

East Asia and Pacific Region: **MARINE PLASTICS SERIES**

# Market Study for the Philippines:

## PLASTICS CIRCULARITY OPPORTUNITIES AND BARRIERS



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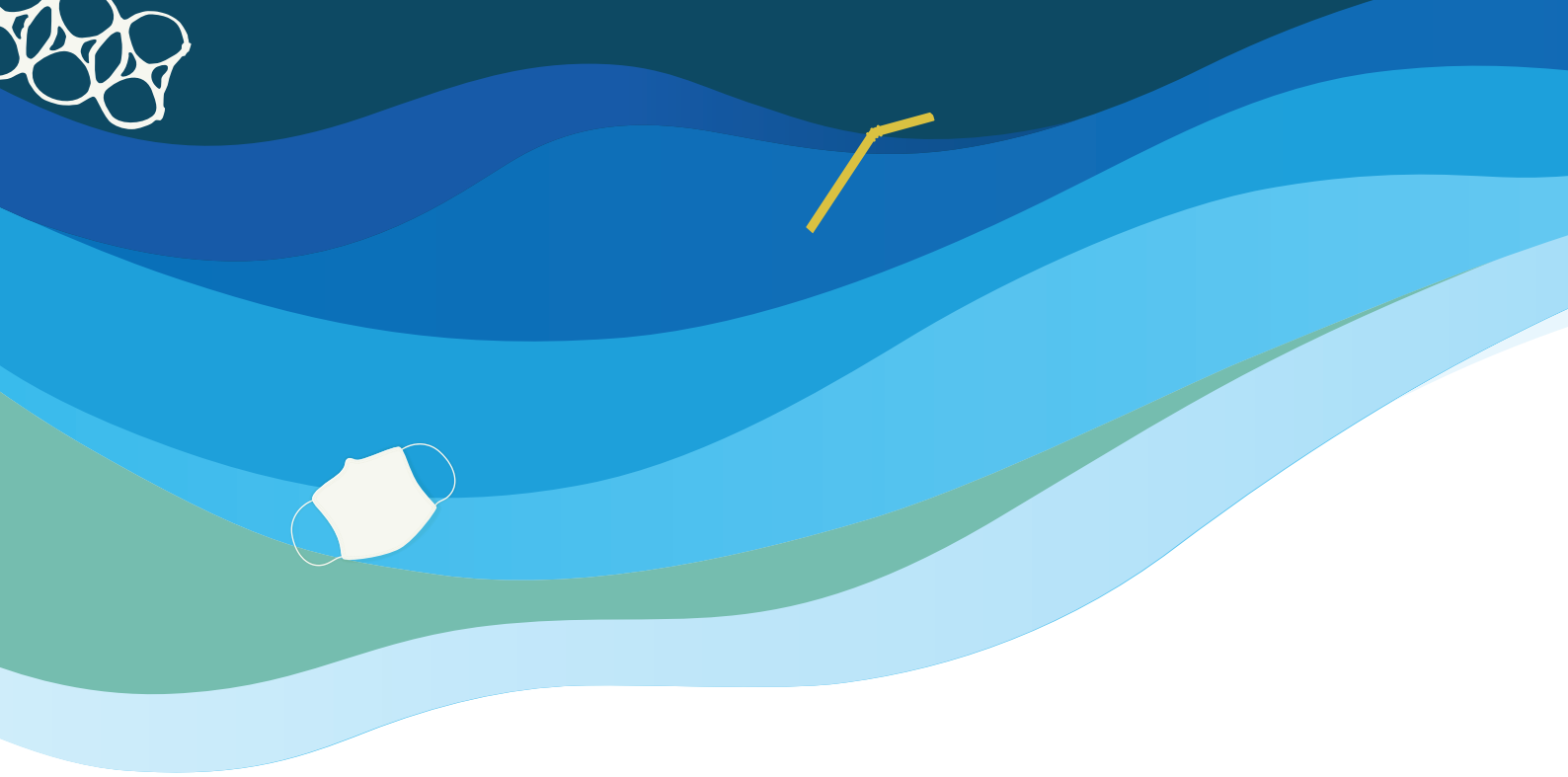
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*Market Study for the Philippines: Plastics Circularity Opportunities and Barriers* is a private sector focused market assessment of plastics value chains and the recycling market in Philippines with the overall goal of identifying the opportunities and barriers for plastics circularity in the country.

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- AUDEO Manufacturing
- Business for Sustainable Development
- Coca-Cola Philippines
- Cofta Mouldings Corporation
- Cygnus Industries, Inc.
- Envirotech Waste Recycling Inc.
- Filpet, Inc.
- Geocycle Philippines
- Geoplast Corporation
- Green Antz Builders, Inc.
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- IPM Waste Management Pasig
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- JG Summit Petrochemical Corporation
- Manly Plastics Inc.
- Linis Ganda
- Nestlé Philippines
- New Foundland Plastic Manufacturing Corporation
- Packaging Institute of the Philippines (PIP)
- PepsiCo Philippines
- Philippine Alliance for Recycling and Materials Sustainability (PARMS)
- Philippine Plastics Industry Associations, Inc. (PIIA)
- Philippine Spring Water Resources, Inc.
- Plastic Bank
- Plastic Credit Exchange (PCEX)
- Reinheart Marketing
- Republic Cement
- Sentinel Plastic Manufacturing Corporation
- The Plastic Flamingo
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- Unilever Philippines
- W2Worth Innovations
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## Government Departments & Other Stakeholders (in alphabetical order)

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- Department of Science and Technology (DOST)
- National Economic and Development Authority (NEDA)
- National Solid Waste Management Commission (NSWMC)
- Philippine Statistics Authority (NEDA – PSA)
- Quezon City Local Government
- UN-Habitat, Healthy Oceans and Clean Cities Initiative – Philippines
- University of the Philippines
- USAID – Clean Cities, Blue Ocean
- WWF Philippines

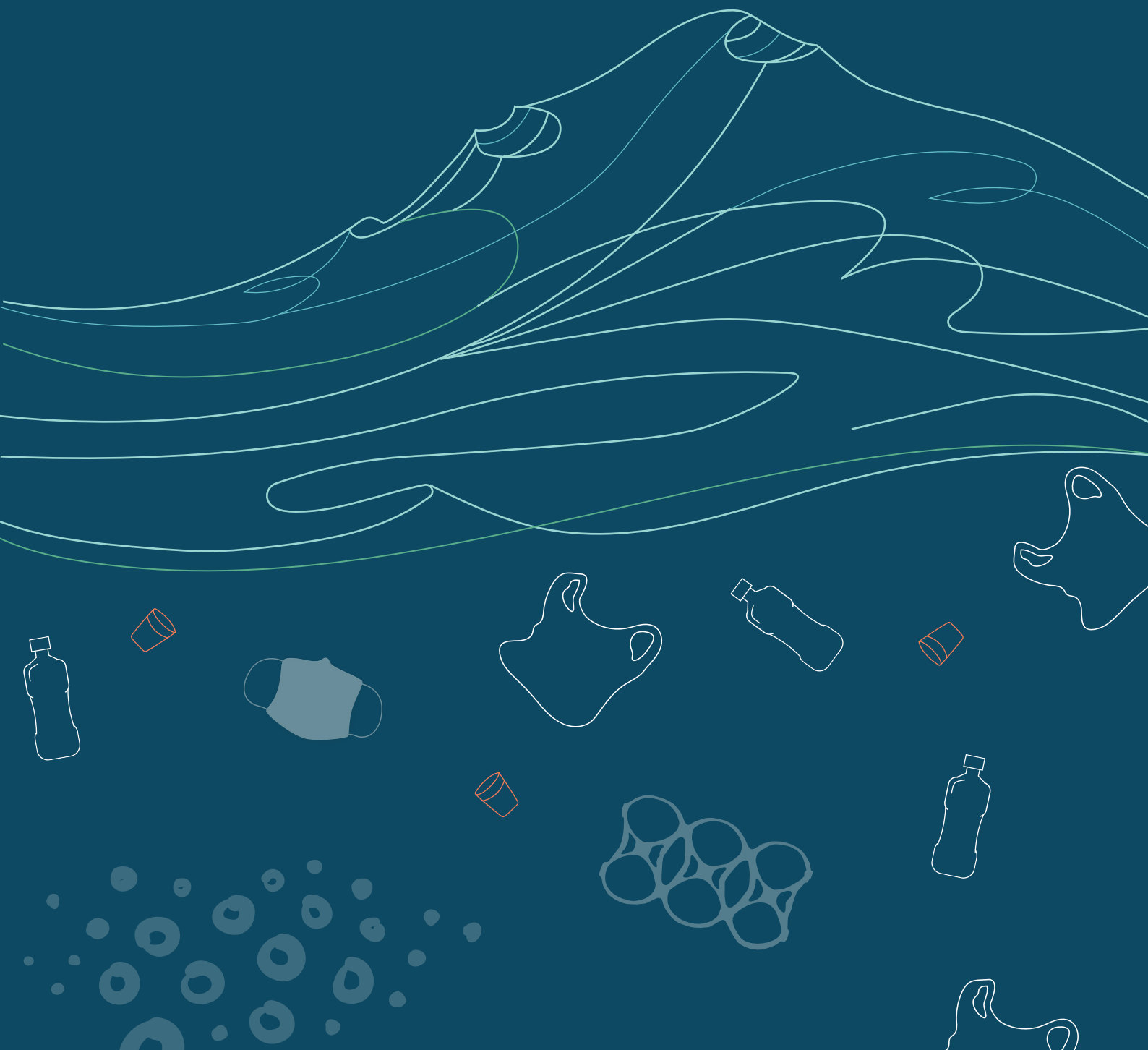
## ABBREVIATIONS AND ACRONYMS

<b>APMP</b>	Association of Petrochemical Manufacturers of the Philippines
<b>BOI</b>	Board of Investments Philippines
<b>BPS</b>	Bureau of Philippines Standards
<b>CAPEX</b>	Capital Expenditure
<b>CFR</b>	Collected For Recycling
<b>DENR</b>	Department of Environment and Natural Resources
<b>DTI</b>	Department of Trade and Industry
<b>EHS</b>	Environmental, Health and Safety
<b>EMB</b>	Environmental Management Bureau (under DENR)
<b>EPR</b>	Extended Producer Responsibility
<b>FDA</b>	Food and Drug Administration
<b>Four key resins</b>	Refers to the four plastic resins PET, HDPE, LDPE/LLDPE and PP that are the main focus of this study.
<b>FMCG</b>	Fast Moving Consumer Good
<b>GPP</b>	Green Public Procurement
<b>HDPE; rHDPE</b>	High Density Polyethylene; Recycled High Density Polyethylene
<b>Informal Recycling Industry</b>	Refers to Pre-Processor and Recycler Stakeholders that are not part of the formal economy.
<b>Informal sector</b>	Typically refers to stakeholders in the informal collection value chain such as street material pickers, recyclables collectors and informal junk shops.
<b>IPP</b>	Investment Priority Plan
<b>ISWM</b>	Integrated Solid Waste Management
<b>LLDPE; rLLDPE</b>	Linear Low Density Polyethylene; Recycled Linear Low Density Polyethylene
<b>LDPE; rLDPE</b>	Low Density Polyethylene; Recycled Low Density Polyethylene
<b>LGU</b>	Local Government Unit
<b>Local</b>	Unless specifically mentioned in the context of a local government unit, the term “local” refers to national-level as per industry usage of the term



<b>MFA</b>	Material Flow Analysis
<b>NEDA</b>	National Economic and Development Authority
<b>NPOA-ML</b>	National Plan of Action Marine Litter
<b>NSWMC</b>	National Solid Waste Management Commission (under DENR)
<b>MRF</b>	Material Recovery Facility
<b>MSW</b>	Municipal Solid Waste
<b>MVRP</b>	Most Valuable Recycled Product
<b>OPEX</b>	Operational Expenditure
<b>PARMS</b>	Philippine Alliance for Recycling and Materials Sustainability
<b>PAP4SCP</b>	Philippines Action Plan for Sustainable Consumption and Production
<b>PDP</b>	Philippine Development Plan 2017-2022
<b>PET; rPET</b>	Polyethylene Terephthalate; Recycled Polyethylene Terephthalate
<b>POY; rPOY</b>	Partially Oriented Yarn; Recycled Partially Oriented Yarn
<b>PP; rPP</b>	Polypropylene; Recycled Polypropylene
<b>PPIA</b>	Philippine Plastics Industry Association
<b>PRO</b>	Producer Responsibility Organization
<b>PS</b>	Polystyrene
<b>PSA</b>	Philippine Statistics Authority
<b>PSF; rPSF</b>	Polyester Staple Fiber; Recycled Polyester Staple Fiber
<b>PVC</b>	Polyvinyl Chloride
<b>RDF</b>	Refuse Derived Fuel
<b>SWM</b>	Solid Waste Management
<b>TPD</b>	Tonnes Per Day
<b>TPM</b>	Tonnes Per Month
<b>TPY</b>	Tonnes Per Year

# EXECUTIVE SUMMARY



# EXECUTIVE SUMMARY

**M**ismanaged plastic waste has growing economic and environmental consequences. USD 80-120 billion worth of plastic packaging is lost from the global economy each year due to lack of recycling and suboptimal value creation where recycling exists.<sup>1</sup> Globally, 4.8 to 12.7 million tonnes of plastic leak into our oceans each year with Asia contributing to over 80% of this marine leakage. The Philippines is the third largest contributor with an estimated 0.75 million metric tonnes of mismanaged plastic entering the ocean every year.<sup>2</sup> This has led to an increased awareness towards plastic waste management, bringing the topic of plastic pollution to the forefront of consumer consciousness in the Philippines.

## **The Philippines is setting ambitious national goals.**

To address the challenge of plastic waste management, the Philippines is currently developing new strategies. The National Plan of Action on Marine Litter, under development by the Department of Environment and Natural Resources (DENR) with support of UNDP Philippines, is currently being finalized. The plan recognizes the need for more concerted and unified efforts from various stakeholders to tackle the problem of marine litter. The National Economic and Development Authority (NEDA) published The Philippine Development Plan (PDP) 2017-2022 targeting a national waste diversion rate of 80% by 2022.<sup>3</sup> This will be primarily achieved through the enforcement of the Ecological Solid Waste Management Act RA9003—an integrated solid waste management plan based on the 3Rs (reduce, reuse and recycle). Furthermore, in 2019, NEDA published the Philippine Action Plan for Sustainable Consumption and Production (PAP4SCP) to improve waste management and plastic circularity.

**This study addresses the critical need for a private sector focused market assessment of plastics recycling in the Philippines. Reuse, refill and new delivery model aspects of a circular economy for plastics are evaluated, but the primary focus of the study is plastic recycling, where scalable private sector investment solutions are greatest.**

To successfully implement its ambitious sustainable plastic waste management goals, the government of the Philippines is targeting private sector participation and support in its efforts. This study defines the current state-of-play for the local waste plastics recycling industry, including demand and supply volumes, market opportunity, and growth drivers and constraints. It also identifies the major private sector players in the Philippine plastics value chain and outlines the market drivers and challenges in scaling up recycling. The study recommends priority actions for the government and private sector stakeholders to increase plastics recycling and mitigate the growing environmental challenges of mismanaged plastic waste, unlocking new economic growth opportunities for the Philippines. A detailed mapping of plastic value chains for four key plastics resins in the Philippines—

- 
- 1 Ellen MacArthur Foundation - [New Plastics Economy: Rethinking the Future of Plastics \(2016\)](#)
  - 2 Science Magazine - [Plastic waste inputs from land into the ocean \(2015\)](#)
  - 3 NEDA - [The Philippine Development Plan 2017-2022 \(2017\)](#)



## KEY FINDINGS



The Philippines recycled about **28% of the key plastic resins** in 2019.



**78% of the material value of plastics** is lost to the Philippines economy each year.



Several structural challenges cause a market failure for plastics recycling leading to a plastic material value loss of **USD 790-890 million per year**.

Polyethylene Terephthalate (PET), High-Density Polyethylene (HDPE), Low-Density Polyethylene/Linear Low-Density Polyethylene (LDPE/LLDPE) and Polypropylene (PP), including resin production, imports/exports, usage, collection, recovery and recycling—revealed substantial gaps in recycling capacity.

Major global brand owners, especially from the packaging and fast-moving consumer goods (FMCG) industry, have voluntarily committed to incorporate recycled content into their products. While this contributes to the increased demand for recycled plastics, most suppliers of recycled resins in the Philippines are small-to-medium enterprises challenged by lack of scale, management systems, process technologies and informal and fragmented waste supply networks that work on cash terms. Additionally, competition from the low cost of virgin plastics due to low oil prices, unclear government policies regarding the usage of recycled resins in food-contact applications, low availability of feedstock due to poor collected-for-recycling (CFR) rates, contaminated feedstock caused by low level of source segregation practice and lack of design for recycling standards prevent recyclers from capitalizing on local, regional and global market demand for recycled content from the packaging industry.

Regulatory actions are necessary to create an enabling environment for plastics circularity. While voluntary commitments by the industry are a step in the right direction, they are not enough to divert plastic waste away from landfills and the open environment or tackle the marine plastics issue. Mandatory standards for

recyclability and minimum recycled content are also needed—especially for industries with wide-ranging plastic usage such as packaging—to sustain local demand for recycled resins and encourage investments in recycling. Without these key regulatory actions, stakeholders interviewed for this study doubt significant new investments can be made in the Philippines recycling industry.

Detailed baseline data collection, analytical work and engagement with private sector stakeholders across the plastics value chain, government stakeholders and other experts in the Philippines revealed **three key findings**, and **six recommended interventions** along with **30 actions** to accelerate plastics circularity in the Philippines.

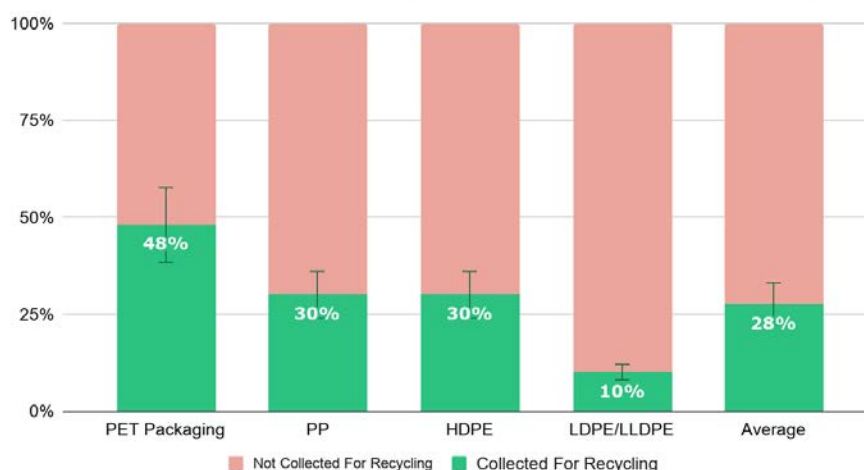
### Three Key Findings on CFR Rates and Material Value Loss:

#### 1 | The Philippines recycled about 28% of the key plastic resins in 2019.

1.1 million tonnes per year (TPY) of the key resins assessed in this study—PET<sup>4</sup>, PP, HDPE and LLDPE/LDPE—were consumed in the Philippines. Of this, only 292,000 TPY (28%) are recycled. PET (excluding polyester applications) has the highest CFR rates of all four resins, as shown in Figure 1. It is widely used in packaging

<sup>4</sup> PET polyester has not been considered in this study. More than 90% of PET polyester is imported in the form of semi-finished products and it is estimated that less than 1% currently gets collected-for-recycling due to the non-existence of a dedicated recycling sector for PET polyester products.

Figure 1.  
ESTIMATED CFR RATES FOR EACH RESIN AS OF 2019



and its applications in other industries are limited, simplifying the collection process. Post-consumer PET bottles also have a relatively high demand from recyclers in the market enabling more PET packaging to be collected. The other polyolefin resins (PE and PP) are used in a range of applications such as electronics, automotives and construction, as rigids (including composites) and films and have longer usage cycles compared to PET. These functional properties as well as structural challenges in the Philippines (see finding 3) severely complicate the collection process for polyolefins. However, it must be noted that recycling rates for individual resins/package formats are highly variable depending on the price of virgin plastic, the end use for recycled resin and other market factors.

## 2 | 78% of the material value of plastics, equivalent to USD 790-890 million/year, is lost to the Philippines economy.

The total material value that could be unlocked from plastic recycling in the Philippines is USD 1.1 billion/year, assuming all four resins had 100% CFR rates and obtained the maximum value in the market.<sup>5</sup> However, Figure 2 shows that only 22% of the total material value of plastics (USD 246 million/year) is currently unlocked. This results in USD 790-890 million/year of potential material value that is lost to the Philippine economy. Fully addressing this market opportunity will require public and private sector investments to improve waste collection/sorting, an enabling

environment to improve recycling economics, and other systemic interventions.

