentage (%) contribution of the various sources of MSW

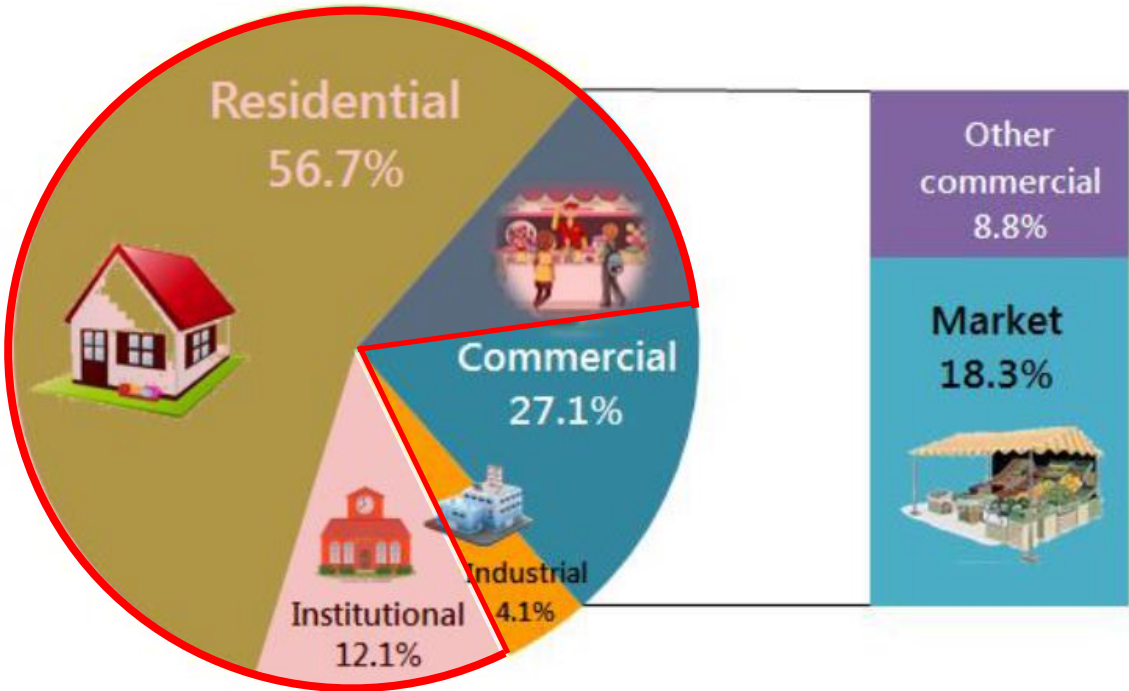


Figure 6. Sources of municipal solid waste (MSW) in the Philippines

Source: NSWMC 2020 Database updating the Philippine Solid Waste Management Status Report

LGU Compliance Updates (RA9003)



SOLID WASTE MANAGEMENT

Where are we now in the management of Solid Wastes?