## 3 | Several structural challenges cause a market failure for plastics recycling.

The material value loss of USD 790-890 million/year is the result of various structural challenges that impact the CFR rates and value yields for all four key resins. The Philippine plastic recycling industry faces similar challenges as other Southeast Asian countries, but it also experiences unique obstacles to its profitability and growth. These challenges explain the comparatively large recycling capacity gap in the Philippines (85% in 2019) across all four resins combined in this study<sup>6</sup> and why the Philippines is a net exporter of plastic scrap. Some specific challenges include:

1. Logistic costs are high by Southeast Asian standards.<sup>7</sup> This limits the recyclers' ability to source feedstock across the Philippines archipelago, creating a negative impact on the CFR rate by putting a disproportionate financial burden on transporting low value goods such as post-consumer plastic feedstock.
2. Electricity costs are high by global developing country standards<sup>8</sup>, and are between 38-67% higher than regional counterparts such as Thailand,

5 100% CFR rate and value yield has been used in material value analysis across this study for illustrative purposes only as targets are typically set based on 100% of market inputs/material.

6 GA Circular data and analysis for this study

7 [Philippine Institute for Development Studies: Regulatory challenges in the Philippine logistic industry](#)

8 Asian Power - [Renewables may cut Philippines' electricity rates by 30% \(2019\)](#)

Figure 2.

# MATERIAL VALUE LOSS ANALYSIS FOR ALL KEY RESINS (DATA BASED ON 2019 VOLUMES)



Malaysia and Vietnam.<sup>9</sup> As many recyclers operate with low-efficiency equipment, this cost is especially challenging to their profitability.

3. Heavy, low-value and hard-to-recycle flexible packaging represents 61% of the plastic packaging units entering the Philippine market. This is considerably higher than 37% in Thailand. In the Philippines, this packaging mix causes a downward pressure on CFR rates by locking the plastic resins away in hard-to-recycle and uncollected materials.
4. Intense competition from the informal recycling industry<sup>10</sup> distorts the market for formal recyclers who bear the costs of taxation and compliance with environmental, health and safety regulations, which the informal recyclers do not. By avoiding the burden of cost of operating as a formal business, the informal recyclers are able to pay more for feedstock, driving up the cost and reducing profitability for formal recyclers.
5. Tipping fees are among the lowest in Asia,<sup>11</sup> disincentivizing local governments from investing

in and supporting solutions higher up the waste management hierarchy (such as energy recovery, plastic waste to fuel and mechanical recycling).

6. The recycling industry across all resins is dominated by small and medium enterprises (SMEs),<sup>12</sup> which are largely unable to meet multinational buyers' requirements on scale, quality, management systems and process demands. Therefore, the sector is unable to capitalize on the growing demand for recycled resins.

Additional challenges to plastic recycling faced by the Philippines and other countries in the region are:

- Fluctuations in virgin resin and oil prices impact the use of recycled resins
- Lack of local recycled content requirements for plastics across all key resins
- Challenging short- and long-term collection economics for the informal sector
- Recyclables are of low quality due to lack of "design for recycling" standards
- Fragmented implementation of waste management and challenges in efficiency
- Lack of organic waste treatment facilities to incentivize source separation and diversion

9 International Energy Consultants - [Global Retail Electricity Tariff Survey \(2018\)](#)

10 The "informal recycling industry" here refers to pre-processors and recyclers that are not part of the formal economy. The "informal recycling industry" should not be confused with the "informal sector" which typically refers to stakeholders in the collection value chain such as street material pickers, recyclables collectors and informal junk shops.

11 ADB - [Quezon City Waste-to-Energy Prefeasibility Study \(2016\)](#)

12 DTI, PPIA and BOI - [The Philippine Plastic Industry Roadmap \(2014\)](#)

## Six Recommended Interventions and Twelve Priority Actions:

This study identifies six recommended interventions, with 12 priority actions (from among 30 total actions) to enable the Philippines to increase recycling rates from the current 28%. These interventions could also enable the country to increase the value yield of plastics recycling from 82% to 95% and unlock significant additional material value from recycling plastics. The recommended interventions for the government and the private sector each have the potential to unlock material value of USD 180-640 million/year (the impact of each of the interventions are interconnected and the potential for material value unlocked varies widely and often overlaps). These interventions could lay the foundation for plastics circularity, further strengthen demand for recycled plastics and build a resilient recycling industry in the Philippines. However, some systemic issues, such as the comparatively high costs of operating recycling businesses in the Philippines, are not addressed by these interventions.

### These six recommended interventions are:

#### 1 | Increase waste collection and sorting efficiency of post-consumer plastics.

Recyclers in the Philippines consistently report challenges sourcing high quality plastics due to high contamination rates. At a bare minimum, segregating municipal solid waste (MSW) between wet (organic) and dry (inorganic) waste will significantly reduce contamination; organic waste is the main contaminant of recyclables recovered from the MSW system.

#### 2 | Set recycled content targets across all major end-use applications.

With only 292,000 TPY collected-for-recycling—out of 1.06 million TPY of plastics resins consumed—the Philippines lacks a strong secondary market for recycled plastics. Additionally, the Philippines' reliance on export markets has exposed the recycling industry to the full brunt of the global price volatility inherent in the recycling industry. Setting recycled content targets will enable the growth of a strong domestic market for recycled products through increasing the demand for post-consumer resin.

#### 3 | Mandate national “design for recycling” standards for all major plastics products, especially packaging.

Packaging constitutes 53% of all plastics consumed in the Philippines. Without fundamental redesign and innovation, about 30% of plastic packaging will never be reused or recycled. This amounts to at least 320,000 TPY of plastic packaging in the Philippines locked away from any possible reuse or recycling. Another 50% of plastic packaging faces challenging recycling economics due to poor design.

#### 4 | Encourage increase in recycling capacities (mechanical and chemical).

Increasing the CFR rate in the Philippines is impossible without increasing the formal mechanical and chemical recycling capacity. This requires a number of interlinked actions, such as the reduction of unfair competition from the informal recyclers, provision of incentives for investments in new recycling technologies and capacity, and accessibility of market prices and volume data.

#### 5 | Create industry-specific requirements to increase plastic waste collection and recycling rates.

A lack of industry-specific collection/take-back requirements for the major end-use industries in the Philippines mean the CFR rate is vulnerable to market forces. When prices for recycled products are under constant cost pressure from virgin plastics, there is little incentive to increase the CFR rates. Thus, the CFR rate needs to be decoupled from this cost pressure on recycled plastics.

#### 6 | Restrict disposal of waste plastics and incentivize phase-out of plastics (where relevant).

A majority of the non-recycled plastics in the Philippines are disposed of in sanitary landfills, dump sites or worse, leaking into the environment across the country. One of the first steps towards becoming a resource-efficient society should be to eradicate the landfilling of any waste that can be used as a resource.



Based on analysis by the study team and stakeholder feedback on practicality of implementation in the next 1-5 years, potential to comprehensively support

growth of plastics recycling and unlock material value, 12 priority actions (from among the 30 actions) are identified in Table 1.

Table 1.

**SUMMARY OF RECOMMENDED INTERVENTIONS AND PRIORITY ACTIONS**

Clusters	Lay Foundation: Actions that create the necessary foundation for plastics circularity 1-2 years			Strengthen Demand: High-impact actions to strengthen CFR Rate & Value Yield 3-5 years			Maximise Value: Actions to unlock maximum possible value >5 years
Interventions							
<b>(A)</b> Increase waste collection and sorting efficiency of post-consumer plastics	<b>1</b> Enforce source segregation & separate collection standards & targets	<b>2</b> Enforce the role of MRFs as part of the waste collection system		<b>3</b> Develop awareness & behavior change campaigns	<b>4</b> Provide opportunities for informal sector inclusion		<b>5</b> Digitalise recyclables collection
<b>(B)</b> Set recycled content targets across all major end-use applications	<b>6</b> Accelerate policies & standards that allow recycled plastics in food-contact applications	<b>7</b> Set recycled content targets & standards for major plastic use industries		<b>8</b> Develop & launch incentives for using recycled content	<b>9</b> Define GPP targets for recycled content specific to plastic products		<b>10</b> Higher fee for plastic applications without minimum recycled content
<b>(C)</b> Mandate "design for recycling" standards for plastics	<b>11</b> Align industries on "design for recycling" standards	<b>12</b> Voluntarily adopt "design for recycling" standards for all plastic products		<b>13</b> Mandate national "design for recycling" standards for plastic applications			
<b>(D)</b> Encourage increase in recycling capacities (mechanical & chemical)	<b>14</b> Incentivise increase in recycling capacity for all resins (PP, PE, PET)	<b>15</b> Formalise informal recyclers and reduce unfair competition from illegal recyclers		<b>16</b> Provide incentives for investments in new recycling technologies	<b>17</b> Invest in chemical recycling capacity for low value plastics	<b>18</b> Provide market pricing & volume data for virgin & recycled plastics	<b>19</b> Streamline/remove red tape on permits and reporting
<b>(E)</b> Create industry-specific requirements to increase plastic waste collection and recycling rates	<b>20</b> Set up voluntary producer responsibility system	<b>21</b> Mandate reporting framework for plastic products	<b>22</b> Plastic value chain to incentivise co-processing	<b>23</b> Mandate collection targets for packaging & other key plastic use industries	<b>24</b> Mandate a compliance scheme to meet obligations	<b>25</b> Use "soft" approaches such as recognising best practices	
<b>(F)</b> Restrict disposal of plastics into landfills and dumpsites	<b>26</b> Improve HS code reporting and tracking	<b>27</b> Incentivise reduction of plastics and reuse systems		<b>28</b> Invest in treatment of organic waste			<b>29</b> Increase landfill tipping fees
							<b>30</b> Mandate targets to reduce sanitary landfill disposal rates for MSW
<b>Legend:</b> <span style="color: blue;">■</span> Government <span style="color: green;">■</span> Private Sector <span style="border: 1px dashed black; display: inline-block; width: 10px; height: 10px;"></span> Highest Impact (based on stakeholder feedback & analysis by study team)							

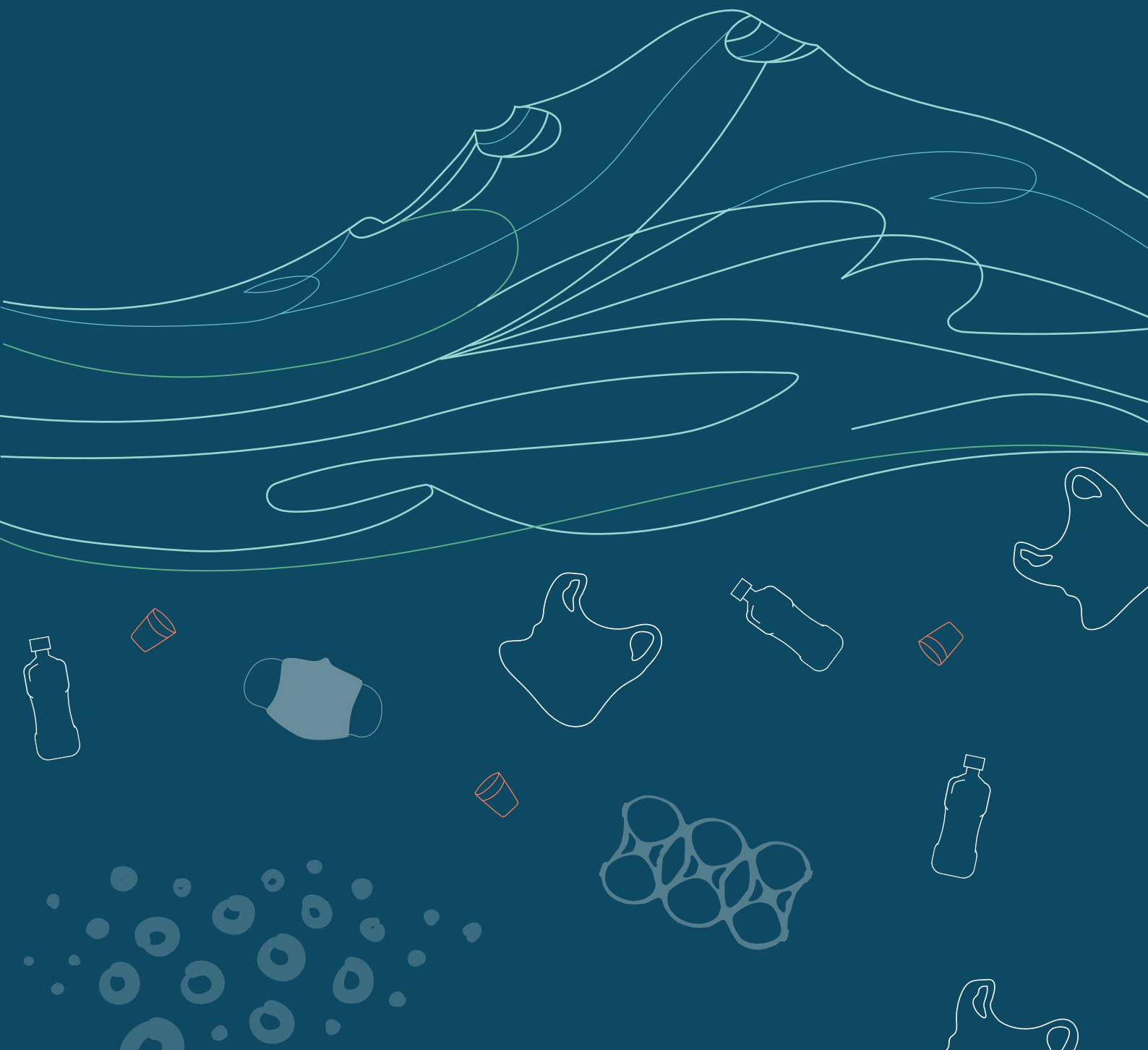






SECTION 1:

# WHY PLASTICS CIRCULARITY IS NEEDED



## SECTION 1:

# WHY PLASTICS CIRCULARITY IS NEEDED

## 1.1 PROJECT BACKGROUND

The Philippines' petrochemical industry contributed PHP 113 billion (USD 2.3 billion) to the national economy in 2018, representing 0.75% of the Philippines' GDP.<sup>13</sup> As of 2019, the total virgin resin production capacity was 900,000 metric tonnes (320,000 tonnes of HDPE/LDPE, 350,000 tonnes of PP, 200,000 tonnes of PVC and 30,000 tonnes of PS).<sup>14</sup> The Philippines does not have PET resin production capacity and is entirely dependent on imports. For the four key resins of focus for this study (PET, HDPE, LDPE and PP), the Philippines is a net importer of resins, with 66% of the total plastic conversion based on imported sources. Due to this dependence on imports, there are plans to increase local virgin resin production capacity by at least 360,000 tonnes from 2021 onwards (250,000 tonnes for HDPE/LDPE and 110,000 tonnes for PP)<sup>15</sup>.

The rapid growth of the plastics industry globally—twenty times growth during the 50 years between 1964 to 2014—brought wide ranging benefits to society.<sup>16</sup> However rapid urbanization, mismanaged plastic waste and litter from land-based sources is generating significant economic costs, reducing the productivity of vital natural systems such as the ocean and coastal areas, and clogging urban infrastructure. Globally, the cost of such after-use externalities for plastic packaging, plus the cost associated with greenhouse gas emissions from its production, is conservatively estimated at USD 40 billion annually—exceeding the plastic packaging industry's profit pool.<sup>17</sup> About 40-50% of marine plastic pollution is contributed by single-use or short-use consumer packaging, and approximately 4.8 to 12.7 million tonnes of plastic waste enters the oceans every year.<sup>18</sup> The Philippines, one of the major contributors to global marine plastic pollution,<sup>19</sup> generates mismanaged plastic waste with disproportionate impacts on the livelihoods of vulnerable coastal communities and tourism, and on fishing and shipping industries. This mismanagement of plastic waste is closely correlated with growth of municipal solid waste (MSW) in the Philippines. The World Bank estimated 14.6 million tonnes of MSW was generated in the Philippines in 2016.<sup>20</sup> By 2019,<sup>21</sup> the MSW generation grew to 15.8 million tonnes. By 2030, the World Bank forecasts MSW generation to reach 20.0 million tonnes in the Philippines, a 37% growth compared to 2016.<sup>22</sup>

13 BOI - [Petrochemicals \(2018\)](#)

14 Based on interviews conducted by GA Circular. Please see Appendix 1 for the resin producers.

15 Data collected via interviews with resins producers

16 Ellen Macarthur Foundation New Plastics Economy: Rethinking the Future of Plastics (2016)

17 Ellen Macarthur Foundation New Plastics Economy: Rethinking the Future of Plastics (2016)

18 Jenna Jambeck - [Plastic waste inputs from land into the ocean \(2015\)](#)

19 Jenna Jambeck - [Plastic waste inputs from land into the ocean \(2015\)](#)

20 World Bank - [What a Waste 2.0 \(2018\)](#)

21 World Bank - Population, total - Philippines (2019)

22 World Bank - [What a Waste 2.0 \(2018\)](#)





A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems and, within this, business models.

As countries recognize the urgency to address the problems associated with the growth of the plastics industry and mismanagement of plastic waste, countries have begun developments and transitions towards a circular economy. A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. This is different to the current economic system of a linear economy where material and fuel resources are used to make products, which are then consumed and thrown away (i.e. take-make-waste). The definition of circular economy used for this study is the one developed by the Ellen MacArthur Foundation, which has also been widely adopted by governments and major private sector organizations in the global plastics value chain.<sup>23</sup> Further elaboration of the definition of circular economy and definitions of other relevant terms can be found in Appendix 2.

*"A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the 'end-of-life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models."*

The Philippine government has begun to work towards a circular economy and address solid waste management according to the waste management hierarchy and the 3R principle through the RA 9003 Law of 2001. Here, recycling refers to the processing of waste materials to make them suitable for beneficial use. This includes transforming waste materials into the same product, a new product or into raw materials for the production of other goods. Since then, several strategies and roadmaps have been developed to improve waste management in the country including:

- The National Solid Waste Management Strategy 2012-2016 served as a guide to develop sustainable practices in the Philippines and deal with key challenges of solid waste management. It consists of eight strategic components that provide an avenue for more concrete initiatives to be implemented in order to achieve the objectives of RA9003. The strategy had a target of 50% solid waste diversion by 2016.
- NEDA has published The Philippine Development Plan (PDP) 2017-2022 that targets a national waste diversion rate of 80% by 2022,<sup>24</sup> which will primarily be done through the enforcement of compliance to RA9003.
- NEDA published the Philippine Action Plan for Sustainable Consumption and Production (PAP4SCP) in 2019. The PAP4SCP identifies the needed strategies and actions to improve, strengthen and fast track the implementation of existing policies on waste management (i.e., solid, hazardous and electronic wastes) and plastic circularity. Please refer to Appendix 3 for a detailed overview of the PAP4SCP goals related to circular economy and waste management.
- The National Plan of Action for Marine Litter, which was developed by DENR with the support of UNDP Philippines, is currently being reviewed by DENR. The strategic document will present strategies and actions to manage marine debris, focusing mainly on plastics. It recognizes the need for more concerted and unified efforts from various stakeholders in order to tackle the problem of marine litter.

The Philippines government is targeting private sector participation, recognizing that the private sector is well equipped to lead the transition to a circular economy for plastics through innovations in product design,

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23 Ellen MacArthur Foundation Global Commitment

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24 NEDA - [The Philippine Development Plan 2017-2022 \(2017\)](#)

business models, recycling technologies, experience of producer responsibility from other markets and project financing. Many leading global brands and multinational retailers using plastics have already made voluntary public commitments to transition to fully reusable, recyclable or compostable packaging by 2025. Plastic resin producers are increasingly investing in plastic recycling—as seen by the examples of Indorama Ventures<sup>25</sup>, the leading global PET resin producer, and LyondellBasell<sup>26</sup>, one of the world’s largest PP resin producers. Resin producers in the region (e.g. PTTGC in Thailand<sup>27</sup> and PETRONAS in Malaysia<sup>28</sup>) are also looking to invest in plastic recycling due to the growing demand for recycled resins. At this stage, resin producers in the Philippines have not shared any plans to invest in plastic recycling facilities. However, some regional resin producers, such as Indorama Ventures (in a joint venture with Coca-Cola Beverage Philippines Inc.), have announced plans to invest in plastic recycling plants.<sup>29</sup>

In an optimal municipal SWM system, the infrastructure of SWM, its operational costs and the positive impact from the diversion of plastics for recycling would be connected, as experienced in many countries, such as in the European Union and Japan. In the Philippines however, much of the recycling happens separate from the SWM system via upstream diversion directly by the informal sector (e.g. pickers, collectors, junk shops and aggregators) leading to a parallel economy for recyclables collection. Many of the valuable plastics like PET bottles that remain in the SWM stream are picked out (informally) at various points of SWM flow, such as from trucks and dumpsites. This study defines the current state-of-play for the local waste plastics recycling industry, including demand and supply volumes, market opportunity, and growth drivers and constraints.

## 1.2 PROJECT OBJECTIVES

The main objective of this study is to scope market opportunities for private sector interventions in plastics circularity in the Philippines with a view to promote management of used plastic as a valuable “resource”

rather than a “waste” that is indiscriminately or cheaply discarded. The primary tasks of this study are to:

1. Engage with the private sector players in the Philippine plastics value chain and understand the market drivers and challenges in scaling up circular economy approaches, focusing specifically on recycling.
2. Define the current state-of-play for the local waste plastics recycling industry, including demand and supply volumes, market opportunity, and growth drivers and constraints.
3. Review national regulations and benchmark against applicable best practices to identify opportunities as well as gaps that could be limiting broader adoption of plastics circularity.
4. Summarize key findings based on the private-sector focused plastics value chain and recycling market analysis and recommend priority actions.

## 1.3 FRAMING THE OBJECTIVES

For the purposes of this study, the above-mentioned objectives have been framed into five main problem statements, each of which are explored in the following sections in this study:

1. What is plastics circularity in the context of the Philippines? This is addressed in Sections 1.5 and 1.6.
2. What is the existing plastics value chain across production, collection, recycling, wastage, imports and exports in the Philippines? This is addressed in Section 2.
3. What are the factors and barriers affecting plastics recovery or recycling across the value chains for different resins and the size of the addressable opportunity? This is addressed in Sections 2 and 3.
4. What are the existing policies and regulatory environments impacting plastics circularity in the Philippines? This is addressed in Section 3.
5. What are the policy and private sector interventions needed to enable plastics circularity in the Philippines and how much value can be unlocked through these interventions? This is addressed in Section 4.

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25 Indorama - [Recycling business](#)

26 LyondellBasell - [Press release](#)

27 PTTGC Thailand - [Press release](#)

28 Plastic Energy & PETRONAS - [Press Release](#)

29 Indorama Ventures - [Indorama Ventures and Coca-Cola](#)

## 1.4 METHODOLOGY OF STUDY

This study was conducted over the period June 2020 to January 2021. Figure 3 gives an overview of the stages of this study.

A desk-based study was done to understand the size and scale of the plastics industry in the Philippines, specifically on plastic resin production. This included reviewing publicly available reports and presentations by DENR and NEDA and annual reports/sustainability reports of major petrochemical and resin manufacturing companies and plastic converters in the Philippines. This step helped to narrow down the resins of focus for the study. Based on this, the value chain of each resin was also developed.

A series of online interviews were held in the Philippines with representatives of various private sector organizations representing the value chain for each resin type. These in-depth interviews provided granular insights on the economics and flow of each resin within the Philippines market and helped identify the major private sector companies across the value chains. Further details of the stakeholders interviewed can be found in Appendix 4A and 4B. Taken together, these first two steps enabled the research team to create the first version of the material flow analysis (MFA) and preliminary insights on each resin type, which was then used to inform different aspects of the study.

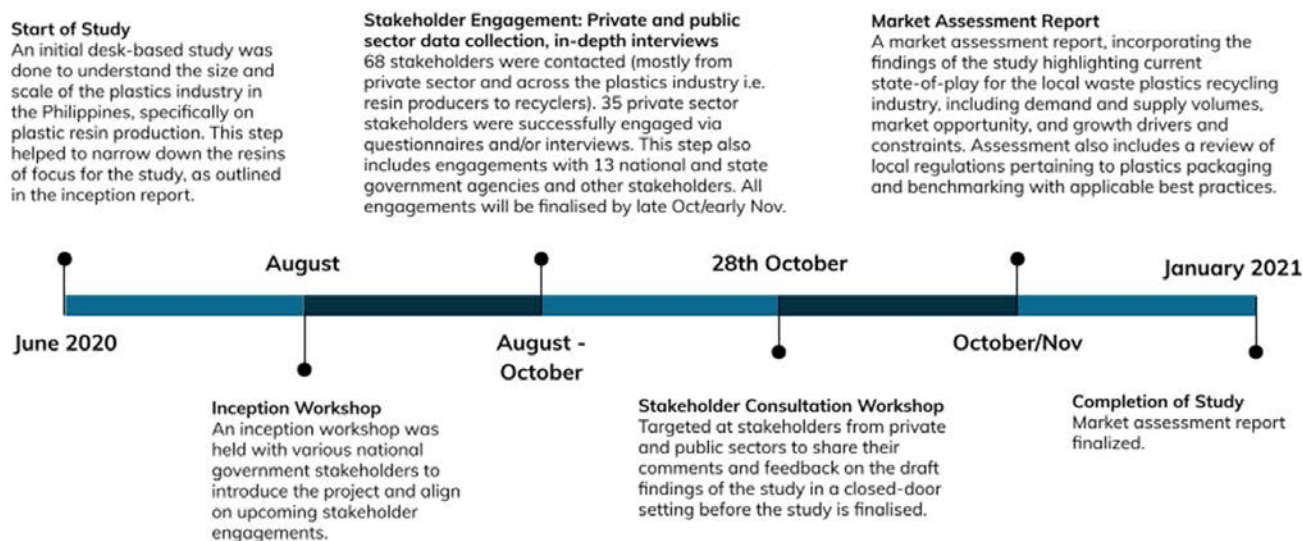
With the insights gathered through these steps, the study entered a critical period of further data collection and analysis. A series of data requests was sent to eleven government agencies and departments in the Philippines. As several government agencies and departments own the necessary data sets, often with an overlap in ownership, a wide net was cast to access these data sets.

With the data and insights gathered, an updated MFA was generated for each resin type studied, described more in detail in Section 2. The methodology used to calculate the MFAs involves calculations that use a mix of data gathered from private sector stakeholder interviews, government datasets and the public domain. This study used the Philippine Statistics Authority (PSA) for the resin production and import/export data. They have been triangulated against industry data, UN Comtrade and other data sources. Data from PSA and other industry stakeholders was used for the breakdown in plastics usage. Resin disposal in future/past years have been calculated according to the modeling that GA Circular developed from regional industry data sources for industry use applications and lifespan. For the collected-for-recycling (CFR) rates, data from the private sector stakeholders was used as reference. The MFA for each resin, together with resin price data, was then used to analyze the material value of recycling in terms of value unlocked and the potential value that could be unlocked. A detailed

Figure 3.

### TIMELINE OF STUDY (NOT TO SCALE)

#### Study Timeline, Milestones & Deliverables



explanation of the methodology of both the tools—the MFA and the Material Value Loss Analysis—is provided in Section 2.1 of this report.

A stakeholder consultation workshop was conducted on 28th October 2020 via video conferencing. The 45 participants for this workshop consisted of representatives of the various private sector organizations that were previously interviewed, as well as representatives from government agencies and departments (further details can be found in Appendix 4C). The objective of this workshop was to validate the key findings and interventions developed in the study and to further refine the findings.

In summary, the study was developed using the following sources and tools:

- Publicly available reports and presentations by relevant private sector organizations and government departments/agencies
- In-depth interviews with 35 private sector stakeholders (please see Appendix 4A for the full list and details)
- In-depth interviews with 14 public sector stakeholders, such as government and NGO stakeholders (please see Appendix 4B for the full list and details)
- In-depth stakeholder consultation workshops with a total of 45 participants from private, public and non-governmental sectors (please see Appendix 4C for the full list and details)
- Material flow analyses and material value analyses of the major plastic resin types, custom-developed for the purposes of this study and benchmarked against global examples of similar analyses
- Quantitative and qualitative data from various private sector stakeholders, government departments/agencies and global plastic resin market pricing providers

## 1.5 SCOPE OF STUDY

This study is a private sector focused market assessment of plastics value chains and the recycling market in the Philippines, with the overall goal of identifying the opportunities and barriers for plastics circularity in the country. The focus is on the recycling aspect of the circular economy for plastics, as a lever to divert plastic wastes away from landfills and the open environment, and to increase the re-introduction of

the plastics into the industrial system. Reduction at source and refill/reuse aspects of the circular economy for plastics were not included in the scope; the focus was on identifying scalable private sector investment solutions, which are primarily in plastic recycling.

The recommended interventions and actions to increase plastics circularity in the Philippines will also support the Sustainable Consumption and Production roadmap by NEDA and the Marine Litter National Plan of Action by DENR, in addition to providing insights for the development of a planned EPR framework for the Philippines.

This study balances the needs for a comprehensive coverage of the plastics sector and a focused review of the enabling policy environment, the opportunities and the barriers for plastics circularity. Therefore, the boundaries of the investigation are limited to four of the most commonly consumed resins and two key-use breakdowns (packaging vs. non-packaging). This section will briefly explain the reasoning behind the selection of these resins and the focus of packaging vs. non packaging breakdown.

### 1.5.1 Resin Selection

The four resins chosen to be the focus for this study are, in order of consumption: HDPE, LDPE, PP and PET. This selection is based on their high consumption levels in the Philippines. A 2014 report, projecting 2015 consumption,<sup>30</sup> indicated that these four resins represented 80-93% of all plastic resins consumed in the Philippines, with PVC and PS comprising the remaining 7-20% (Figure 4). The WWF EPR 2020 report also asserts that these four plastic resins represent 80% of plastic consumption among the six types of key resins studied.<sup>31</sup>

Multilayer, multimaterial flexibles form an important part of the packaging mix for consumer goods brands in the Philippines. The Philippines is a “sachet economy,” meaning there is a high dependence on sachets to provide low-cost consumer goods to poor and middle-income families.<sup>32</sup> Sachets are made of

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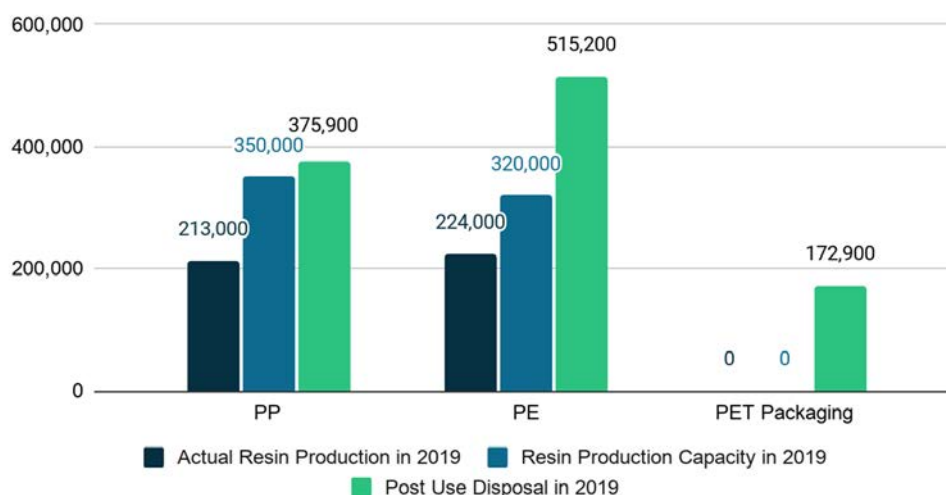
30 DTI, PPIA and BOI - [The Philippine Plastic Industry Roadmap \(2014\)](#). In the document, percentages for the 6 resins add up to more than 100% (108%) which is why ranges are used here. The percentages in the document are Polyethylene (49%), Polypropylene (35.6%), PET (8%), PVC (9%) and PS (6%). This provides a total for the four key resins of 93% and for PS and PVC of 15%.

31 WWF - [EPR Scheme Assessment for Plastic Packaging Waste in the Philippines \(2020\)](#)

32 Mongabay - [Plastic trash from the 'sachet economy' chokes the Philippines' seas \(2018\)](#)



Figure 4.

**BREAKDOWN OF RESIN PRODUCTION AND POST-USE DISPOSAL IN THE PHILIPPINES (2019)**

Source: Resin producers, PPIA, APMP and GA Circular analysis

Note: Post-use disposal amounts consider the imports and exports of resins and semi-finished products. The resin producers do not break down their PE production between HDPE and LDPE. GA Circular has consulted industry sources to do a breakdown between HDPE and LDPE for Section 2 of this report.

multiple layers of plastic and foil, and fall under the Type 7 plastics ("Others").<sup>33</sup> However they are not commercially collected or recycled at scale—unlike rigids and monomaterial flexibles (a small proportion of these multilayer flexibles in the Philippines are currently sent for energy recovery via co-processing in cement plants or converted to plastic lumber/furniture, etc. Most end up in landfills, dumpsites or leak into the open environment). As scalable private sector investment solutions for recycling these multilayer, multimaterial flexibles have not yet been commercialized, a breakdown of the key resins into multilayer, multimaterial flexibles and a dedicated assessment of material value analysis for this category of flexibles is out of scope. However, this study team has included some analysis of the estimated consumption of multi-layer flexibles in the Philippines, amounts which are sent for co-processing and conversion to plastic lumber, and the key stakeholders involved in this value chain. The study also highlights recommendations related to multilayer flexible packaging, including targets for co-processing via cement kilns and reduction/reuse models.

PVC and PS were not further evaluated for the following reasons: PVC is widely used in the building and construction industry to make siding and window

frames, flooring, roofing, insulation for electrical cables and water and sewage pipes. PVC for construction applications has a long application lifetime (between 10-20 years) as compared to single- or short-use products made from HDPE, LDPE, PP and PET. Also, as usage of PVC plastic is largely confined to the building and construction industry, it is expected that PVC is treated as construction and demolition (C&D) waste and likely to be better managed—unlike HDPE, LDPE, PP and PET, which are widely disposed of as part of municipal solid waste. For these reasons, PVC has limited relevance regarding marine debris. While PS products with single-use applications, such as styrofoam food boxes and single-use plastic cups, are contributors to marine debris, PS applications have started to be regulated by some LGUs<sup>34</sup> in the Philippines. There is also wide global recognition of the need to phase out the use of PS due to its poor recycling outcomes and contamination of the polyolefin recycling system (it cannot be removed during the float-sink separation process).<sup>35</sup> Furthermore, PS products are not as widely used in the Philippines and represented just 5% and 6% of the total plastic consumption in 2015 and 2019 respectively, per PPIA and WWF Philippines studies.

33 Plastic Type 7 includes several plastics - not just multilayer flexibles.

34 <https://www.no-burn.org/bagbanph/>

35 Ellen MacArthur Foundation - [The New Plastics Economy: Catalyzing Action \(2017\)](#)



## 1.5.2 Industry Applications

This study categorizes plastic resins into either packaging or non-packaging applications. The consumption behavior and collection factors of plastics are different, requiring a breakdown of the different applications. For example, plastics in packaging applications tend to be single layer or multi-material and disposed of in the MSW system, while plastics in automotive, building and construction applications are typically used as composites and collected as industrial waste. Regulations also differ between different industries and products, and different policy realities need to be considered. However, as the consumption behavior and post-consumer value chain of plastics for all non-packaging plastics are broadly similar, these plastics will be analyzed under a broad category of non-packaging plastics. This study calculated plastic resin for the four key resins of focus at approximately 1.06 million metric tonnes in 2019.<sup>36</sup> As shown in Table 2, packaging accounted for the largest application segment (53%) of the local plastics market, more than any other individual application type.<sup>37</sup> More recent data is not available.

<sup>36</sup> Data are specific for the focus resins of this study (PET, HDPE, LDPE and PP).

<sup>37</sup> DTI, PPIA and BOI - [The Philippine Plastic Industry Roadmap \(2014\)](#)

## 1.6 CIRCULARITY COMMITMENTS OF SELECTED PLASTICS STAKEHOLDERS

The study team has reviewed public commitments made by key stakeholders in the Philippines' plastics value chain to understand the market drivers for plastic circularity and demand for recycled plastics. The four following circularity commitments that were reviewed:

1. Increasing production and use of recycled plastics content
2. Increasing local plastics recycling capacity
3. Moving towards 100% reusable, recyclable, biodegradable or compostable plastics materials
4. Recycling rate targets for plastics materials

While this review does not analyze the scale or efficacy of the commitments, it is still useful as it shows the direction the industry is heading towards and what each stakeholder has been communicating.

Figure 5 shows that brand owners have the highest proportion of commitments made. They are the most consumer-facing stakeholder with the most incentive to make commitments to win over consumers. Recycling is the primary business focus for recyclers, and they have made the greatest number of possible commitments. Commitment 3 (Moving towards 100% reusable,

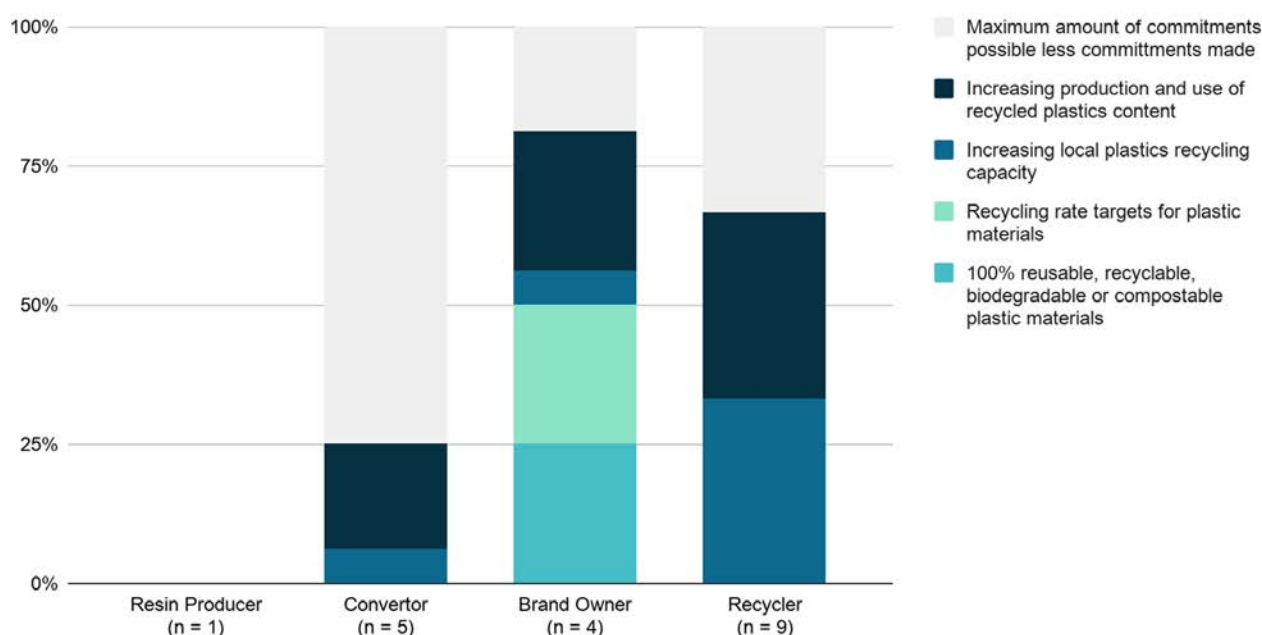
Table 2.

### BREAKDOWN OF THE END-USE OF RESINS BY PLASTIC SUB-INDUSTRIES IN THE PHILIPPINES (2014)

End-use industry	Breakdown based on revenue
Packaging	53%
Non-Packaging	47%
Household wares	6%
Furniture fittings	1%
Pipes/tubes	13%
Industrial and other supplies	13%
Primary products (e.g. sheets, etc.)	3%
Windows, doors, etc.	1%
Others	10%
Total	100%

Note: 2014 is the most recent data available.

Figure 5.

**PLASTICS CIRCULARITY COMMITMENTS BY STAKEHOLDER TYPE**

Note: Stakeholders have been ordered from left to right following the plastics value chain.

recyclable, biodegradable or compostable plastics materials) and commitment 4 (Recycling rate targets for plastics materials) are not applicable to recyclers' industry, so are not included in the calculation of percentage of circularity commitments. This review shows that for future private sector engagement efforts on plastics circularity in the Philippines, brand owners and recyclers are most likely to engage as they are most primed to effect change, followed by converters then resin producers. This is not intended to suggest that recommendations from this study are

only targeted towards brand owners and recyclers, however. Resin producers and converters also play an equally important role in implementing the recommendations.

### 1.7 STUDY LIMITATIONS AND OPPORTUNITIES FOR FUTURE WORK

This study has certain limitations due to availability of data, scope of work or overall study objectives. As shown in Table 3, however, these limitations are also opportunities to build on this study for any future work.

Table 3.

**STUDY LIMITATIONS AND OPPORTUNITIES FOR FUTURE WORK**

Limitation area	Details	Opportunities for Future Work
Resin focus and extent of breakdown in MFAs	As outlined in section 1.5, the four resins chosen to be the focus for this study are PET, PP, LDPE/LLDPE and HDPE. Therefore, the MFAs have been conducted for these four key resins only. The objective of these MFAs is to provide a directional estimate of recycling rates for the resins of focus and they are not intended to account for every ton of plastic produced, consumed or recycled in the Philippines.	An annual review of the MFAs for the four resins will provide the Philippines plastics industry a thorough understanding of the progress towards circularity.