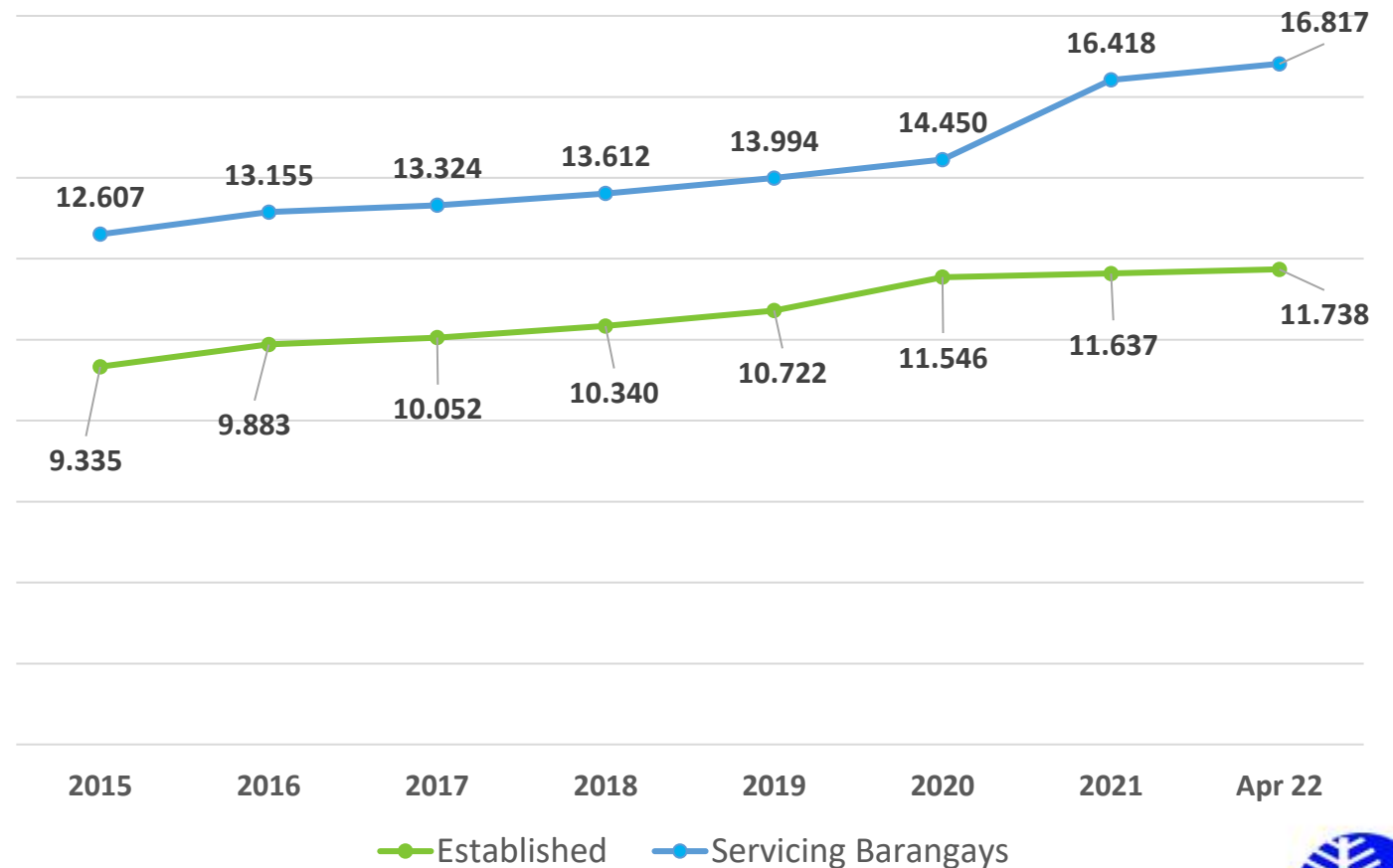
- **Materials Recovery Facility (MRF)**

- ✓ A total of **11,738 MRFs** established servicing **16,817 barangays** nationwide.
- ✓ 40% compliance

- **10-Year Solid Waste Management Plan (SWMP)**

- ✓ **68% or 1,175** Solid Waste Management Plan approved.

Materials Recovery Facility (CY 2015-2021)



SOLID WASTE MANAGEMENT

Where are we now in the management of Solid Wastes?

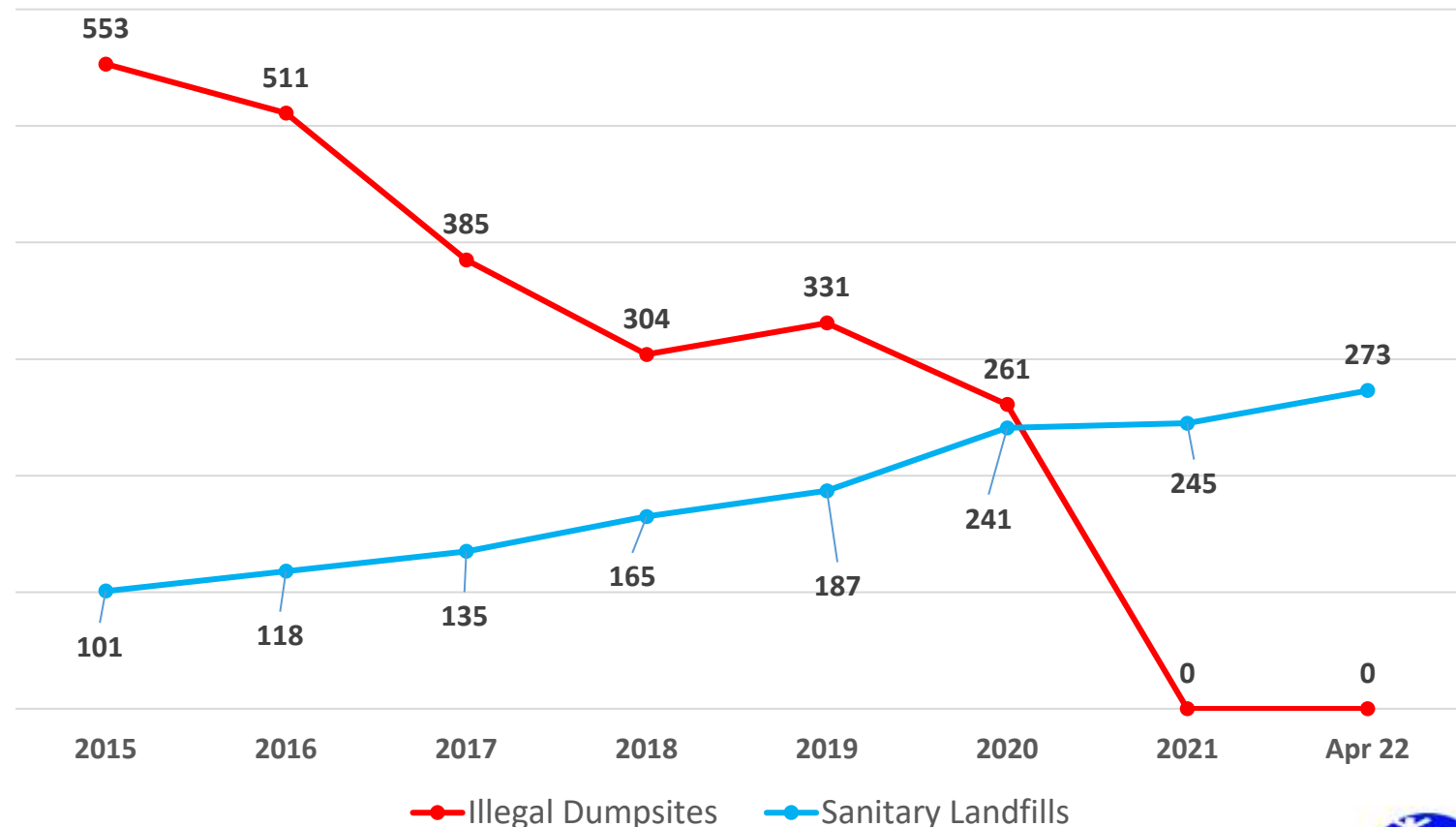
- **Illegal Dumpsites**

- ✓ **100%** of illegal dumpsites in the country in 2021.

- **Sanitary Landfill**

- ✓ A total of **273 SLFs** operational nationwide serving 524 LGUs in the country. (32% LGUs with access to SLFs)

Disposal Facilities (CY 2015-2021)



Percentage of waste disposal and treatment in the Philippines

Recycling	27.78 %*
Incineration	0
Landfill (LGUs with access to sanitary landfill)	30.3%**
Open dump	0**
Others***	41.92%**

*National Solid Waste Management Status Report 2008-2018

**DENR-EMB 2021 data

***Other wastes came from Materials Recovery Facilities, Waste-to-Energy Facilities, other facilities, and mismanaged wastes.