<b>Resin focus and extent of breakdown in MFAs</b> <i>(continued)</i>	<p>While multimaterial flexibles (e.g. sachets) are an important part of the packaging mix in the Philippines, they are not yet being commercially collected for recycling at scale unlike rigids and mono-material flexibles. A small proportion of these multi-material flexibles are being sent for energy recovery via cement plants or turned into eco-bricks/furniture while most are disposed of. Only a high-level MFA has been conducted for this type of material.</p> <p>Determination of breakdown between landfill, energy recovery, and leakage of each resin is not part of the study's scope. Similarly detailed calorific value assessment of sachets and energy recovery pathways of flexibles is also out of the study's scope.</p>	<p>Breakdown between landfill, energy recovery, and leakage rates will provide an understanding of the extent of shift away from landfill and leakage.</p> <p>Given that a vast majority of multimaterial flexibles are currently not being collected for energy recovery or recycling, a detailed MFA for multimaterial flexibles similar to the one done at a resin-level in this study, is not expected to yield significant benefits unless various interventions concerning multimaterial flexible packaging (Section 4.4.4) have been specifically addressed.</p>
<b>HS code data for imports/exports of plastic products</b>	<p>Imports/exports of resins and semi-finished products are based on PSA data. They have been triangulated against industry data, UN Comtrade and other data sources. However, it must be noted that there are inherent challenges with the accuracy of data reported via the universal HS Codes.</p>	<p>Refer to action 26 under section 4.3 (F)</p>
<b>Imports/exports of resin and finished products</b>	<p>The data for PET resin imports and PE, PP resin production and imports is representative as these data sets have been received from all major industry sources/resin producers. All plastic recycling is fragmented with a few large recyclers and many small (formal and informal) recyclers. The large recyclers who agreed to participate in this study have been interviewed and a best possible estimate of the smaller recyclers was calculated through interviews with some of the small recyclers and by compiling the lists of recyclers obtained from government stakeholders, desktop research and responses received from large recyclers.</p> <p>Imports/exports of finished products made from PET, PP, HDPE and LDPE/LLDPE are not accounted for due to unavailability of data as well as significant uncertainties in attempting to calculate the plastic weightage within finished products. Based on stakeholder interviews, the Philippines is a net importer of finished products, particularly packaged products—i.e. actual consumption is likely to be much higher. The implication of this is that assessment of CFR rates as part of this study would be an overstatement and assessments of material value loss would be an understatement. While the MFA consumption and disposal are believed to be an understatement due to the inability to account for finished products, this study still provides a clear understanding of the current realities (e.g. minimum plastic consumption and disposal amounts, lack of recycled product demand, lack of recycling capacity) to consider when developing effective policies/regulations, etc. Further data collection of finished product consumption is not critical to develop effective policies/regulations.</p>	<p>Attempts to determine finished product consumption will be challenging as: (i) There are thousands of brand owners across all industries who would need to share data to make it a representative data set; (ii) Brand owners place a high degree of confidentiality on such data; and (iii) Even if such data were to be available, calculating the tonnages of plastics within finished products is complex and has a high degree of uncertainty.</p> <p>Therefore, efforts to determine finished product consumption can be seen as a 5-10 year goal to be achieved through a mandatory plastic reporting framework (refer to action 21 in Section 4.3 (E)).</p>

<b>Investment opportunities in post-industrial LDPE/LLDPE recycling</b>	The study received participation from formal recyclers of post-consumer LDPE/LLDPE but no participation from dedicated, formal post-industrial LDPE/LLDPE recyclers. Hence specific insights on the opportunities for potential investments in LDPE/LLDPE was not possible in this study.	Based on a comparison with recent studies done in the Southeast Asia (e.g. in Thailand, Vietnam, Malaysia) post-industrial LDPE/LLDPE (i.e. from shopping malls, logistics centers, etc., which are not food contaminated) is expected to have opportunities for further investment in the Philippines and thus should be explored further.
<b>Lifespan of plastic products</b>	Resin disposal in future/past years have been calculated according to the modeling that this study has developed based on regional industry data sources for industry use applications and lifespan.	Future studies could develop lifespan modeling specific to the Philippines plastics industry, but this is estimated to have minimal impact (<5%) on the final post-use disposal figure.
<b>Margin analysis for recycling of plastic resins</b>	The material value analyses on plastics recycling carried out under this study are not meant to be a margin analysis for recycling each type of resin. A margin analysis on recycling each type of resin would shed light on additional benefits that activities or incentives in the plastics value chain would bring compared to the additional costs incurred by those same activities or incentives. Such margin analysis would be also particularly relevant to address the very low CFR rates, especially for non-PET, which would be the main driver for unlocking value, and from a business-case perspective, will show the net value taking into account costs and reasonable profit margin. Recyclers engaged during the course of this study were reluctant to share price-sensitive information or detailed operational costs. Due to the different levels of upstream and downstream integration among recyclers, each recycling business unit is expected to have different margins depending on their business model, and this forbids modeling for estimations of margins.	The study team recommends any margin analysis to be done on a case-by-case basis as part of in-depth, pre-feasibility studies by investors in the waste management or recycling sectors to promote an enabling market.
<b>Assessment of SWM costs</b>	While a basic assessment of the SWM costs in the Philippines has been conducted, a systematic assessment of national-level SWM infrastructure, operational costs of SWM and identifying the linkages between informal sector and SWM, is not within the scope of this study. Where available, secondary research or past GA Circular work in the Philippines and other online sources on the informal sector has been used to identify the role of the informal sector in recyclables collection and to address challenges in order to recognize and better integrate the informal sector.	A detailed evaluation of SWM infrastructure and its costs in the context of plastic circularity could be addressed in subsequent work as a follow-up to this market assessment.



<p><b>Impact of COVID-19 on recycling landscape</b></p>	<p>All data used in the MFA as part of this study are for 2019 as it was the latest complete data set available as of mid-2020 when this study commenced. Hence, it does not reflect the significant changes in the recycling landscape due to COVID-19. Also, the COVID-19 pandemic has caused severe setbacks to the ongoing global movement to tackle plastic waste, with recyclers across several countries, including the Philippines, showing on average of a 50% drop in demand for their products, 21% drop in sales prices and many recyclers and businesses across the plastics value chain at the risk of insolvency. This study was started after the peak of the COVID-19 pandemic in the Philippines and it was observed to cause disruptions across the businesses of almost all the recycling value chain businesses that were engaged. As the pandemic and its impact are still evolving, the material value analysis done in this study does not reflect the business impact of COVID-19 on the plastics recycling sector. However, insights regarding the impacts of COVID-19, particularly with regards to the economic downturn and low oil/virgin plastic prices now and projected into the future, have been included.</p>	<p>When considering investments in these sectors in the Philippines, it is recommended to refer to studies about the impact of COVID-19 on the recycling sector<sup>38</sup> as well as the waste management sector.<sup>39</sup></p>
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## 1.8 RELATION TO THE RECENT WWF PHILIPPINES STUDY (EPR SCHEME ASSESSMENT FOR PLASTIC PACKAGING WASTE IN THE PHILIPPINES)

In 2020, WWF (with Cyclos and AMH-MWTS as the implementation partners) carried out a study that included a material flow exercise focused on all seven plastic resins in the Philippines. The Market Study for the Philippines was conducted in parallel with the WWF study, allowing for an exchange of knowledge on individual MFAs and insights on various plastic resins and other key findings.

It is important to note that the WWF study and this study have differences in methodologies and focus that lead to varying MFAs. Both studies include MFAs for the key resins of PET, HDPE, PP and LDPE/LLDPE, factor in resin and semi-finished product imports/exports and rely on industry interviews for data for the MFAs.

But this study builds on WWF's MFA approach for the Philippines by using only 2019 figures for MFA, factoring in lifespan for plastic consumption amounts and leveraging a significant number of recycler interviews and data collection. This study does not include finished product import and exports due to concerns about data reliability. More detailed consideration of recycler data—including incorporation of recycling capacities and actual utilization, and factoring in process losses and net exports of semi-finished products—was key to this study. This detailed recycler data is needed to understand the specific barriers and opportunities for plastic recycling, including investments, as opposed to the WWF study—which focuses specifically on implementation of EPR.

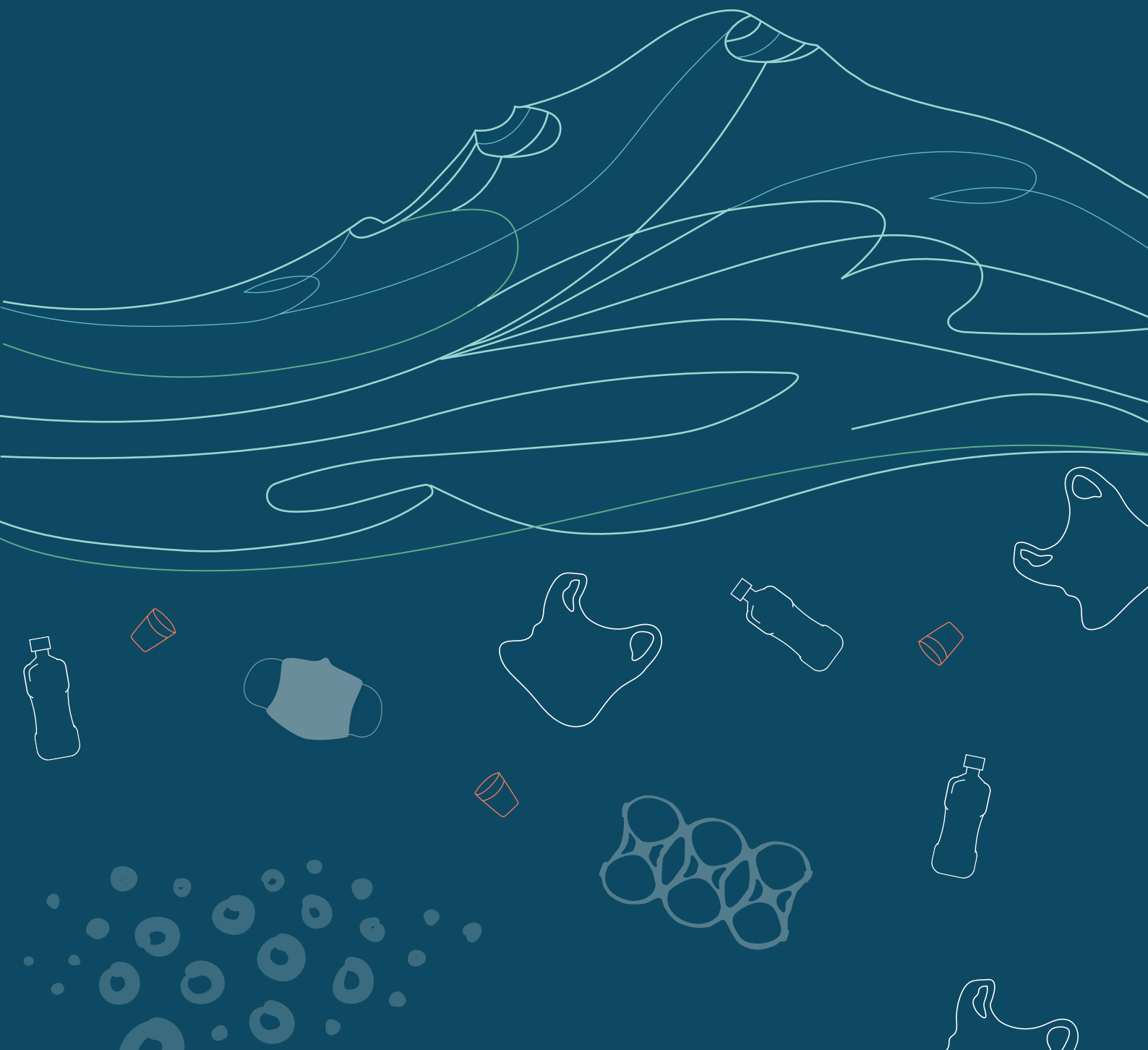
Please see Appendix 5 for further information regarding the similarities and methodological differences between the two studies.

38 GA Circular & Circulate Capital - [Safeguarding the Plastic Recycling Value Chain \(2020\)](#)

39 IFC - [COVID-19's Impact on the Waste Sector \(2020\)](#)

SECTION 2:

# THE PHILIPPINES LOSES 78% OF THE MATERIAL VALUE OF PET, PP, HDPE AND LDPE PLASTICS



## SECTION 2:

# THE PHILIPPINES LOSES 78% OF THE MATERIAL VALUE OF PET, PP, HDPE AND LDPE PLASTICS

Section 2.1 introduces the two tools used to assess the current plastics circularity situation in the Philippines for each resin—material flow analysis (MFA) and material value loss analysis. Section 2.2 analyses each of the key resins in focus in detail using the two tools. It also highlights the findings relevant to increasing circularity.

## 2.1 TOOLS USED TO ASSESS PLASTICS CIRCULARITY

### 2.1.1 Material Flow Analysis (MFA)

Figure 6 presents the MFA conducted for each resin and shows the amounts of resin flowing through each stage of the value chain from resin production to consumption, to its management post-consumption. It helps to visualize how much of the resins flow across the stages and enables an understanding of factors affecting circularity at each stage.

The MFA can be analyzed in three sections from left to right. The three sections are:

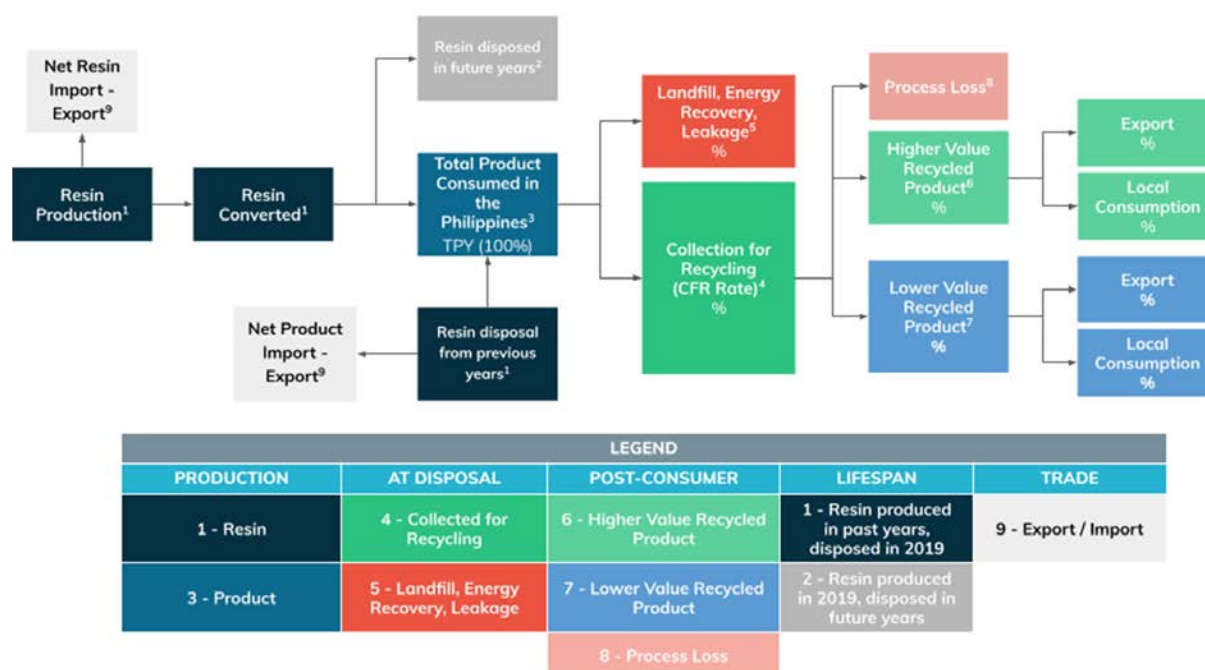
1. **Production:** On the left, the MFA starts with the amount of resin produced (box 1). Imports and exports of this resin (box 9) and the semi-finished products (e.g., pre-forms for PET bottles) the resins are made into (box 3) are considered to arrive at the total amount of plastic products consumed locally.<sup>40</sup> The total amount of plastic products consumed locally represents 100% of what can theoretically be recycled for that particular resin.
2. **At disposal:** After consumption, the plastic products are either collected for recycling (box 4), disposed of at the landfill, used for energy recovery or leak into the environment (box 5). The lifespan of the plastic products was also considered: calculations remove products produced in 2019 that would be disposed of in future years and include products that were produced before 2019 and disposed of in 2019. This calculation uses the following steps.
  - b. First, determine the proportion of materials disposed of in year 0 (year of manufacture) until end of lifespan by understanding the typical lifespan of plastic products for each end-use application and the proportion of end-use applications for each resin (details in Appendix 7).
  - c. Second, using the normal distribution curve for the average lifespan (in Appendix 7) and estimated historical production numbers of the key resins in the Philippines,<sup>41</sup> calculate the amount of plastic products disposed of in 2019 but produced before 2019 by multiplying the amount of resin

<sup>40</sup> Further details of the HS codes used in the calculations can be found in Appendix 6A.

<sup>41</sup> Estimated using growth rates calculated from the data gathered during a recent World Bank study and provided by the Plastics Institute of Thailand (PIT) as a proxy because corresponding data was unavailable for the Philippines. Furthermore, PIT data has been deemed the most representative.

Figure 6.

## THE MATERIAL FLOW ANALYSIS (MFA) APPROACH USED FOR EACH RESIN



consumed in each year with the corresponding proportion of products that are estimated to be disposed of in 2019. For example, the amount of PET packaging consumed in 2014 is multiplied by the proportion of PET packaging that is going to be disposed of in 5 years. The figures for each year are then summed up for a final estimate of what will be disposed of in 2019.

- c. Third, remove the proportion of materials that was produced in 2019 but is estimated to be disposed of in future years (box 2) to arrive at a final figure for the total amount of resins disposed in 2019 as final products in the Philippines.

**3. Post-Consumer:** In this last section on the right, the CFR rate and subsequent products of recycling are shown.

- a. CFR: Denotes the tonnes or percentage of a particular resin collected through the informal and formal collection sectors within the country which is then sold to Processors and/or Recyclers within the country or for export, as compared to the total consumption. The CFR rate already factors in removal of contaminants and other plastics and materials

which are not the resin of focus. The term CFR is used for a few reasons:

- i. Given imports and exports of material for recycling, the CFR rate denotes local collection which is sold to processors/recyclers, not necessarily within the country, (e.g. a country can have a CFR rate of 75%, even though none of the material is recycled locally due to the lack of a robust local recycling industry).
- ii. Because recycling yield does not equal 100% and varies across resin type (due to "process loss"), the CFR rate is not equal to the share of after-use plastics that is sold from the recycling process. While contamination (e.g. dirt, other plastics, metals, etc.) is removed during the sorting and cleaning process, it is not part of the mass balance MFA of each resin (e.g. for a PET MFA, the MFA inputs are PET, thus contamination is not added on). Thus, the CFR rate of PET is calculated after contaminants (dirt, metals, etc.) and other plastics (sleeves and caps from other materials such as HDPE and PP) are removed.



- b. Process yield and loss affects the final quantity of recycled product output from the recycling process.
- c. The products of recycling can be of higher value (e.g. for example food-grade resin (box 6)) or of lower value (e.g. resin used strapping (box 7)). These products are then either exported or consumed locally again in domestic plastics production.

## 2.1.2 MATERIAL VALUE LOSS ANALYSIS

Analysis of the plastic **material value loss** assesses the value loss when the resins are not recycled into the Most Valuable Recycled Product (MVRP) for that particular resin or when the resins are not recycled at all (e.g. when disposed of in a landfill). The analysis of this material value lost is informed by the MFA tool in Figure 6. It is shown in Figure 7 using a graphical method to demonstrate the current value unlocked from recycling the resin at a national level using the two key values:

1. CFR Rate which is represented by the X-axis
2. Value Yield (product of Volume Yield and Price Yield) which is represented by the Y-axis

The value unlocked through recycling is represented by the size of the green boxes. All areas outside of the green boxes represent the lost material value. Red arrows represent the pressures that lower the value unlocked (i.e. pressure through lower CFR Rate and pressure through lower Value Yield).

The graphical method in Figure 7 was benchmarked and developed based on the methodology used by the Ellen MacArthur Foundation to assess the material value lost from single-use plastic packaging applications globally. It was modified specifically for the purposes of this study and for the context in the Philippines.<sup>42</sup>

The World Bank is developing the tools to help countries identify the “Pathways out of Plastic Pollution,” which is expected to be completed in FY21. The scope of this work has been extended both geographically and technically to reflect high uptake within the World Bank Group and demand from countries. The model will be piloted in Indonesia, will follow a comprehensive approach to the valuation of damages from plastic and its alternatives, and will include five country case studies in the lifecycle valuation of plastics and alternatives,

together with policy analysis in 10 countries. The material value analysis done in this study can provide valuable inputs for the development of the “Pathways of Plastic Pollution” in the Philippines.