Recycling & Resource Recovery



How we can be
CLIMATE SMART

Biodegradables

Food Waste Management Program



Composting at Household & Institutional Level



Biodigesters



Padyak haulers will collect namamaho, kitchen waste in households daily



1000 L Portable Biogas digester with max. capacity of 50 kgs/day

For Waterfield
300 HH =
23 units



08/03/2011 13:31

Recyclables



PAPER
PLASTIC
GLASS
STEEL/AL

Working hand in hand to Establish Recycling Guidelines for Plastics developed by



PAG-RECYCLE NG PLASTIC: HDPE (High Density Polyethylene)
Ang mga sumusunod ay habinbawa ng "sakaker" na plastic:
Bote ng shampoo, alcohol, mantikang pangluto, lanti at fluid ng mga sasakyan, drum, at plastic bag



PAG-RECYCLE NG PLASTIC: PET (Polyethylene Terephthalate)
Ang mga sumusunod ay habinbawa ng PET: mga bote na nakabitin ang lantad ng softdrink o mineral water, cold tea, o gampon ng peanut butter



PAG-RECYCLE NG PLASTIC: PVC (Polyvinyl Chloride)
Ang mga sumusunod ay habinbawa ng kagamitang gawa sa PVC:
Water / electrical / sanitary pipes, pintuan, linoleum (flooring), at shower curtains



PAG-RECYCLE NG LATA

Mayroong dalawang klase ng lata na maaaring i-recycle: Aluminum cans o lata ng softdrink at tin cans o lata ng sardinas, mantika atbp.



tin cans



aluminum cans



MGA PAALALA:

- Ang mga latang pinaglagyan ng pintura, insecticide, hair spray at iba pang kemikal ay nasa kategorya na "special waste"
- Ang mga latang nasa kategorya ng "special waste" ay hindi na dapat lini-sin at hindi dapat hinahalo sa ibang recyclable o residual waste. Makipag-ugnay sa inyong barangay o munisipyo sa tamang pagtapon nito

PAG-RECYCLE NG PAPEL

Ang mga sumusunod ay ang mga iba't-ibang uri ng papel na maaaring i-recycle:



MGA PAALALA:

- Huwag gumamit ng pandikit (glue o tape) sa pagtali ng mga papel
- Siguraduhing nakaayos ayon sa kategorya ang mga papel
- Huwag isama ang mga papel na nabahiran ng pagkain o langis
- Huwag isama ang mga sumusunod na uri ng papel: thermal papers, carbon paper, coated papers, dark-colored papers, used tissue papers, photos, plastic coated papers, aluminum coated papers

PAG-RECYCLE NG BABASAGIN NA BOTE

May tatlong uri ng bote na maaaring i-recycle ayon sa kulay: amber (o brown), emerald green (berde) o flint (walang kulay).



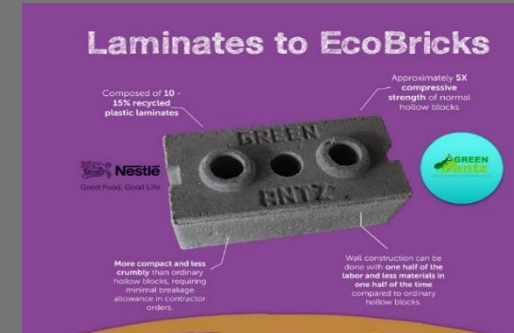
Amber Flint emerald green



MGA PAALALA:

- Ang mga basag na bote, bumbilya, fluorescent light at jalusi (bintana), at mga boteng pinaglagyan ng gaas o kemikal ay special waste. Huwag itong ihalo sa recyclable o residual na basura. Makipag-ugnay sa barangay para sa tamang pagtapon nito.
- Ibalot ang mga basag na bote sa papel upang hindi makasugat.

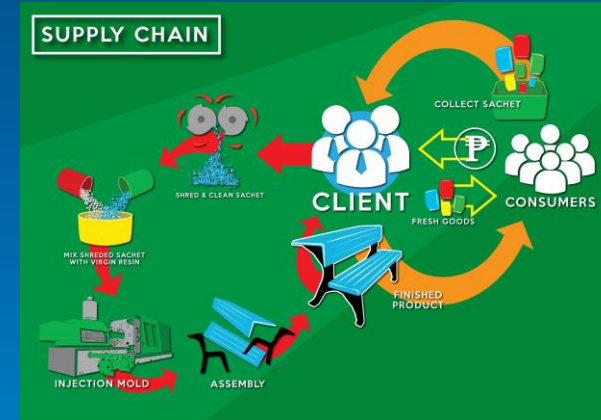
Residuals (Alternative Technologies)



Industry Initiatives: PLASTIC



- Enhancing RECYCLING capabilities
 - Rainwater Harvesting for Recycling operations
 - Laminates and Sachets to Moulded Pallets & School Chairs



Mixed Plastic Waste Recycling

WASTE PLASTIC BAGS TO SCHOOL CHAIRS

MIXED WASTE PLASTIC TO SCHOOL CHAIRS



Enviro⁺tech



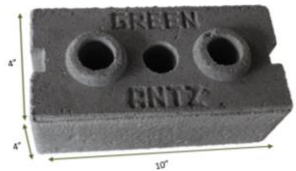
Construction Materials with Mixed Plastic Waste Inputs

GREEN ANTZ Way



From Your Waste We Create . . .

Green Antz Eco Bricks

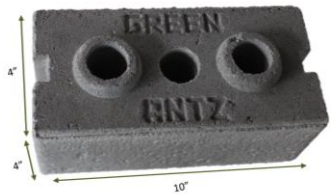


Property	Eco-Brick	Standard Hollow Block
Length (in)	9.39	16
Weight (kg)	4.43	6.7
Compressive Strength (PSI)	550	158

Advantages

- Less labor man-hours
- Less concrete mix, shorter curing time
- No breakage while stored on site
- Less Water
- 30% savings in overall wall construction costs.