## 2.2 RESINS IN FOCUS

### 2.2.1 PET

#### General Characteristics of PET

PET is clear, tough, and has good gas and moisture barrier properties. It is widely used in:

- Plastic bottles for soft drinks, water, juice, sports drinks etc.
- Food jars for peanut butter, sauces, condiments etc.
- Ovenable film and microwavable food trays
- Textiles, monofilament, carpet, strapping, films and engineering moldings.

Cleaned, recycled PET flakes and pellets are in high demand globally for use in bottles as well as for spinning fiber for carpet yarns and textiles. PET can be recycled into the following:

- rFiber: Fiber for carpet, fleece jackets, comforter fill, bags, etc. through rPSF (Recycled Polyester Staple Fiber) and rPOY (Recycled Partially Oriented Yarn)
- rPET (food-grade): Containers for food, beverages bottles
- rPET (non-food-grade): Films, sheets, strapping



Photo: junpinzon / Shutterstock

42 Ellen MacArthur Foundation - [New Plastics Economy: Rethinking the Future of Plastics](#) (2016)

Figure 7.

## METHODOLOGY OVERVIEW OF HOW THE MATERIAL VALUE LOSS IS CALCULATED

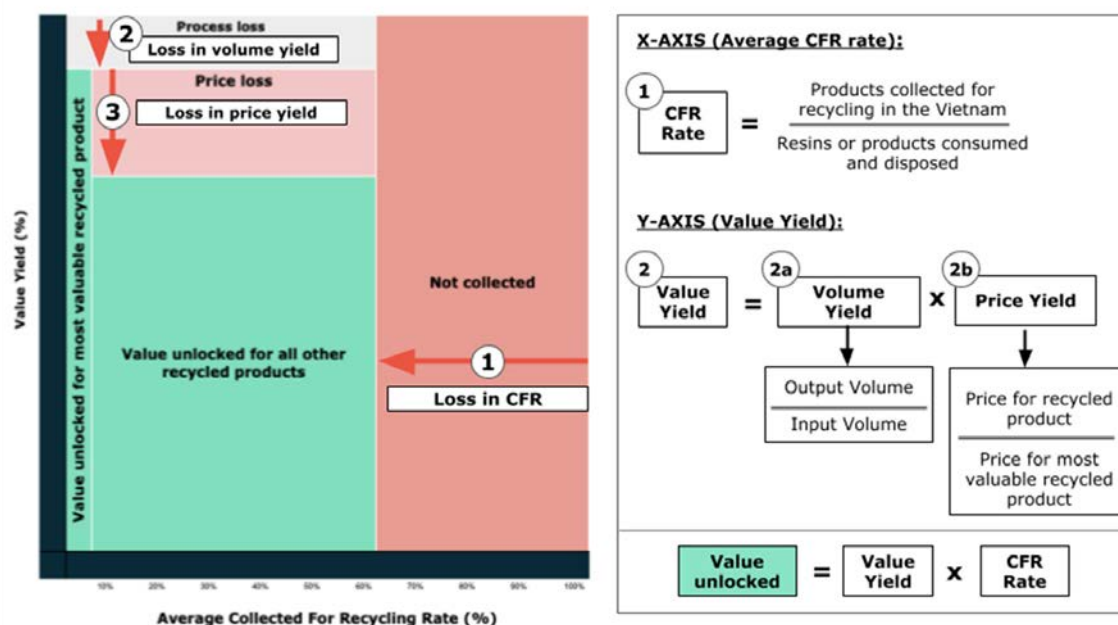


Figure 7 Notes:

1. The material value analysis does not include:

- The costs that could be saved from not having to collect and dispose of the non-recycled resins as waste under the MSW collection system.
- The cost of setting up and operationalizing municipal solid waste management infrastructure to support the transition towards plastics circularity.

This analysis should therefore be considered as providing the potential monetary benefits from plastics recycling and not the “net” financial opportunity. This is in line with the methodology used by the Ellen Macarthur Foundation which does not factor in upfront investment costs, operational costs for circular approaches towards solid waste management or cost savings through reduction in collection and disposal of plastic waste.

- 100% CFR rate and value yield has been used in material value analysis across this study for illustrative purposes only as targets are typically set based on 100% of market inputs/material.
- The below criteria were used to ensure reliable and consistent prices for recycled products:
  - Prices need to be representative of the industry i.e. price data must be from: (i) industry associations, (ii) independent market pricing provider or (iii) from independent recyclers.
  - Prices need to be available for various categories of end products (for example, HDPE's end products are rHPDE natural, rHDPE pipe grade, rHDPE injection mold black, rHDPE colored, rHDPE food grade, etc.).
  - Prices need to be available for a period of three months within 2019 so that the average of the three months can be used. This is to avoid price anomalies.
- Currently there are no independent, industry-level price information sources available for recycled products in the Philippines. Therefore, local prices were used for PET recycled products where available from independent recyclers and were benchmarked with global prices, as many PET recycled products compete in the global market, meaning global pricing provides an accurate picture of the market opportunity. For the other resins, local prices are unavailable based on the above criteria. Part of this is due to the large number of informal recyclers for polyolefins and because formal recyclers were unable to share sensitive price information. For these resins, global prices that meet the above criteria were used.
- The term MVRP for each resin refers to the recycled product that has the most value in the global recycled plastics market, out of all the possible options that the resin can be recycled into. For this calculation, MVRP uses a weighted average of the various possible recycled products, with the proportions of each type of recycled product representing a best-case scenario of maximal value unlocked for the resin. It also recognizes it is not realistic to expect 100% of a resin to be recycled into the corresponding highest value recycled product (e.g. food-grade PET bottles for post-consumer PET waste).
- A complete breakdown of the data sources and key assumptions for material value loss analysis calculations for each resin can be found in Appendix 8.

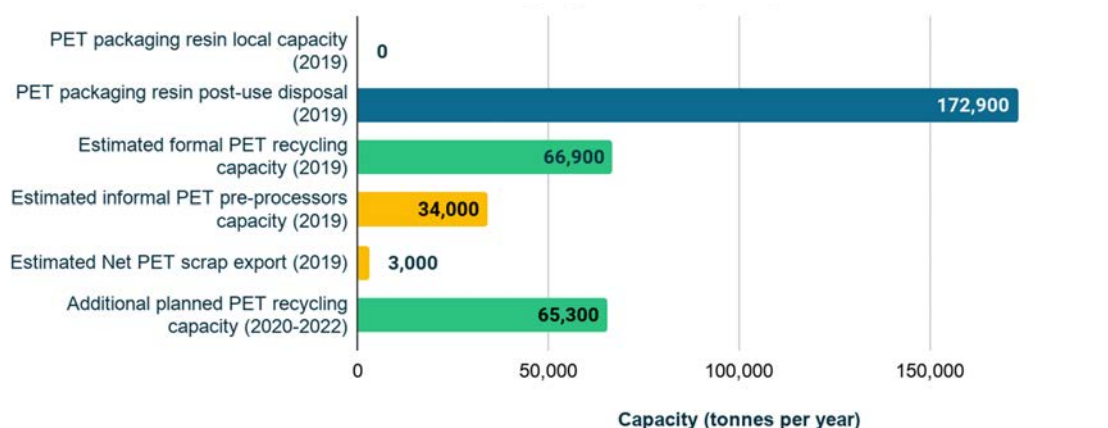
## Major PET Producers and Recyclers in the Philippines

Figure 8 shows the respective amounts for virgin PET production (zero in the Philippines; all is imported), the PET packaging resin post-use disposal amount for 2019

and the estimated formal and informal PET recycling capacities. The estimated volume of exported PET scrap is also included. See Figure 9 for a breakdown of the value of recycled products from PET.

Figure 8.

### PET PACKAGING RESIN PRODUCTION, POST-USE DISPOSAL AND RECYCLING IN THE PHILIPPINES



Sources: Private sector stakeholder interviews, financial reports and data from other industry sources within the Philippines

Figure 9 Notes:

1. There are no PET resin producers in the Philippines, hence all PET resins are imported.
2. The capacity values stated are for 2019. The producer capacities and Estimated Recycling Capacity are based on 2019 values while the Planned Recycling Capacity is as of December 2019 (i.e. will become operational during 2020 -2022).
3. PET scrap export is an estimate and is based on the net of imports and exports. See Appendix 9 for the assumptions related to scrap plastic imports and exports per resin.
4. Estimated formal recycling capacity is based on known formal recycling capacity of 60,800 TPY (based on interviews with 3 major recyclers) plus an estimated/assumed amount to an additional 10% (based on knowledge of the existence of a minimum of 3 minor other recyclers which are known to or believed to recycle this resin, but where their capacity is not known as they were not contactable or responsive for this study and other industry sources have not been able to provide estimates for these other recyclers). This results in a total estimated formal PET recycling capacity of 66,900 TPY.
5. The estimated informal pre-processor capacity has been calculated as: PET Collected for recycling less PET formal recycler capacity less PET exported as scrap. The estimated informal capacity aims to account for the informal pre-processors that are known to turn PET into rPET flakes and then export to China; this practice has been widely reported by multiple stakeholders.
6. The major formal PET recyclers as of 2019 include Toplun Plastic Corporation, Infinity Eight Trading and Marketing Corporation and Yi Lu Jia Plastics. The output of both is PET flakes.
7. Additional planned recycling capacity (from 2020 onwards) includes Indorama Ventures Packaging (Philippines) Corporation in collaboration with Coca-Cola Philippines, Toplun Plastic Corporation and Yi Lu Jia Plastics. Indorama Ventures Packaging (Philippines) Corporation will be the first in the Philippines to produce food-grade rPET pellets.

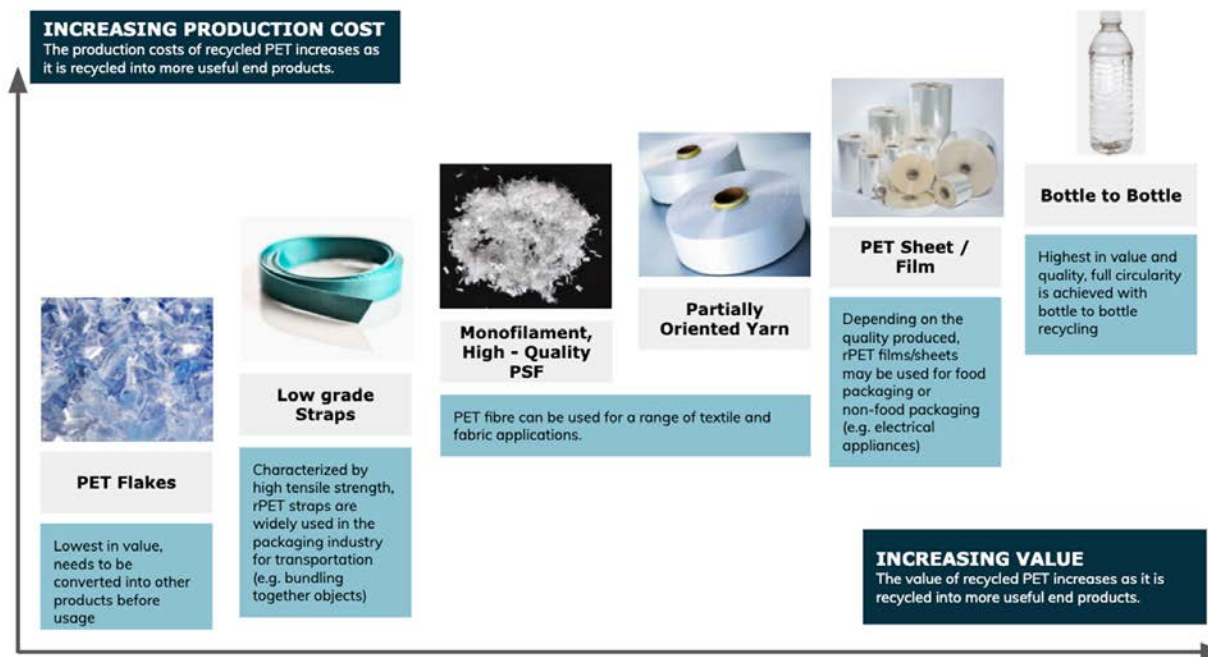
Figure 9 Notes continued:

8. Please refer to Appendix 10B for a breakdown between estimated installed formal and informal capacity and estimated actual utilization.
9. While key stakeholders are represented in the above, this is not an exhaustive list of all PET recyclers in the Philippines. Note that there are no PET resin producers in the Philippines.\*

\* The data for formal PET recycling is representative as this study team has received inputs from all key formal PET recyclers which represent upwards of 90% of formal PET recycling capacity. Estimates regarding the remaining formal recyclers and regarding informal recyclers are based on inputs from formal PE recyclers and are thus considered representative. PPIA and APMP have confirmed there are no PET resin producers.

Figure 9.

## EXAMPLE OF BREAKDOWN OF THE VALUE OF RECYCLED PRODUCTS FROM PET



Note: Bottle to bottle rPET resin can be considered to be the most valuable recycled product.

### Material Flow Analysis (MFA) For PET

There are three key messages from the MFA of PET in the Philippines, as shown in Figure 10:

- PET resins are not produced in the Philippines. All converted PET resins are imported, mainly from other Asian countries.
- The CFR rate for PET packaging (including bottles, sheet and films) varies widely between 20% to 65%. The wide range of recycling rate is mainly due to two reasons:
  - The recycling rate varies significantly between applications. The recycling rate for PET beverage bottles is estimated at between 35-65%, given their high value, while for other PET packaging applications, (sheets, films, oil bottle applications, cosmetic applications, etc.) it is estimated to be between 20-30%.
  - Stakeholders such as aggregators and recyclers responding to price fluctuations. As prices drop, aggregators and recyclers slow collection as it gets less profitable to do business. When prices rise, collection increases again as these stakeholders take advantage of the higher prices.
- There is insufficient recycling capacity in the Philippines:
  - Current formal recycling capacity is estimated at 66,900 TPY. It must be noted that all of this is in the form of PET flakes (so technically is considered as pre-processing, not recycling). Informal recycling/processing capacity is estimated at approximately half of the formal amount. Stakeholders interviewed in the Philippines widely report that there are many informal PET processors that create PET flakes and export overseas, mainly to China.
  - None of the PET bottles collected-for-recycling are recycled into food grade materials. This is important as food-grade rPET has the highest value in the market and achieves circularity (i.e. bottle-to-bottle recycling). Furthermore, it is more resistant to drops in prices for virgin PET as demand for food-grade rPET is increasing due to sustainability commitments of global food and beverage corporations. However, food grade rPET will be produced in the Philippines starting from 2022 via the investment by Indorama Ventures Packaging (Philippines) Corporation and Coca-Cola Philippines.



Figure 10.  
MATERIAL FLOW ANALYSIS OF PET RESIN IN THE PHILIPPINES (TPY)

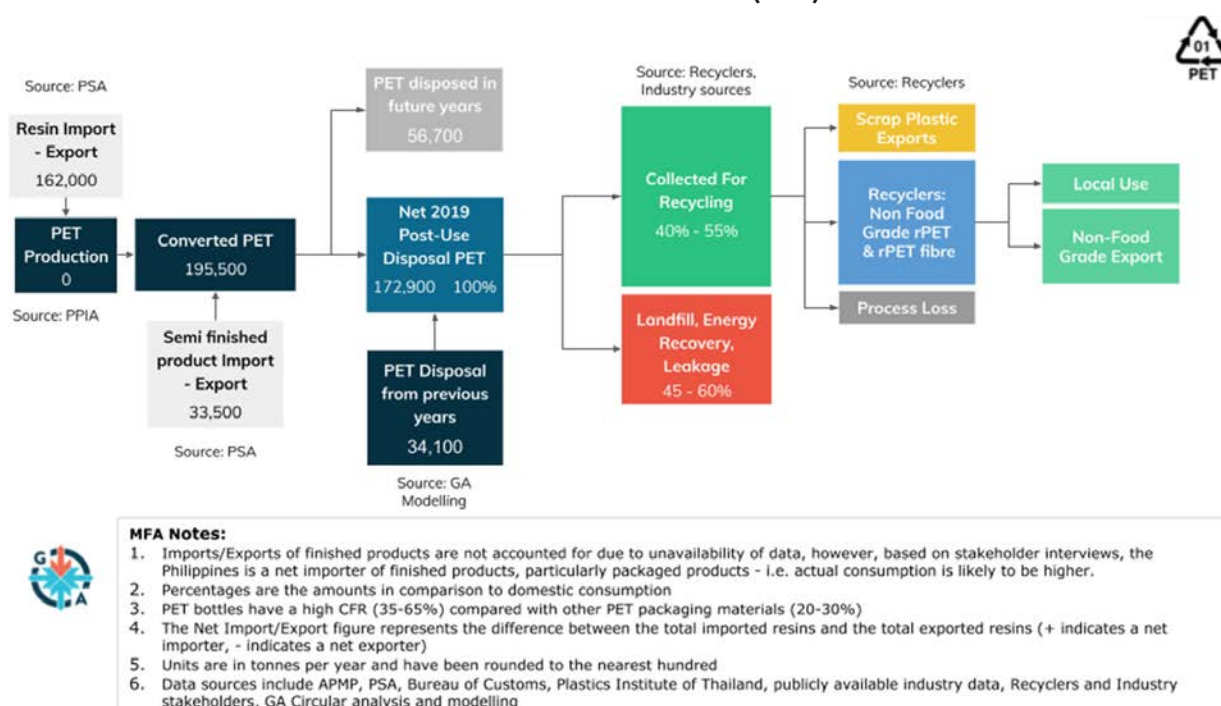


Figure 10 Notes:

- Data sources for resin production, imports and exports, material accumulation in future years and disposal from previous years, consumption, and collection-for-recycling and its breakdown include: Association of Petrochemical Manufacturer of the Philippines (APMP), Philippines Statistic Authority (PSA), UN Comtrade, publicly available industry data, recyclers and industry stakeholders including brand owners, industry associations and NGOs, GA Circular analysis and modeling.
- In reality, most of these values have wide fluctuations. The values shown in this chart are our best average estimates of the realities.

In addition, the consultant team has researched the material flow for **PET Polyester**; more than 90% of PET Polyester is imported in the form of semi-finished products and it is estimated that less than 1% currently gets collected-for-recycling due to the non-existence of a dedicated recycling sector. Therefore, this material has not been further included in the focus of the study. For the PET Polyester MFA please refer to Appendix 11.

### Material Value Loss Analysis for PET Packaging

Figure 11 represents the value unlocked for PET packaging based on the MFA for PET. The key findings are:

- Average CFR is 48% and Value Yield is 73%. This results in a material value unlocked of 35%. The CFR value includes all PET Packaging (e.g. bottles, films, and sheets).
- Therefore, an average of 65% of the material value of PET packaging is lost. This is equivalent to USD 132-156 million of material value lost per year.



Photo: Alberto Stocco / Shutterstock

Figure 11.

## MATERIAL VALUE LOSS ANALYSIS FOR PET PACKAGING (BASED ON 2019 VOLUMES)

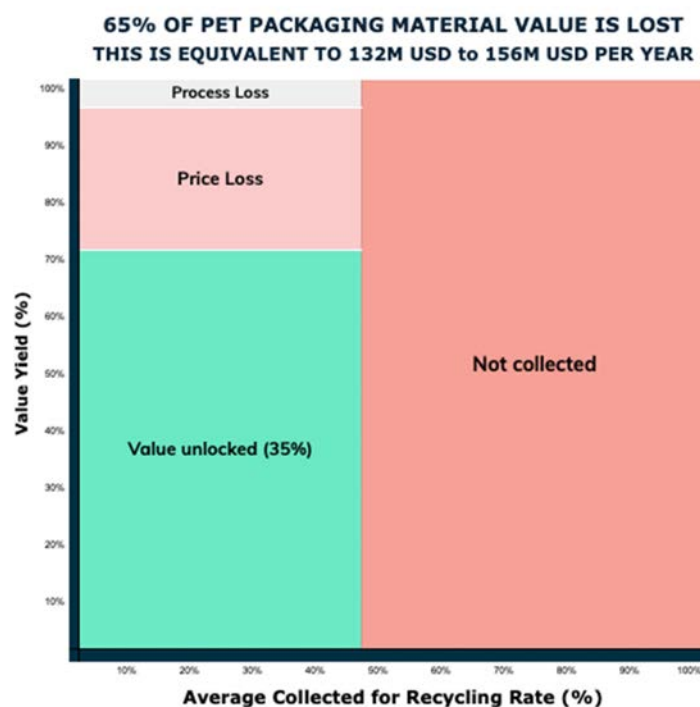


Figure 11 Notes:

1. Value yield = volume yield x price yield where volume yield = output volumes/input volumes, and price yield = weighted average USD per tonne of reprocessed PET/USD per tonne of most valuable recycled product from PET.
2. 100% CFR rate and value yield has been used in material value analysis across this study for illustrative purposes only as targets are typically set based on 100% of market inputs/material.
3. MVRP for PET packaging is a mix of food-grade rPET, rPET flakes, rPOY and rPSF used in apparel applications.
4. Current situation for PET packaging is an average of 94% volume yield (as process losses are approximately 6%) and 78% price yield, thus giving a 73% value yield.
5. Total volume of PET packaging of 173,000 TPY, and Most Valuable Recycled Product under weighted average best circular scenario price of USD 1,273/ton.
6. CFR rate only includes PET packaging (i.e. not other contaminants).
7. Process losses only includes PET packaging (i.e. not other contaminants).
8. All percentages used here are weighted average values.
9. Please see Appendix 8 for further information regarding the values and calculations.



### 2.2.2 PP

#### General Characteristics of PP

PP is a tough, rigid and crystalline thermoplastic produced from propene (or propylene) monomers. Its good barrier properties, high strength, good surface finish and low cost make PP ideal for several packaging applications. PP is among the cheapest plastics available today. It is widely used in:

- Packaging Applications: used for both rigid and flexible packaging
- Automotive Applications: battery cases and trays, bumpers, fender liners, interior trim, instrumental panels and door trims

- Fibers and Fabrics: A large volume of PP utilized in strapping, filament and staple fibers

PP can be recycled into the following:

- rPP for packaging applications
- rPP for industrial application: auto, electronics and furniture industries

#### PP Resin Production and Estimated Recycling Capacity in the Philippines

Figure 12 shows the respective amounts of virgin PP production and the estimated recycled PP resin. For this resin, a significant component of the collected PP gets processed via informal recyclers or pre-processors.

Figure 12.

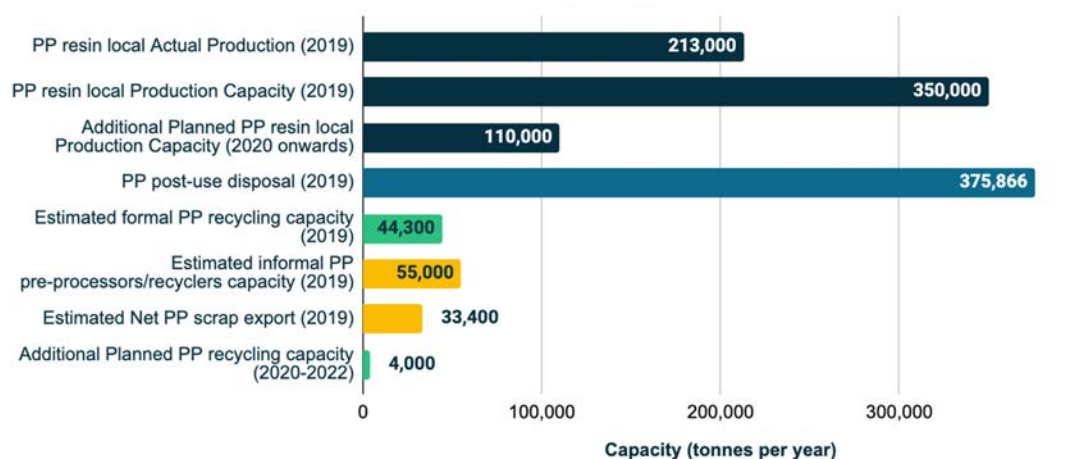
**PP RESIN PRODUCTION, POST-USE DISPOSAL AND RECYCLING IN THE PHILIPPINES**

Figure 12 Notes:

1. PP virgin resin producers in the Philippines include JG Summit (capacity 190,000 TPY) and PPI (capacity 160,000 TPY). Additional planned PP resin production capacity is planned by JG Summit. The Actual Resin Production for 2019 is based on data provided by industry stakeholders, including the resin producers, PPIA and APMP.
2. The capacity values stated are for 2019. The producer capacities and Estimated Recycling Capacity are based on 2019 values while the Planned Recycling Capacity is as of December 2019 (i.e. will become operational during 2020 -2022).
3. PP scrap export is an estimate and is based on the net of imports and exports. See Appendix 9 for the assumptions related to scrap plastic imports and exports per resin.
4. Estimated formal recycling capacity is based on known formal recycling capacity of 36,900 TPY (based on interviews with 9 recyclers) plus an estimated/assumed amount to an additional 20% (based on knowledge of the existence of a minimum of 6 minor other recyclers which are known to or believed to recycle this resin, but where their capacity is not known as they were not contactable or responsive for this study and other industry sources have not been able to provide estimates for these other recyclers). This results in a total estimated formal PP recycling capacity of 44,300 TPY.
5. The informal pre-processor capacity has been calculated as: PP Collected for recycling - PP formal recycler capacity - PP exported as scrap.
6. The major formal PP recyclers include Citipoly Industries Inc., Infinity Eight Trading and Marketing Corporation, New Foundland Plastic Manufacturing Corporation, Reinheart Marketing, Geoplast Corporation, TAT Recyclables and Renewables Corporation, Manly Plastics Inc. and Envirotech Waste Recycling Inc.
7. Additional planned formal PP recycling capacity (from 2020 onwards) includes New Foundland Plastic Manufacturing Corporation and Envirotech Waste Recycling Inc.
8. Please refer to Appendix 10B for a breakdown between installed capacity and estimated actual utilization.
9. While key stakeholders are represented in the above, this is not an exhaustive list of all PP producers and recyclers in the Philippines.\*

\* The data for formal PP recycling is representative as this study team has received inputs from key formal PP recyclers which is considered to represent upwards of 80% of formal PP recycling capacity. Estimates regarding the remaining formal recyclers and regarding informal recyclers are based on inputs from formal PE recyclers and are thus considered representative. The data for resin production is considered representative as one of the two key resin producers was interviewed (JG Summit), whilst insights on the other resin producer (PPI) were provided by PPIA and APMP.

**Material Flow Analysis (MFA) For PP**

There are three key messages from the MFA of PP in the Philippines, as shown in Figure 13:

1. PP has a CFR rate of about 25%-35%. This CFR range is estimated based on interviews with key local stakeholders.
2. A high proportion of PP is used in film packaging applications, which includes food packaging. These PP film products are contaminated or have prints on them which recyclers are unable to take out.
3. PP components that are non-recyclable are those used in composite products in industrial applications (e.g. in electronics, automotives). The composite nature of the products mean that an additional step of dismantling and separation is

Therefore, such PP products tend to have low value yields when recycled and therefore remain uncollected. In Metro Manila, 2019 street sales prices of rigid PP from collectors to junkshops was on average PHP 15/kg while from junkshops to aggregators was on average 17-18/kg.



Figure 13.  
MATERIAL FLOW ANALYSIS OF PP RESIN IN THE PHILIPPINES (TPY)

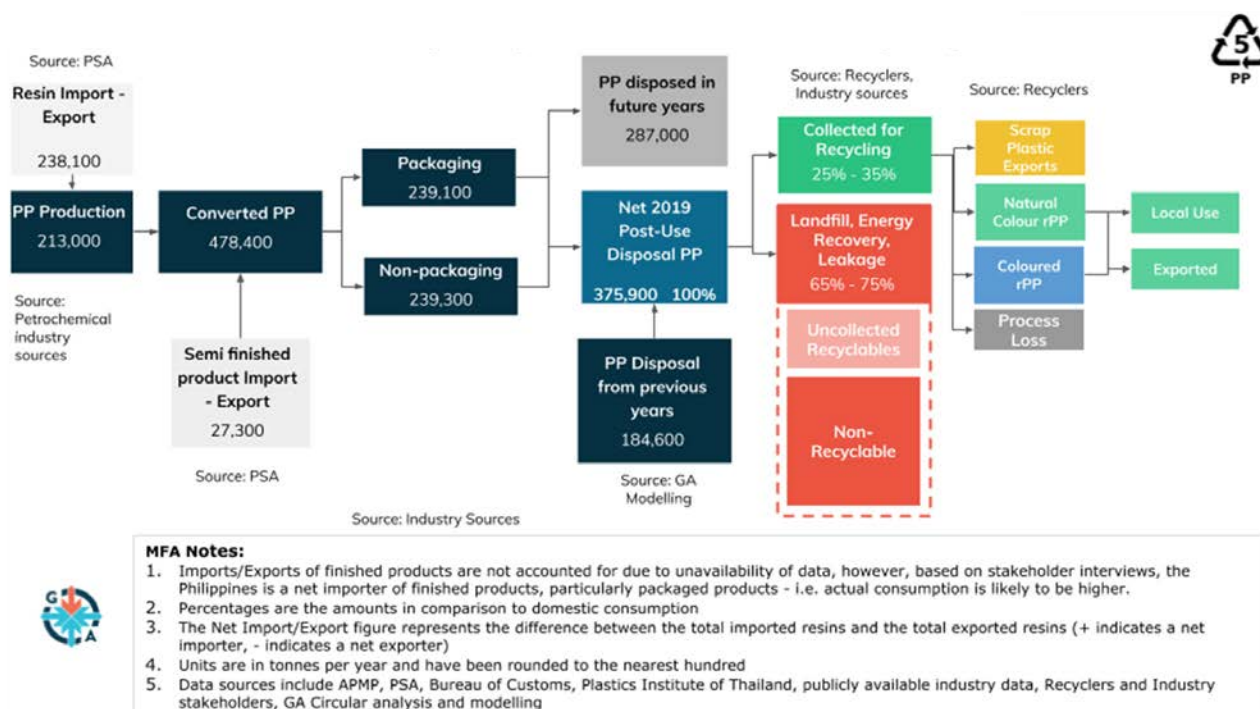


Figure 13 Notes:

1. Data sources for resin production, imports and exports, material accumulation in future years and disposal from previous years, consumption, and collection-for-recycling and its breakdown include: Association of Petrochemical Manufacturer of the Philippines (APMP), Philippines Statistic Authority (PSA), UN Comtrade, Plastics Institute of Thailand, publicly available industry data, recyclers and industry stakeholders including brand owners, industry associations and NGOs, GA Circular analysis and modeling .
2. In reality, most of these values have wide fluctuations—the values in this chart are our best average estimates of the realities.

required before it can be collected for recycling. This requires dedicated facilities (e.g. dedicated car bumper recycling facilities) which currently do not exist in the Philippines.

### Material Value Loss Analysis for PP

Figure 14 represents the value unlocked for PP based on the MFA for PP. The key findings are:

- Average CFR is 30% and Value Yield is 78%. This results in a material value unlocked of 23%.
- Therefore, an average of 77% of the material value of PP is lost. This is equivalent to USD 272-301 million of material value lost per year.



Photo: Antonio V. Oquias / Shutterstock



Figure 14.

## MATERIAL VALUE LOSS ANALYSIS FOR PP (BASED ON 2019 VOLUMES)

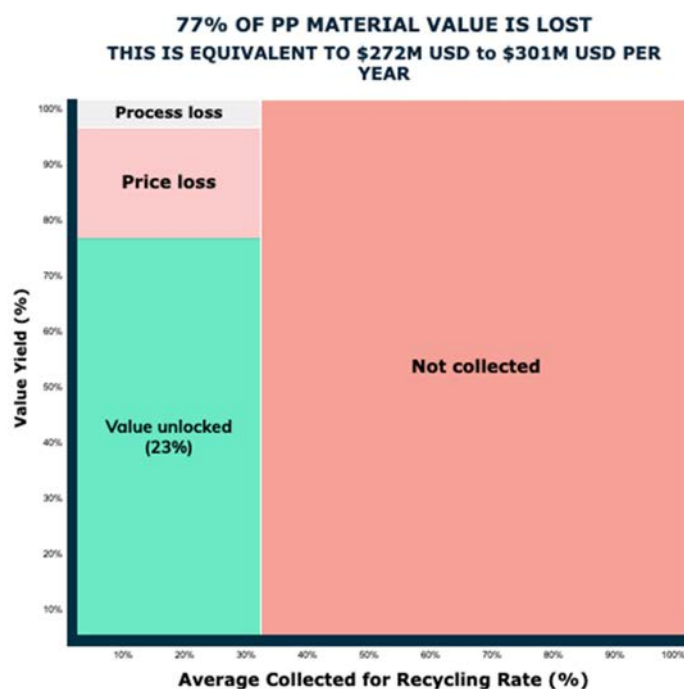


Figure 14 Notes:

1. Value yield = volume yield x price yield where volume yield = output volumes/input volumes, and price yield = weighted average USD per tonne of reprocessed PP/USD per tonne of most valuable recycled product from PP.
2. 100% CFR rate and value yield has been used in material value analysis across this study for illustrative purposes only as targets are typically set based on 100% of market inputs/material.
3. MVRP for PP is rPP food-grade pellets which are being manufactured in some countries but not yet in the Philippines. Only some of the Philippines' PP can be turned into rPP food-grade, so a weighted average of the products is used to calculate the MVRP price for rPP.
4. Current situation for PP is an average of 97% volume yield (as process losses are approximately 3%) and 80% price yield, thus giving a 78% value yield.
5. Total volume of PP is 375,900 TPY, and Most Valuable Recycled Product under weighted average best circular scenario price of USD 993/ton.
6. CFR rate only includes PP (i.e. not other contaminants).
7. Process losses only includes PP (i.e. not other contaminants).
8. All percentages used here are weighted average values.
9. Please see Appendix 8 for further information regarding the values and calculations.

### 2.2.3 PE (HDPE and LDPE)

A breakdown between HDPE and LDPE/LLDPE resin productions is difficult to develop for the Philippines due to lack of data at the virgin resin production stage. According to the Philippine petrochemical industry the amounts of HDPE and LDPE/LLDPE resins produced in the country vary following their market prices.

#### PE Resin Production and Estimated Recycling Capacity

Figure 15 shows the amounts of virgin PE produced and the estimated recycled PE resins in the country. For these plastics, a significant component of the collected PE gets processed via informal recyclers or pre-processors.

The total PE production and conversion was considered for the MFA, given some uncertainties for resin production breakdown between HDPE and LDPE. Subsequently, a breakdown between HDPE and LDPE resins was modeled and a specific MFA for each resin is developed starting from this stage. The breakdown between HDPE and LDPE in Figure 16 was based on data provided by Philippines industry sources (49.6% HDPE, 50.6% LDPE) and the breakdown in other comparative Southeast Asian countries. The breakdown is approximately 47% HDPE and 53% LLDPE/LDPE.

Figure 15.

## PE RESIN PRODUCTION, POST-USE DISPOSAL AND RECYCLING IN THE PHILIPPINES

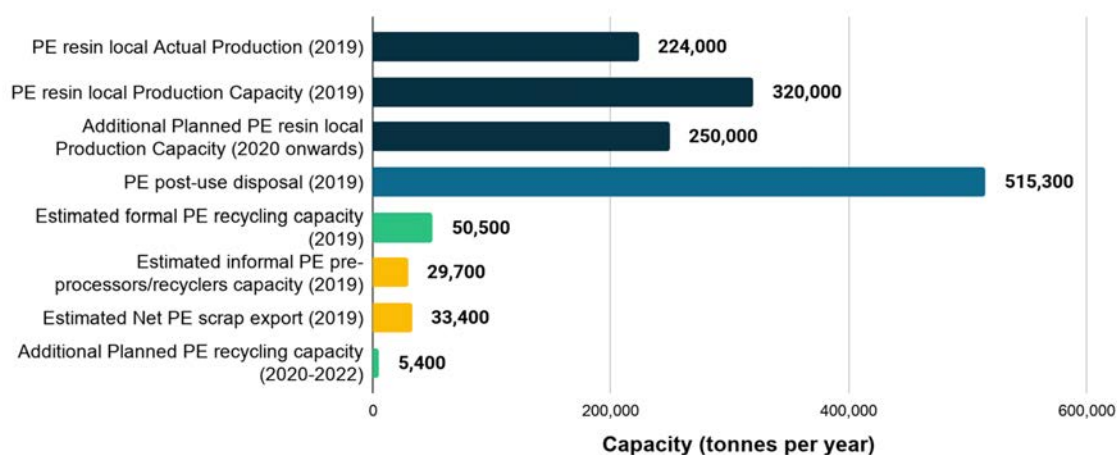


Figure 15 Notes:

1. PE virgin resin production in the Philippines is limited to JG Summit who is planning to increase its PE production capacity in the next years.
2. The capacity values stated are for 2019. The producer capacities and Estimated Recycling Capacity are based on 2019 values while the Planned Recycling Capacity is as of December 2019 (i.e. will become operational during 2020 -2022).
3. PE scrap export is an estimate and is based on the net of imports and exports. See Appendix 9 for the assumptions related to scrap plastic imports and exports per resin.
4. Estimated formal recycling capacity is based on known formal recycling capacity of 42,050 TPY (based on interviews with 10 recyclers) plus an estimated/assumed amount to an additional 20% (based on knowledge of the existence of a minimum of 6 minor other recyclers which are known to or believed to recycle this resin, but where their capacity is not known as they were not contactable or responsive for this study and other industry sources have not been able to provide estimates for these other recyclers). This results in a total estimated formal PP recycling capacity of 50,500 TPY.
5. The informal pre-processor capacity has been calculated as: PE Collected for recycling - PE formal recycler capacity - PE exported as scrap.
6. The major formal PE recyclers included in the analysis are Citipoly Industries Inc., Infinity Eight Trading and Marketing Corporation, New Foundland Plastic Manufacturing Corporation, Reinheart Marketing, Geoplast Corporation, TAT Recyclables and Renewables Corporation, Manly Plastics Inc., Toplun Plastic Corporation, Envirotech Waste Recycling Inc.
7. Additional planned formal PP recycling capacity (from 2020 onwards) includes New Foundland Plastic Manufacturing Corporation, Toplun Plastic Corporation and Envirotech Waste Recycling Inc.
8. Please refer to Appendix 10B for a breakdown between installed capacity and estimated actual utilisation.
9. While key stakeholders are represented in the above, this is not an exhaustive list of all PE producers and recyclers in the Philippines.\*

\* The data for formal PE recycling is representative as this study team has received inputs from key formal PP recyclers which are considered to represent upwards of 80% of formal PE recycling capacity. Estimates regarding the remaining formal recyclers and regarding informal recyclers are based on inputs from formal PE recyclers and are thus considered representative. The data for resin production is considered representative as the only resin producer was interviewed (JG Summit) in addition to insights provided by PPIA and APMP.



### 2.2.3.1 HDPE

#### General Characteristics of HDPE

HDPE is a thermoplastic polymer produced from the monomer ethylene. It is known for its high strength to density ratio, making it suitable for a very wide variety of rigid plastic applications. While it can also be used for film packaging applications too (especially where a stronger film is needed), its opacity means that LDPE/LLDPE is preferred in most cases.

- Packaging Applications: shampoo bottles, milk jugs, plastic shopping bags
- Automotive Applications: fuel tanks, inner and outer protective covers

HDPE can be recycled into the following:

- rHDPE for packaging applications: shampoo bottles, plastic bags
- rHDPE for industrial application: automotive and electronics components

## Material Flow Analysis (MFA) For HDPE

There are four key messages from the MFA of HDPE in the Philippines, as shown in Figure 17:

1. HDPE has a CFR rate of about 25%-35%. This CFR range is estimated based on interviews with key local stakeholders and past research conducted by GA Circular.
2. Similar to PP, a high proportion of HDPE is used in film packaging applications, which includes food packaging and plastic garbage bags. These HDPE products are contaminated and also therefore have low value yields and therefore remain uncollected.
3. Rigid HDPE is often recycled into plastic shopping bags (known locally as sando bags). These bags

Figure 16.