Green Antz Eco Bricks



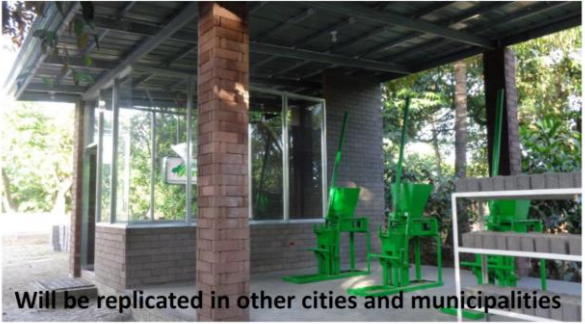
Property	Eco-Brick	Standard Hollow Block
Length (in)	9.39	16
Weight (kg)	4.43	6.7
Compressive Strength (PSI)	550	158

Advantages

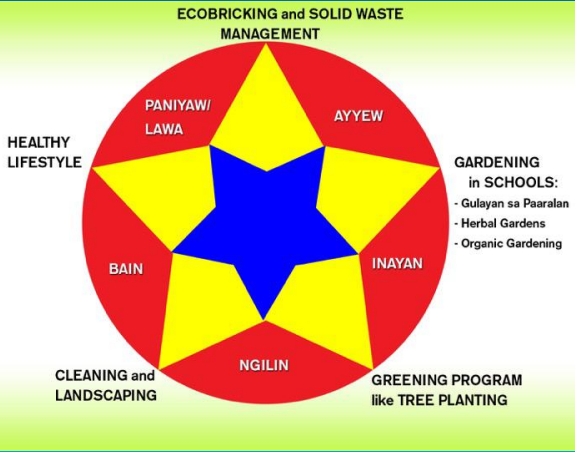
- Less labor man-hours
- Less concrete mix, shorter curing time
- No breakage while stored on site
- Less Water
- 30% savings in overall wall construction costs.

How do We Do This

Typical Eco-brick Hub



Green Antz Plant in Plaridel, Bulacan



Industry Initiatives: PLASTIC

- Arts & Crafts



Residuals (Treatment/Energy Recovery)

SUKI SMALL-SCALE GARBAGE GASIFIER PLANT

Introducing the latest development in the field of garbage gasification by converting garbage into a clean gas to produce heat, mechanical and electrical power.

Suki Trading Corporation now can customize the design of garbage gasifier plant on job-to-order basis, ranging from 10 - 100 kW using surplus spark-ignition or imported gas engine.

The Suki gasifier plant technology is a combination of the CAHET moving-bed downdraft reactor and the improved design of gas conditioning devices. This gasifier plant can provide clean gaseous fuel that is suitable for use in rice milling operation as well as in crop irrigation.



Applications:

- Power supply for irrigation pump, rice mill, and other farmstead activities
- Barangay clinic/center for residential, community hall and street lighting, including micro business enterprises, etc.

Model	400	500	600	700	800
Power Output (kW)	10	20	50	75	100
Rice Husk Consumption (kg/hr)	10	42	73	118	160
Engine / Generator	Surplus spark-ignition engine with AC-synchronous generator or imported gas engine generator set				
Floor Area (m x m x m)	5.0 x 5.0 x 4.0	5.5 x 5.5 x 4.5	6.0 x 6.0 x 5.0	6.5 x 6.5 x 5.5	6.5 x 7.0 x 6.0

For details, please contact: Engr. Vic Ocan, Suki Trading Corporation, Agos, Butuan, Lapu-Lapu City, Philippines.
 Mobile: +639176248119 Email: sukitradingcenter@yahoo.com website: www.sukitradingcorp.com

Other Alternatives

Plastic Waste to Fuel

TECHNOLOGY

The technology is modular in concept and may be deployed in 5, 10 and 20 ton/day capacities. With this design, operation can be carried out in smaller plants and processing may be situated wherever it is deemed necessary.

Assorted plastics are first shredded into evenly sized pieces and are entered into an agglomeration chamber. It then enters a feeding screw where it is melted and the polymers are mixed with a catalyst. The melted plastic goes to a specially designed pyrolysis chamber and depolymerization occurs, where hydrocarbon gases are being produced. It then passes through distillation to separate different hydrocarbon chains, filtration, and centrifuge to remove contaminants and impurities. The light gases produced are then purified, compressed and stored. Provision will be made as to make this light gas into liquefied petroleum gas (LPG).

The process is done entirely inside a vacuum, hence no resultant chemicals are released into the environment. The conversion efficiency rate is 75% to 80% depending on feedstock components.

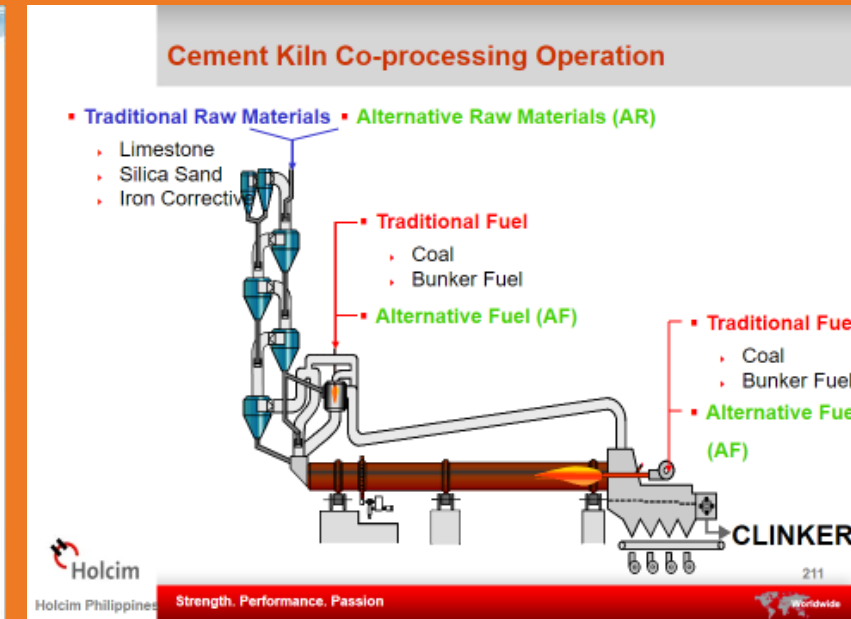
RECON ENERGY



Prototype conversion plant in Bacolod



Diesel & Gasoline end products



UPCOMING PROJECTS:

QC Project Consortium: MPIC – COVANTA – MACQUAIRE JV with QC Gov Php 15B investment,

MBT (Mech. Bio. Treatment) + Stoker

35 yr concession agreement + 15 yrs; 2200 TPD,

MOEJ (Envi. Ministry Japan)

Davao

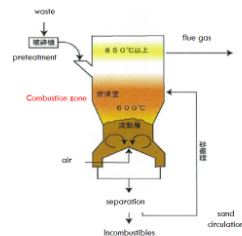
Waste to Worth Project

Pampanga, Laguna & Dagupan Projects coming soon

Residuals (Treatment/Energy Recovery)

Fluidized bed

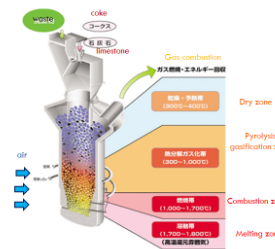
Courtesy of Ryo Hiraga, EX Research Institute Ltd.



- Outline**
- The sand in the furnace is stirred by air provided from the bottom.
 - Waste is floated combustion by the movement as described above.
 - Sand and incombustibles are discharged from the bottom of furnace and separated individually. Sand is returned in the furnace again.
- Characteristic**
- It is possible to retrieve metal in the state of non-oxidation.
 - Pretreatment is required to cut MSW under 10cm.
 - It is difficult to meet fluctuation of waste quality.

Gasification and melting (Direct melting type)

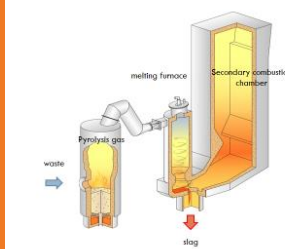
Courtesy of Ryo Hiraga, EX Research Institute Ltd.



- Outline**
- Gasification part and melting of ash part will be an integral structure.
 - Cokes and limestone are provided with waste from the upper part of furnace.
 - Melted matters are discharged from bottom of furnace, after that they will be granular slag and metal by cooling.
- Characteristic**
- It is possible to utilize ash as slag.
 - There is a lot of CO₂ emission due to using coke and limestone.
 - It is difficult to operate due to need blast furnace operation skill.

Gasification and melting (fluidized bed type)

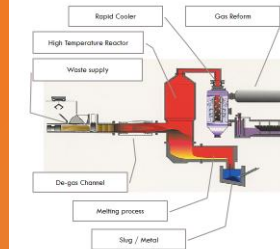
Courtesy of Ryo Hiraga, EX Research Institute Ltd.



- Outline**
- The sand in the furnace is stirred by air provided from the bottom.
 - Waste is gasified by the movement as described above, and it is melted in melting furnace.
- Characteristic**
- It is possible to retrieve metal in the state of non-oxidation.
 - Pretreatment is required to cut MSW under 10cm.
 - It is difficult to meet fluctuation of waste quality.

Gasification and reforming (Pyrolysis)

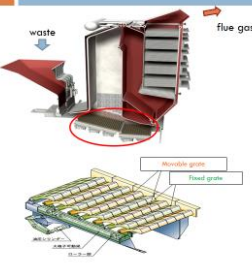
Courtesy of Ryo Hiraga, EX Research Institute Ltd.



- Outline**
- Waste is compacted and supplied.
 - Waste is heated indirectly and dried, thermal decomposed at de-gassing channel.
 - By oxygen, waste is melted to slag and metal.
 - Exhausted gas is cooled and reformed / refined.
- Characteristic**
- Slag / metal can be recycled.
 - Gas is reformed.
 - Lots of oxygen and water are necessary, therefore running cost is expensive.
 - Very few actual construction.

Stoker

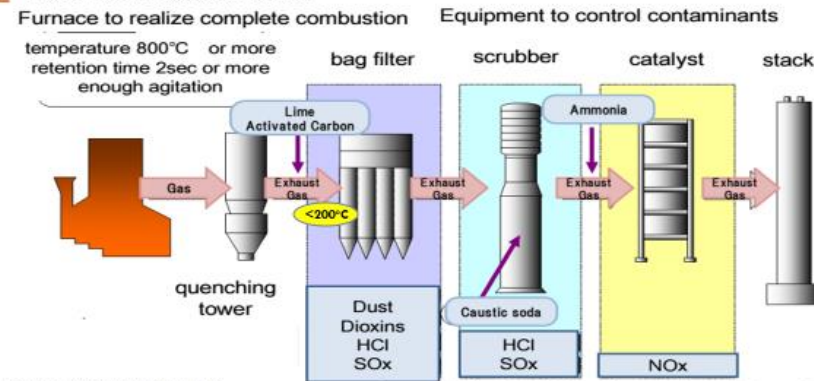
Courtesy of Ryo Hiraga, EX Research Institute Ltd.



- Outline**
- Waste is burned by autogenous combustion while moving on the grate.
 - Air is provided under the grate.
 - Waste is burned slowly on the grate for 1 to 2 hours.
- Characteristic**
- It is possible to treat a large amount of waste in short time.
 - It is easy to meet fluctuation of waste quality flexibly.
 - It is not necessary to pretreat waste.

Air Pollution Control

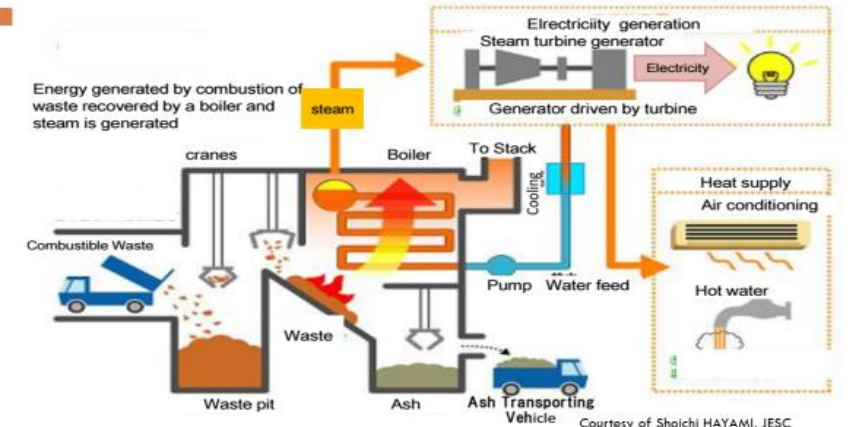
Contaminants contained in exhaust gas from incinerator are controlled enough to be less than emission standard.



Courtesy of Shoichi HAYAMI, JESC

Source: Web site of Clean Association of Tokyo 23

1-4-3 Energy Recovery System



Courtesy of Shoichi HAYAMI, JESC

FOR RESIDUAL WASTE:

- Gasification or Pyrolysis for fuel conversion
- Stoker System for heat and electricity

AIR POLLUTION CONTROL TO MEET



EPR Act and Compliance Options



*Bringing together the business sector, non-profits,
academic institutions, and the government to address
waste management and create systemic solutions towards
Marine Litter Prevention and Circular Economy*

Our journey towards circular economy

COLLABORATION | INNOVATION | AMBITION

the driving force that powers the Zero Waste to Nature 2030 Program

WHO WE ARE

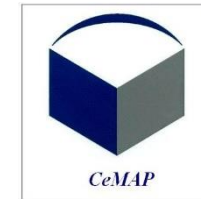
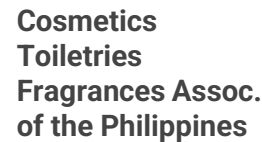
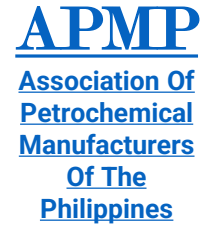


OUR INVESTING PARTNERS WITH A SHARED VISION & MISSION

PARMS shares the responsibility with all stakeholders to protect and progress our natural environment, our citizens and our country.



INDUSTRY GROUP PARTNERS



CORPORATE MEMBER PARTNERS

ACADEME & CSO PARTNERS



JG SUMMIT HOLDINGS, INC.



Zero Waste to Nature Ambisyon 2030



Rigid and Flexible Packaging Applications

Strategy and Roadmap



2021-2030

For Public Release

Philippine Alliance for Recycling and Materials Sustainability
(PARMS)



PARMS ZWTN EPR PROGRAM

Prepared by:

Philippine Alliance for Recycling and
Materials Sustainability

Submitted on February 1, 2023

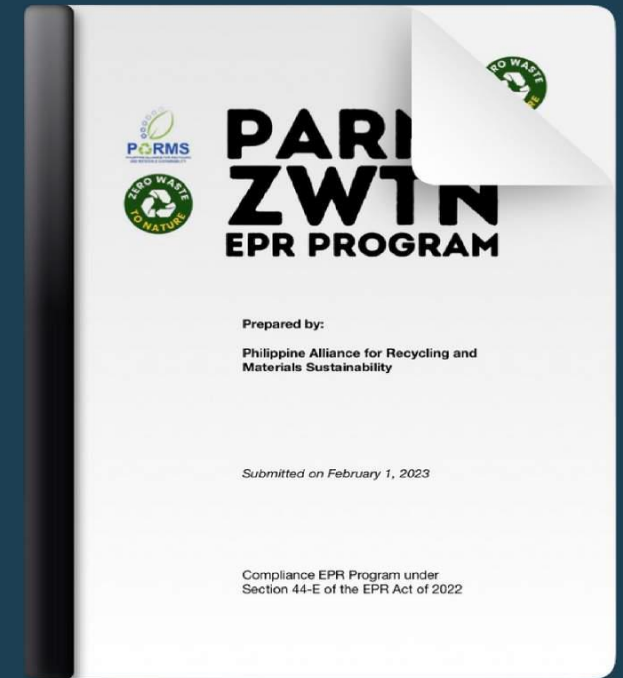
Compliance EPR Program under
Section 44-E of the EPR Act of 2022

PARMS ZWTN EPR PROGRAM



EXECUTIVE SUMMARY

- Under PARMS as a **Producers Responsibility Organization (PRO)** system consistent with Sec. 44H of RA11898
- **Ensures OE member compliance** with the EPR Act of 2022 (RA 11898) and amended provisions of the Ecological Solid Waste Management Act of 2000 (RA 9003).
- PARMS will use the implementable provisions of draft standards developed under the **ZWTN2030 Roadmap** until "Uniform Standards" are developed and adopted by the Department.
- OE companies will individually track their plastic footprint and waste diversion to meet targets set under **Sec 44F of the EPR Act**. OE members may also choose to directly submit their EPR programs and compliance to NEC.
- Aims to bring about **systemic change across the supply and waste value chain**
- Aims to promote a **circular economy** in the Philippines and support sustainable consumption and production through recyclable packaging, funding waste recovery and diversion, and investing in recycling and waste processing infrastructure.



WHO? Sec 6 Extended Producers Responsibility (EPR)