## BREAKDOWN BETWEEN HDPE AND LLDPE/LDPE

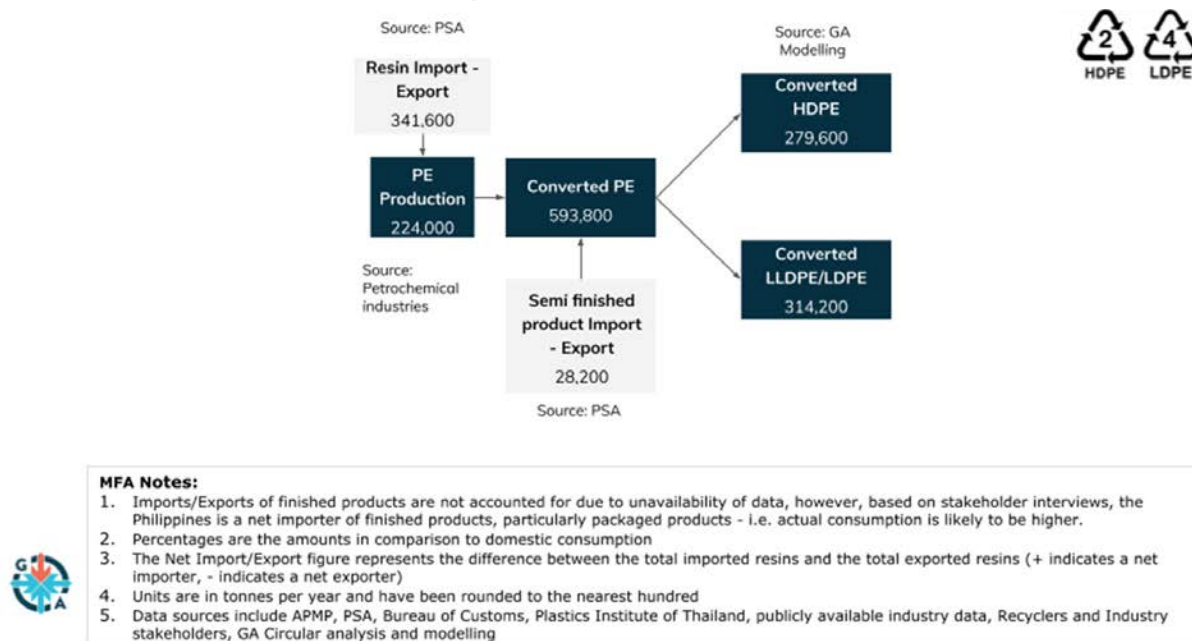
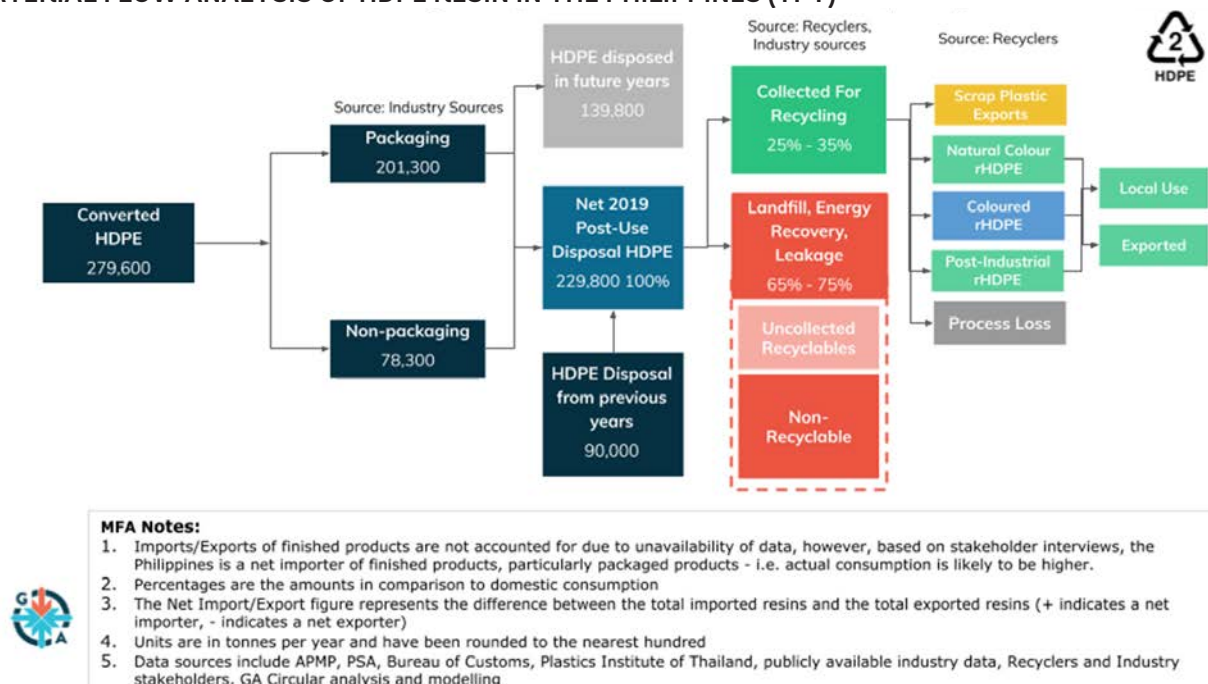


Figure 17.

## MATERIAL FLOW ANALYSIS OF HDPE RESIN IN THE PHILIPPINES (TPY)



contain approximately 75% rHDPE and 25% rLDPE.<sup>43</sup> Sando bags are not recycled as they do not have street value among the informal sector. In Metro Manila, 2019 street sales prices of rigid HDPE from collectors to junkshops was on average PHP 15/kg, while from junkshops to aggregators was on average 17-18/kg.

4. HDPE components that are non-recyclable are those used in composite products in industrial applications (e.g. in electronics, automotives). The composite nature of the products mean that an additional step of dismantling and separation is required before it can be collected for recycling.

This requires dedicated facilities (e.g. dedicated car bumper recycling facilities) which currently do not exist in the Philippines.

### Material Value Loss Analysis for HDPE

Figure 18 represents the value unlocked for HDPE based on the MFA for HDPE. The key findings are:

- Average CFR is 30% and Value Yield is 83%. This results in a material value unlocked of 25%.
- Therefore, an average of 75% of the material value of HDPE is lost. This is equivalent to USD 172-192 million of material value lost per year.

43 Interviews with local plastic recyclers

Figure 18.

### MATERIAL VALUE LOSS ANALYSIS FOR HDPE (BASED ON 2019 VOLUMES)

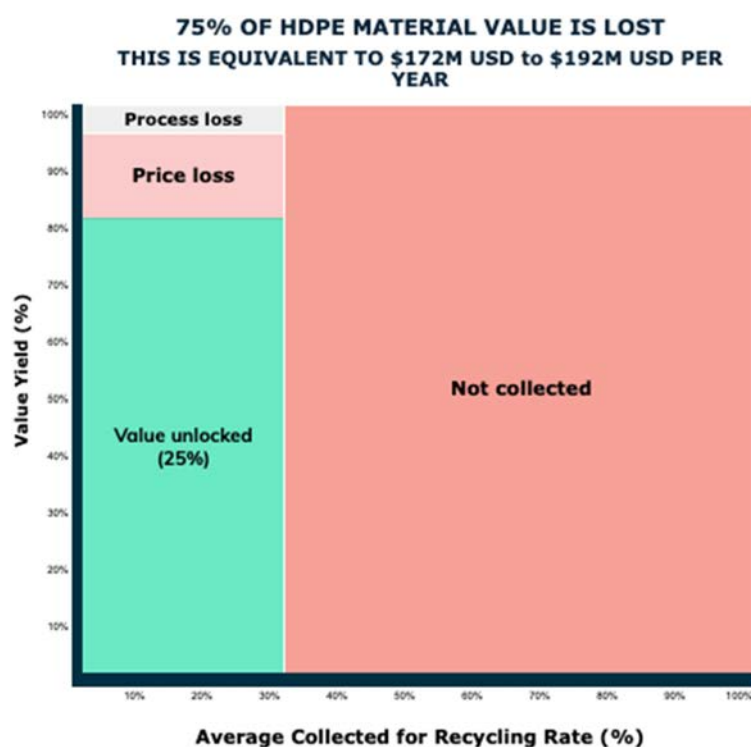


Figure 18 Notes:

1. Value yield = volume yield x price yield where volume yield = output volumes/input volumes, and price yield = weighted average USD per tonne of reprocessed HDPE/USD per tonne of most valuable recycled product from HDPE.
2. 100% CFR rate and value yield has been used in material value analysis across this study for illustrative purposes only as targets are typically set based on 100% of market inputs/material.
3. MVRP for HDPE is rHDPE food-grade pellets which are being manufactured in some countries but not yet in the Philippines. Only some of the Philippines' HDPE can be turned into rHDPE food-grade, a weighted average of the different products is used to calculate the MVRP price for rHDPE.
4. HDPE is an average of 97% volume yield (as process losses are approximately 3%) and 85% price yield, thus giving a 83% value yield.
5. Total volume of HDPE is 229,800 TPY, and MVRP under weighted average best circular scenario price of USD 1,055/ton.
6. CFR rate only includes HDPE (i.e. not other contaminants).
7. Process losses only includes HDPE (i.e. not other contaminants).
8. All percentages used here are weighted average values.
9. Please see Appendix 8 for further information regarding the values and calculations.



### 2.2.3.2 LDPE/LLDPE

#### General Characteristics of LDPE

LDPE is a thermoplastic polymer produced from the monomer ethylene.

While it has a slightly lower density, the ability to make it in transparent form means that it is used mainly in film applications for both packaging and non-packaging applications. Some products that can be made from LDPE are:

- Meat and poultry wrapping
- Dairy products
- Snacks and sweets
- Frozen food bags
- Baked goods

LDPE can be recycled into the following:

- Plastic lumber, furniture
- Trash bags, sheeting, films (for agriculture)
- Flooring

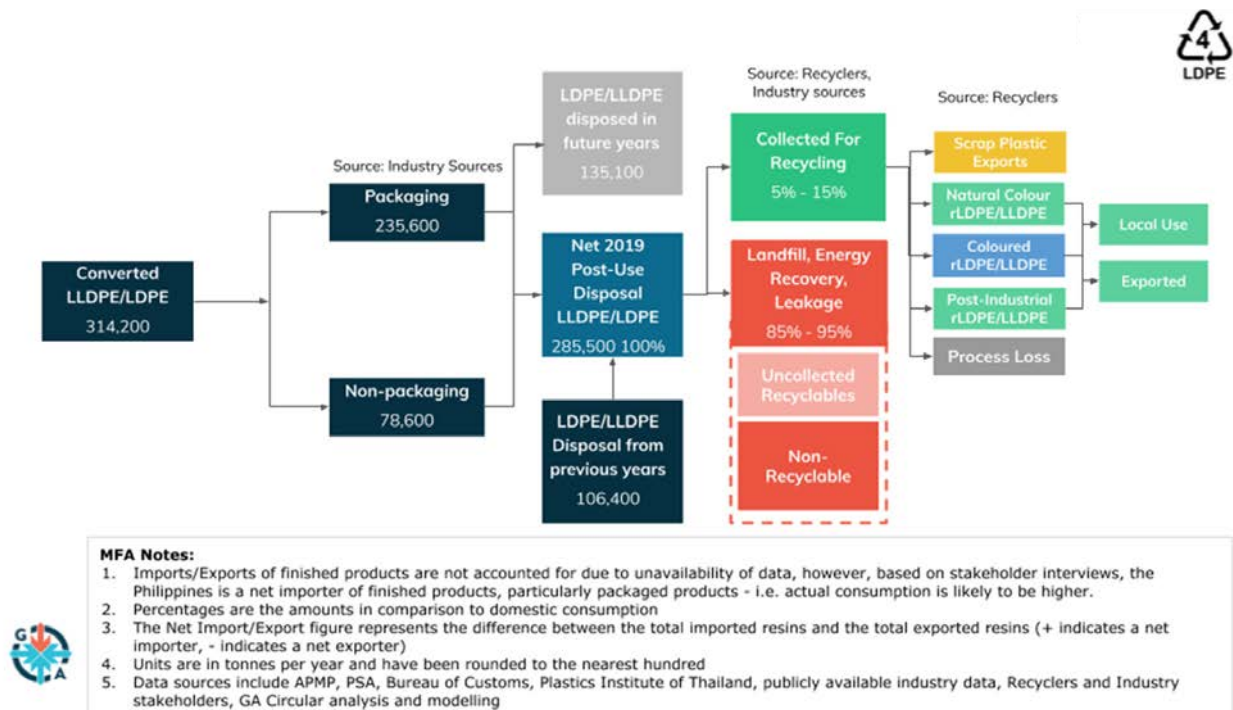
#### Material Flow Analysis (MFA) For LDPE/LLDPE

There are four key messages from the MFA of LDPE/LLDPE, as shown in Figure 19:

1. LDPE has a CFR rate of about 5%-15%. This CFR range is estimated based on interviews with key local stakeholders and past research conducted by GA Circular.
2. A high proportion of LDPE is used in film packaging applications, which includes food packaging. These LDPE products are contaminated and also therefore have low value yields and therefore remain uncollected. Rigid LDPE however does have value—in Metro Manila, 2019 street sales prices of rigid LDPE from collectors to junkshops was on average PHP 15/kg while from junkshops to aggregators was on average 17-18/kg.

Figure 19.

#### MATERIAL FLOW ANALYSIS OF LDPE/LLDPE RESIN IN THE PHILIPPINES (TPY)





3. LDPE is commonly used in sando bags, which are difficult to get collected segregated by colors, have no street value among the informal sector and therefore no recyclers are currently collecting them.
4. LDPE components that are non-recyclable are those used in composite products in industrial applications (e.g. in electronics, automotives). The composite nature of the products mean that an additional step of dismantling and separation is required before it can be collected for recycling.

### Material Value Loss Analysis for LDPE/LLDPE

Figure 20 represents the value unlocked for HDPE based on the MFA for LDPE/LLDPE.

The key findings are:

- Average CFR is 10% and Value Yield is 92%. This results in a material value unlocked of 9%.
- Therefore, an average of 91% of the material value of LDPE/LLDPE is lost. This is equivalent to USD 217-240 million of material value lost.

Figure 20.

### MATERIAL VALUE LOSS ANALYSIS FOR LDPE/LLDPE (BASED ON 2019 VOLUMES)

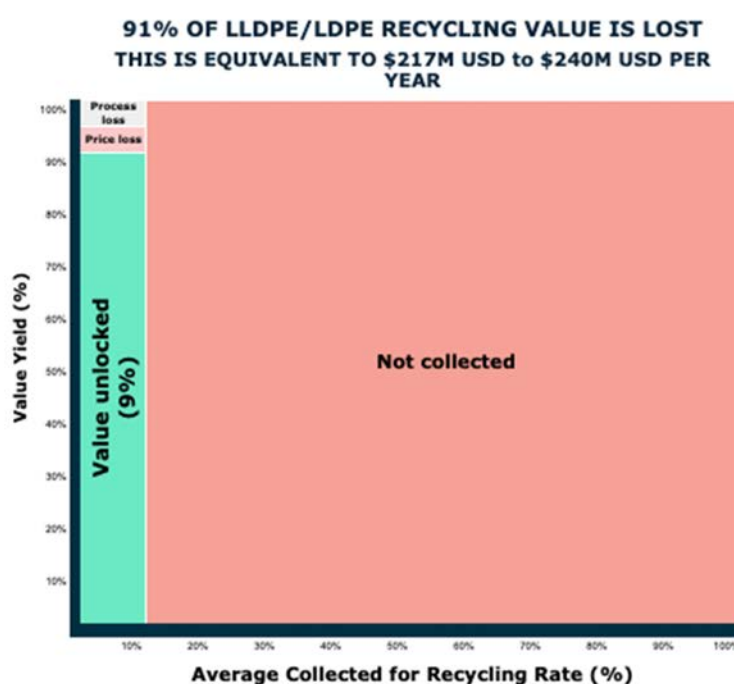


Figure 20 Notes:

1. Value yield = volume yield x price yield where volume yield = output volumes/input volumes, and price yield = weighted average USD per tonne of reprocessed LDPE or LLDPE/USD per tonne of most valuable recycled product from LDPE or LLDPE.
2. 100% CFR rate and value yield has been used in material value analysis across this study for illustrative purposes only as targets are typically set based on 100% of market inputs/material.
3. MVRP for LDPE or LLDPE is rLDPE natural pellets. As only some of the Philippines' LDPE/LLDPE can be turned into rLDPE natural pellets, a weighted average of the different products is used to calculate the MVRP price for rLDPE.
4. Current situation for LDPE or LLDPE is an average of 97% volume yield (as process losses are approximately 3%) and 95% price yield, thus giving a 92% value yield.
5. Total volume of LDPE or LLDPE is 285,500 TPY, and Most Valuable Recycled Product under weighted average best circular scenario price of USD 924/ton.
6. CFR rate only includes LDPE or LLDPE (i.e. not other contaminants).
7. Process losses only include LDPE or LLDPE (i.e. not other contaminants).
8. All percentages used here are weighted average values.
9. Please see Appendix 8 for further information regarding the values and calculations.

## 2.3 SUMMARY OF RESINS IN FOCUS

### 2.3.1 MFA for All Resins

Key insights from comparing the MFA between the resins shows:

1. PET Packaging has the highest CFR rates of all four resins. This is due to several reasons:
  - a. The number of end-use applications that are used by PET packaging is limited compared to other materials which simplifies the collection process. A majority of the usage of PET is for food and beverage packaging hence collectors are able to easily identify them (e.g. PET plastic bottles). On the other hand, the other resins can be used in a wide range of applications such as electronics, automotives and construction components and this complicates the process of collection.
  - b. The technology and relatively high capacities for processing PET packaging into various applications and demand from global end-use markets for recycled PET gives PET packaging recycling a “headstart” when compared to the recycling for other resins.
  - c. The recycled products from PET, such as flakes, are in demand by the fiber industry in China who use the flakes to create rPSF and/or rPOY. There has also been growing demand from the FMCG industry for rPET flakes.
  - d. PET packaging has a much lower consumption amount than the other resins (about 173,000 TPY for PET packaging versus 376,000 TPY for PP packaging, 230,000 TPY for HDPE packaging and 285,000 TPY for LDPE/LLDPE packaging).
2. The recycling rates for PP and HDPE are much higher than for LDPE/LLDPE. This is mainly due to film applications making up a much larger proportion of LDPE and LLDPE than either PP or HDPE. Hence, since plastic films have lower value due to the difficulty in collection (its light weight means that more pieces need to be collected per kg of material) and the ease of contamination, plastic films are collected in much lower amounts than rigids by the informal sector.



Photo: Meryll / Shutterstock

3. The weighted average of the CFR rates of all the key plastic resins for 2019 is estimated at 28% (Figure 21). The current plastic recycling rate is still low as compared to the target of recovering and recycling 40% of plastic material inputs by 2022 indicated in the Philippine Plastics Industry Roadmap in 2014.<sup>44</sup> For context, the global CFR rate for PET is between 55%-57%<sup>45</sup> (global CFR rates specifically for polyolefins are unavailable) while the Ellen MacArthur Foundation estimates the CFR rate for all plastic packaging (i.e. packaging made from all types of plastic resins—PET, HDPE, PVC, LLDPE/LDPE, PP, PS and others) to be 14%.<sup>46</sup>

1.1 million TPY of the key resins was disposed of in the Philippines in 2019. Of this, 292,000 TPY was

collected-for-recycling while 771,000 TPY was not collected-for-recycling (see Figure 22).

### Material Value Loss Analysis for All Resins

To emphasize the sense of urgency needed to address the large plastic recycling gap, Figure 23 summarizes the net material value lost each year in the Philippines due to this gap.

- The Philippines currently unlocks USD 246 million/year from recycling various plastic resins but has the potential to unlock material value four times higher up to USD 1.1 billion/year.
- Currently only 22% of the possible value from recycling is being unlocked, leading to a loss of 78% of the value (see Figure 24). This is equivalent to a loss of USD 793-889 million/year and this is the theoretical maximum addressable market opportunity for plastics recycling for the Philippines.

44 DTI, PPIA and BOI - [Philippine Plastic Industry Roadmap \(2014\)](#)

45 S&P Global Platts Petrochemicals Special Report (2019)

46 The New Plastics Economy: Catalysing Action (2017)

Figure 21.

### ESTIMATED CFR RATES FOR EACH RESIN

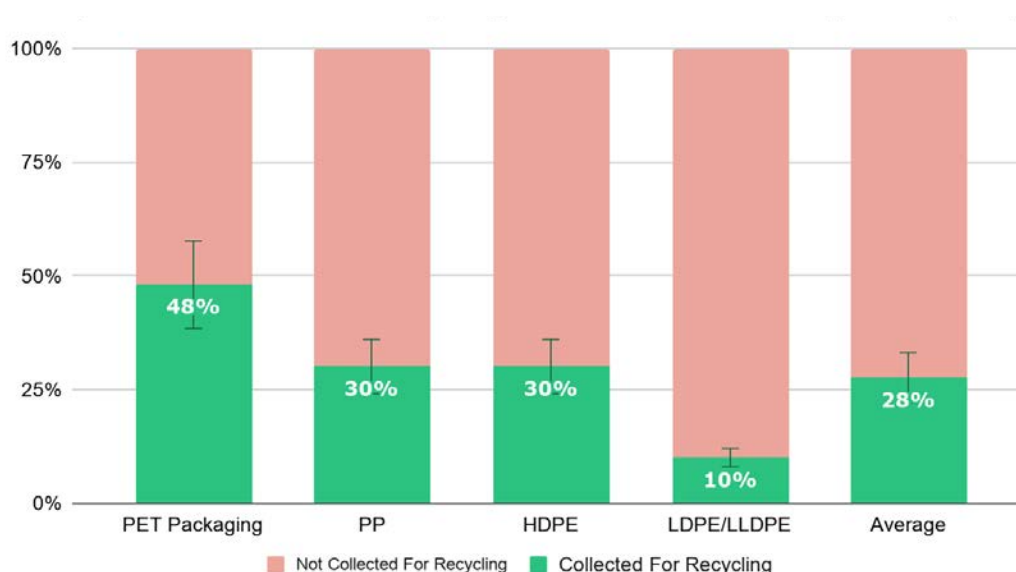


Figure 22.