Sec. 44-B Obligated Enterprises of RA9003 Addendum

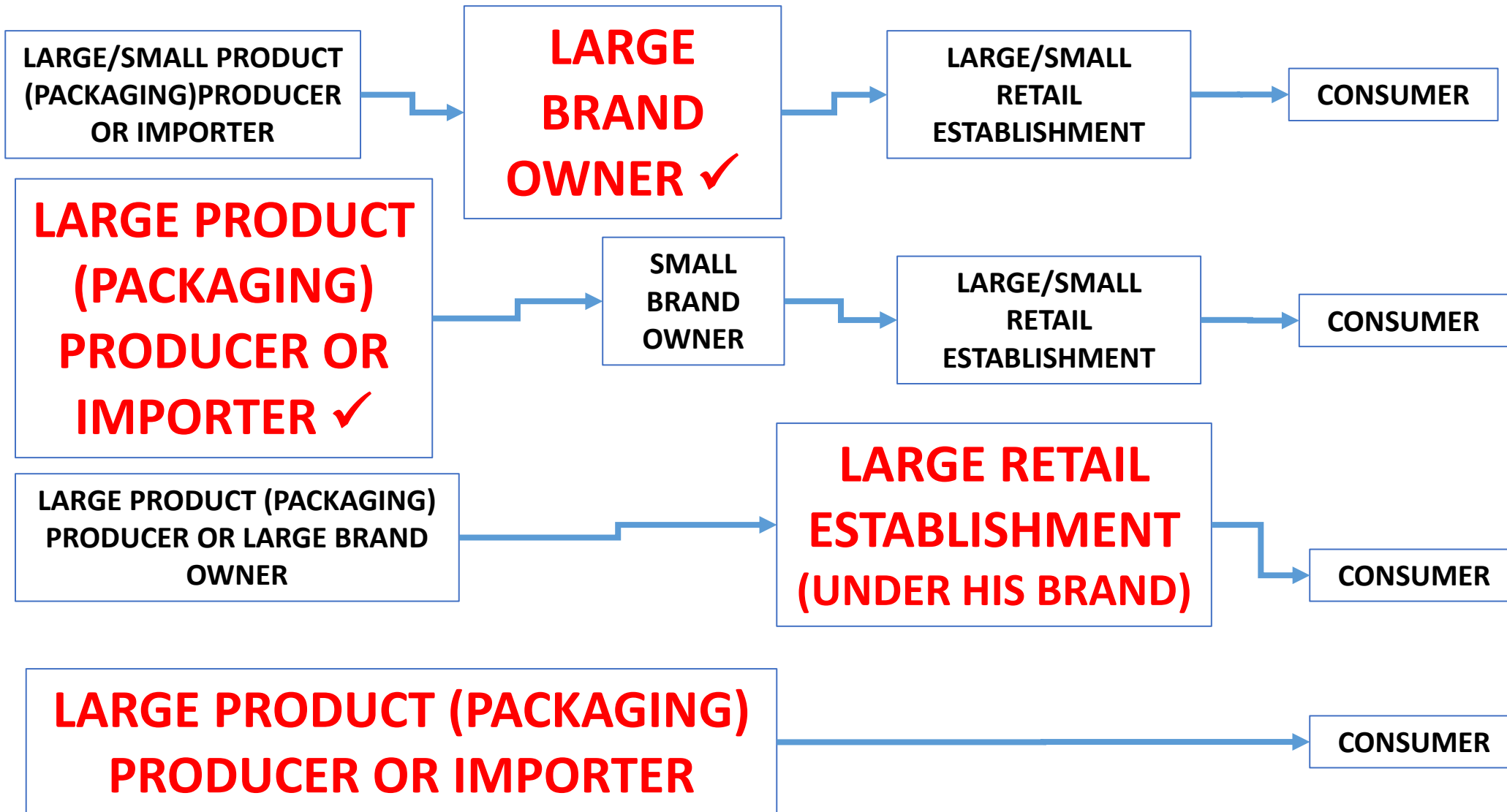
Obligated Enterprises: Product Producers shall refer to **LARGE ENTERPRISES** that generate **plastic packaging waste**
(PhP100million Assests except land)

... micro, small, and medium enterprises (under R.A. No. 9501) are encouraged to practice EPR voluntarily, or be a part of the network of obligated enterprises or producer responsibility organizations practicing EPR

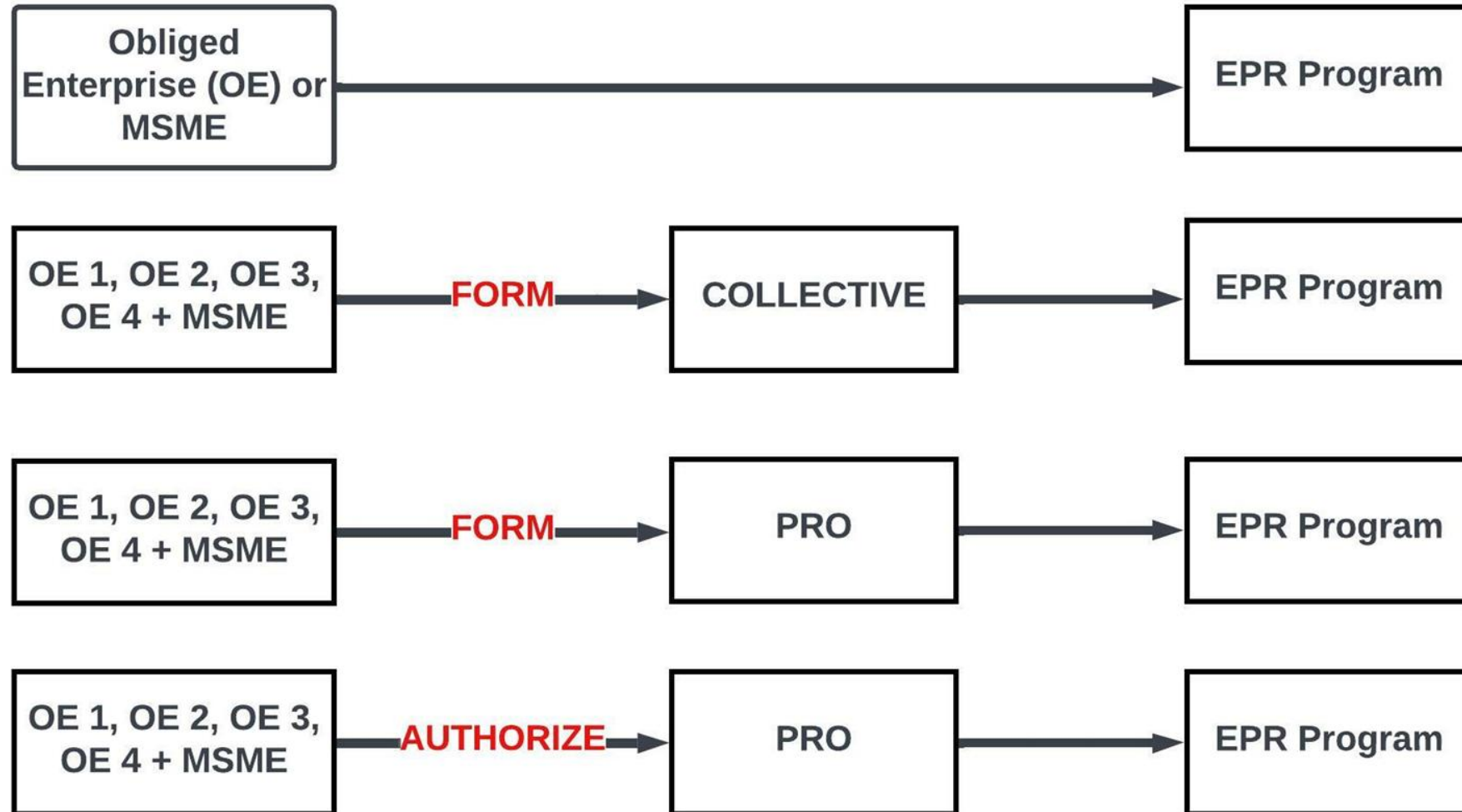
(a) BRAND OWNER

**(b) PRODUCT MANUFACTURER OR
IMPORTER**

THE OBLIGED ENTERPRISE ✓ (Illustrations)



Modes of Compliance with the EPR Law



HOW TO COMPLY WITH REDUCTION TARGETS



- Shift packaging to **Reusable and Recyclable** options - Document and Audit the volumes (in KGS).
- Incorporate **Post-Consumer Recycled (PCR) Content** (when feasible) in packaging - Document and Audit the volumes (in KGS)
- Adopt **refill** programs - Document and Audit the reduction volumes (in KGS).
- Support **IEC** (Information, Education, and Communication) programs and **R&D** (Research and Development) for sustainable packaging alternatives.
- Adopt applicable Philippine National Standards for labeling or apply for a Green Choice seal.

HOW TO COMPLY WITH REDUCTION TARGETS



Our Reduction Programs pursuant to Sec. 44-A

1. Adoption of reusable packaging products, or packaging design to improve their reusability, recyclability or retrievability pursuant to 12.1.1 of the EPR IRR

- Eliminate Colorants, Fillers and Additives from Rigid Packaging and Products
- Shift to High Diversion Value Flexible Packaging
- Substitute Flexible packaging applications to Rigid alternatives for food take out delivery systems
- Biodegradable alternatives
- Instruments to drive market uptake of products from waste.

Our Reduction Programs pursuant to Sec. 44-A

2. Inclusion of recycled content or recycled materials in packaging materials under 12.1.2 of the EPR IRR

(a) For packaging applications with recycled content

- rPET (recycled Polyester Terephthalate) CLEAR Bottles and Sheets
- rPE, rPP, rPS (recycled recycled Polyethylene, Polypropylene, Polystyrene)

(b) For packaging and products with recycled content.

- rPET Others (e.g. straps, clothing, etc)
- rPE, rPP, rPS (e.g. pallets, crates, plastic lumber, construction boards and materials, etc.)

HOW TO COMPLY WITH REDUCTION TARGETS

Our Reduction Programs pursuant to Sec. 44-A

3. Adoption of appropriate product refilling systems for retailers under 12.1.3 of the EPR IRR

We propose that DENR as the EPR implementing agency, in collaboration with the National Solid Waste Management Commission (NSWMC) where the Department of Health (DOH) and Department of Interior and Local Government (DILG) are members, create a technical working group with stakeholders to address the policy gap to ascertain as to whether the jurisdiction of refilling systems falls under FDA or the Local Government Unit (LGU) similar to what is in place for water refilling stations.

HOW TO COMPLY WITH REDUCTION TARGETS



Our Reduction Programs pursuant to Sec. 44-A

4. Viable reduction rates plan under 12.1.4 of the EPR IRR

- The shift to alternative materials that are not disposable options of higher weight and with end-of-life management in place
- Light-weighting, applicable mostly to rigid packaging applications without impeding recovery for recycling
- Improved packaging weight to content ratio
- Improved packaging to reduce product waste
- Removal or reduction of unnecessary packaging applicable mostly to secondary packaging such as bundling

Our Reduction Programs pursuant to Sec. 44-A

5. Information and education campaign (IEC) schemes under 12.1.5 of the EPR IRR

PARMS and/or its OE members under this EPR program shall develop and implement an IEC campaign that will promote the waste hierarchy of Avoidance, Reduce, Reuse, Recycle. Treatment and Final Disposal in Sanitary landfills together with RA9003's mandate on Segregation at Source, Segregated Collection consistent with NSWMC and DENR programs

Our Reduction Programs pursuant to Sec. 44-A

6. Appropriate labelling of products and packaging materials to include information thereon to facilitate recovery, reuse, recycling, and proper disposal of waste product and packaging under 12.1.6 of the EPR IRR

Eco-labelling for the purposes of this program would refer to the markings or labels placed on products and packaging to identify the same to facilitate reuse and final end-of-life recycling and treatment.

Philippine National Standards are in place and being developed
The National Eco-Labeling Program can also be applied

HOW TO COMPLY WITH RECOVERY TARGETS

- DIY - Do it yourself as an **OE**, form a **Collective** or engage/join a **PRO** (Producer Responsibility Organization) to do it for you.
- **Buy Audited Waste Credits** from recognized and established **Waste Diverters**.
- Buy products/packaging with **Post-Consumer Recycled Content** (with Audited Waste Credits).
- Adopt a **MRF** (Material Recovery Facility) or Establish/Set Up **R&R** Recovery for Recycling/Reclamation depots or centers.
- Invest in/Establish long-term procurement contracts with **Recycling or Treatment Facilities**.



Together we will make a difference



The significant problems we have cannot be solved at the same level of thinking with which we created them.

Albert Einstein



Crispian Lao

NSWMC Vice Chair/Commissioner
(Recycling Industry Sector)
recycling.nswmc@gmail.com

PARMS Founding President
crispian@parms.com.ph