**ESTIMATED TOTAL COLLECTED FOR RECYCLING OUT OF TOTAL CONSUMPTION FOR EACH RESIN**

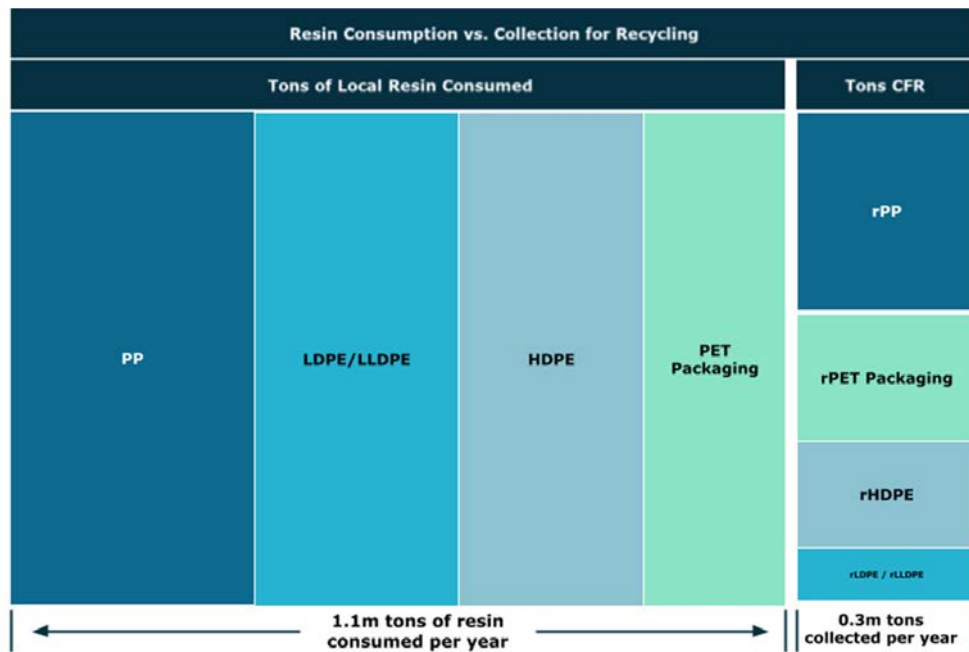


Figure 23.

**ESTIMATED MATERIAL VALUE UNLOCKED VS MATERIAL VALUE LOST**

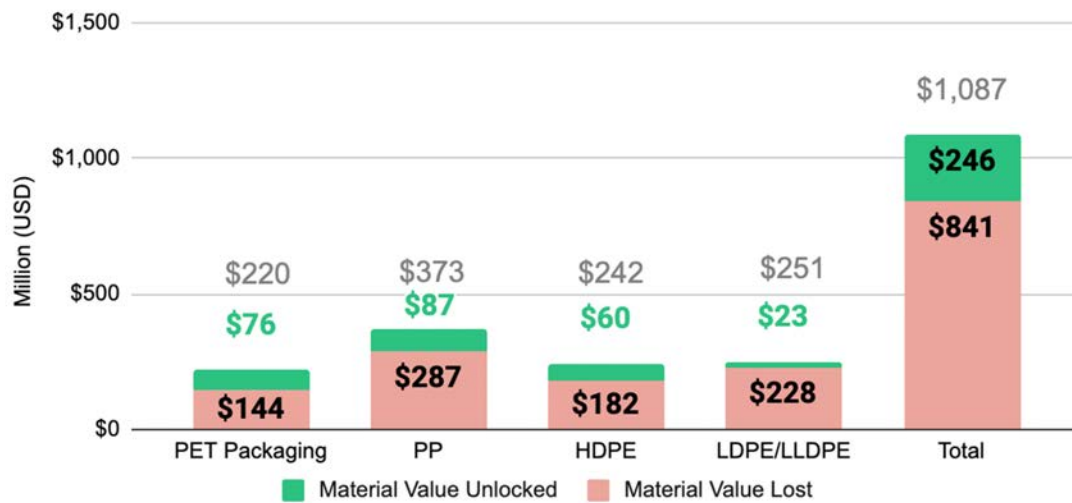
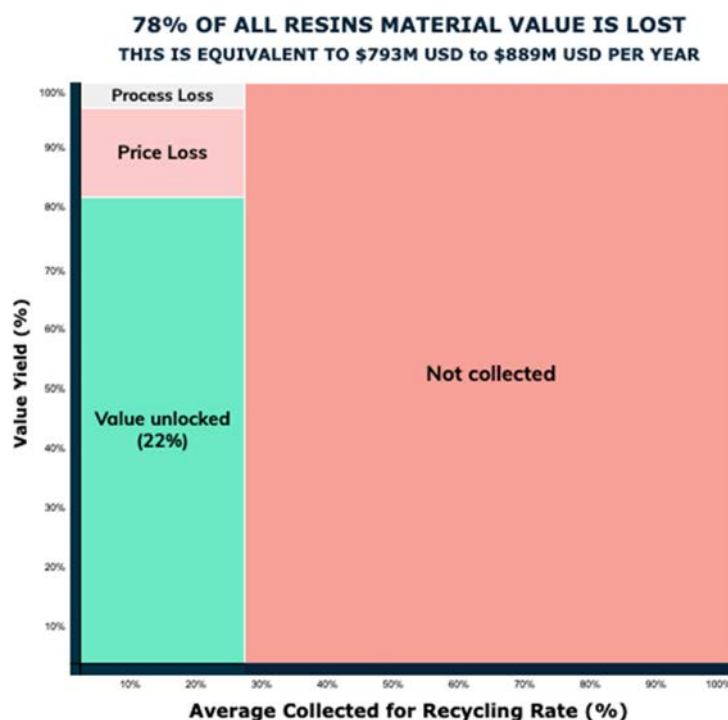




Figure 24.

## MATERIAL VALUE LOSS ANALYSIS FOR ALL KEY RESINS (BASED ON 2019 VOLUMES)



## 2.4 MULTILAYER FLEXIBLES

This study's scope focuses on the four resins discussed in section 2.2 to 2.3. However, the Philippines is a "sachet economy" in terms of packaging use, and there is a high reliance on multi-layer flexibles (e.g. sachets, pouches, etc.) as a means of distributing products to the general population. Due to their hard-to-recycle nature, they are found in large quantities in waste streams. Furthermore, given the high rate of contamination, their CFR rate is very low.

Currently, the collected multilayer flexibles are diverted to three different channels:

- Co-processing at cement plants for energy recovery
- Processed to make consumer products, such as Eco-bricks, lumber, furniture etc.
- Processed for use with bitumen in road construction

This section discusses a high-level MFA for this type of packaging in order to provide an overview of the paths that this material follows once disposed.

### 2.4.1 High-Level Material Flow Analysis (MFA) for Multilayer Flexibles

There are four key messages from the MFA of multilayer flexibles, as shown in Figure 25:

1. Nearly all multilayer flexibles are used in film packaging applications, which includes food packaging. These products are contaminated and therefore have low value yield that causes a high disposal or leakage for this material (higher than 90%).
2. Between 3% and 7% of the disposed multilayer flexibles get used as refuse-derived fuel (RDF) for co-processing. This CFR range is estimated based on interviews with key local stakeholders and past research conducted by GA Circular. Notes with regards to RDF:
  - a. RDF is a material produced from municipal, industrial or commercial waste. RDF consists largely of combustible components such as non-recyclable plastics, paper cardboard



and other materials. These fractions are shredded into a uniform grain size to produce a homogeneous material which can be used as a substitute for fossil fuels. In the last few years, more cement kilns in the Philippines have introduced co-processing in their operations, using RDF as a substitute to coal.

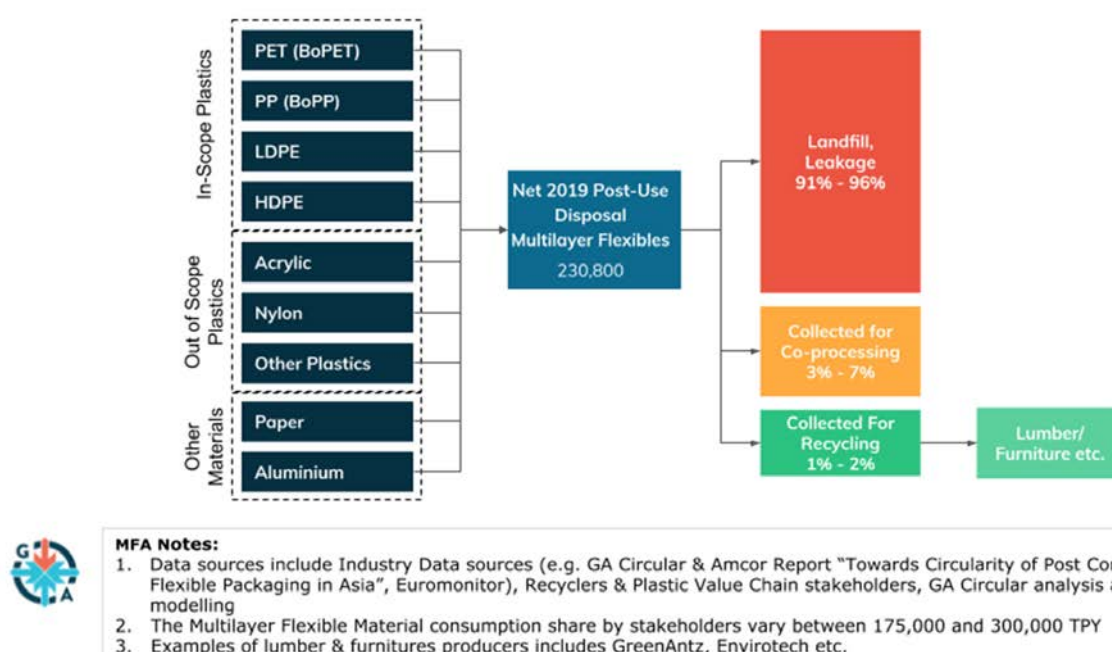
- b. A first overview of the main RDF producers and end markets in the country evaluating the amount of multilayer flexibles that are processed as part of the total RDF produced. Presently, between 5,000 and 30,000 tonnes/year of multilayer flexibles have been estimated

to be co-processed in the Philippines. Please refer to Appendix 12 for an overview of the main RDF producers, end users and their capacity.

3. Less than 2% of the collected multilayer flexibles is recycled into products such as Ecobricks, lumber, furniture, etc.
4. Given that multilayer flexibles contribute a significant tonnage of materials into the Philippines and that the CFR rate and co-processing rates are very low, multilayer flexibles are expected to be a major contributor to environmental leakage (especially into marine environments) in the Philippines.

Figure 25.

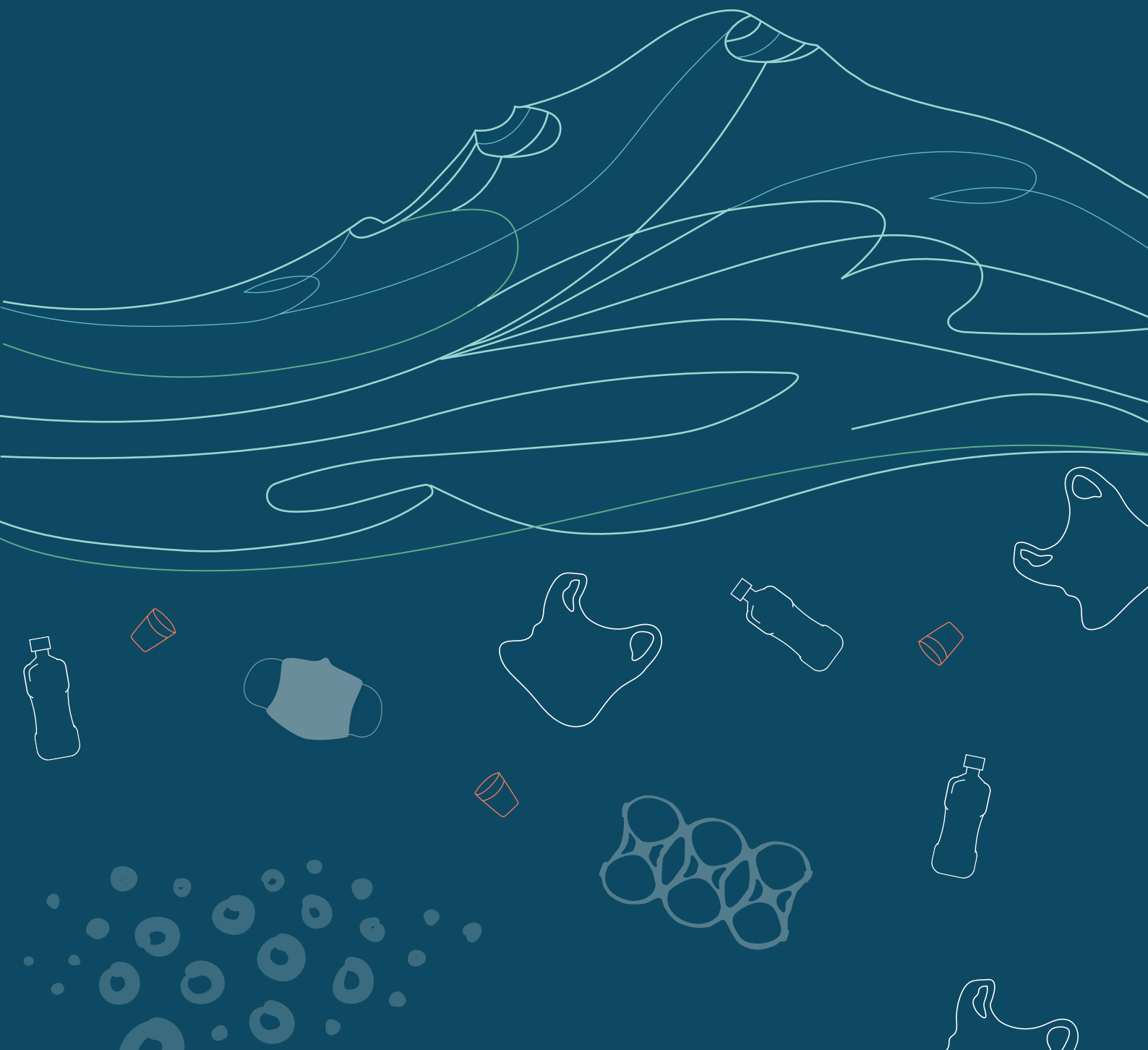
#### HIGH-LEVEL MATERIAL FLOW ANALYSIS OF MULTILAYER FLEXIBLES IN THE PHILIPPINES (TPY)



Note: Multilayer flexibles are intended materials made up of multiple layers of plastic from different monomers or plastic made from different monomers along with a metallic or paper layer.

SECTION 3:

# WHY 78% OF MATERIAL VALUE OF PLASTICS IS LOST



## SECTION 3:

# WHY 78% OF MATERIAL VALUE OF PLASTICS IS LOST

As seen in the previous section, the Philippines disposed of 1.1 million tonnes of the four key plastic resins in 2019 (292,000 TPY was recycled while 771,000 TPY was not recycled) and lost about 78% of the material value. This section presents two main categories of pressures that cause this material value loss:

### 1. Pressures that impact CFR rate (section 3.1)

### 2. Pressures that impact Value Yield and CFR rate (section 3.2)

While the CFR and value yield data used in this study is based on volumes from 2019, COVID-19 has had a significant negative impact on the health of the recycling industry impacting both CFR and value yield. Section 3.3 covers this impact of COVID-19 on the recycling industry in the Philippines, while section 3.4 covers the impacts of the new regulations on scrap plastic and recycled plastic in 2020.

## 3.1 PRESSURES IMPACTING CFR RATE

### 3.1.1 Use of Recycled Resins is Impacted by Fluctuations in Virgin Resin and Oil Prices

Over the past years, the global supply of oil, petrochemicals, and virgin plastic (polymers) has grown significantly which has gradually reduced virgin plastic prices. Most of the recycled resins have seen a steady drop in global prices, over the last three years. Based on industry interviews in Southeast Asia, plastics recycling tends to be competitive when the oil prices are above USD 70/barrel which was last reached in September 2018. At the end of April 2020, the oil prices were 76% lower at USD 17/barrel (their lowest price in 15 years) and for 2020 year to date, the average is USD 38/barrel. Thus, the viability of recycling has been seriously challenged.

Similar to the global and regional virgin plastic prices, virgin prices in the Philippines saw significant reductions in 2019 and 2020, as shown in Figure 26.

Most plastic converters and brands have a choice to use either virgin plastic or recycled plastic. There are no recycled content requirements or other policies that require industries to use recycled content, so recycled plastic is generally only bought when the price is more attractive than virgin plastic or when recycling target commitments need to be met. As the performance of low grades of recycled plastic is generally lower than virgin plastic, their prices are expected to be lower than virgin. Recyclers report that their recycled products generally need to be 15-30% cheaper to compete with virgin plastic. Thus, when virgin resin prices fall, manufacturers have an economic incentive to switch back to virgin resins, as has been the case in the last 18 months.

To compound matters for recyclers, as economies develop, the cost of post-consumer plastic scrap increases due to higher living cost requirements for the informal sector and higher cost of waste collection and segregation. Thus, there is upwards

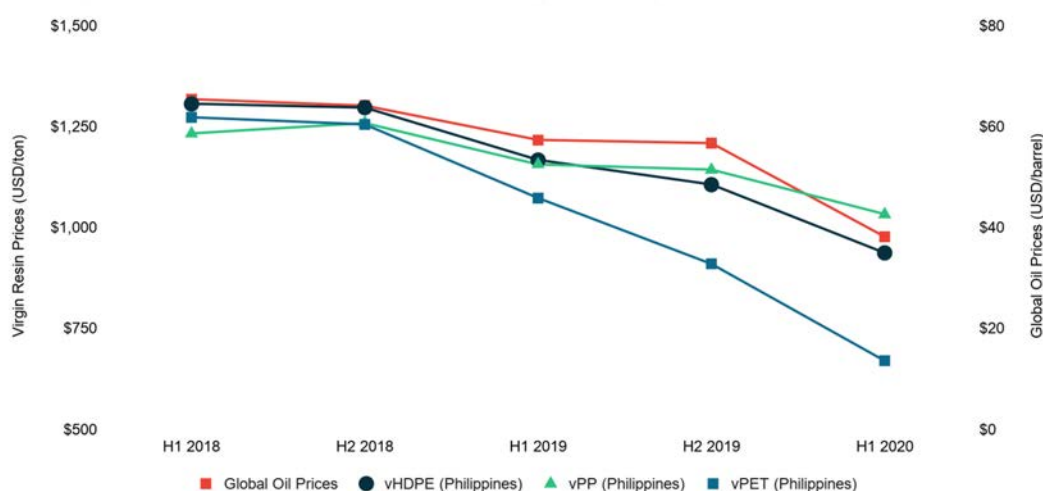
“

When prices of virgin resins are very low, there is no incentive for converters to use recycled resins. And the product made from virgin resins will always have better performance than recycled resins. It's a disincentive to the recycling industry when virgin resin prices are low.

*Petrochemical company in the Philippines*

Figure 26.

# COMPARISON OF GLOBAL OIL PRICES AND VIRGIN RESIN PRICES IN THE PHILIPPINES



Source: Various converters in the Philippines for virgin resin prices

Note: A more detailed version can be found in Appendix 13.

pressure on recyclers feedstock/operating costs in addition to the downwards pressure on recycled plastic sales prices noted above. With this, it has become increasingly difficult for recycling companies to remain profitable and survive. It is for these reasons that some recyclers in the Philippines closed their operations in recent years and in 2020.<sup>47</sup>

The challenges presented by decreasing virgin plastic prices in the Philippines is highlighted in Figure 27, where recycled material was struggling to compete in 2019. The shaded area indicates a 0-30% reduction against virgin prices, within which recycled resins are challenged and below which recycled resins are competitive against virgin. The recycled natural HDPE resin is well within the gray shaded area indicating the lack of competitiveness in comparison to virgin resins, hence making virgin resins the preferred option.

Even the prices of the lower value, colored resins are within the gray area in 2019. The same pattern is true for other resins (see Appendices 13 and 14) within the Philippines and globally. The COVID-19 pandemic which has caused drops in the oil price and reduced demand for recycled resins, has further exacerbated the situation (see Appendix 15).

Structural and systemic corrective measures, especially supporting legislations, are needed to enable decoupling of recycled resins from virgin and to ensure that the recycling industry remains competitive against virgin plastic prices. Without government intervention, recyclers in the Philippines and the rest of the region will remain fully exposed to global drops in oil and virgin plastics prices, thus **reducing the CFR rate**.

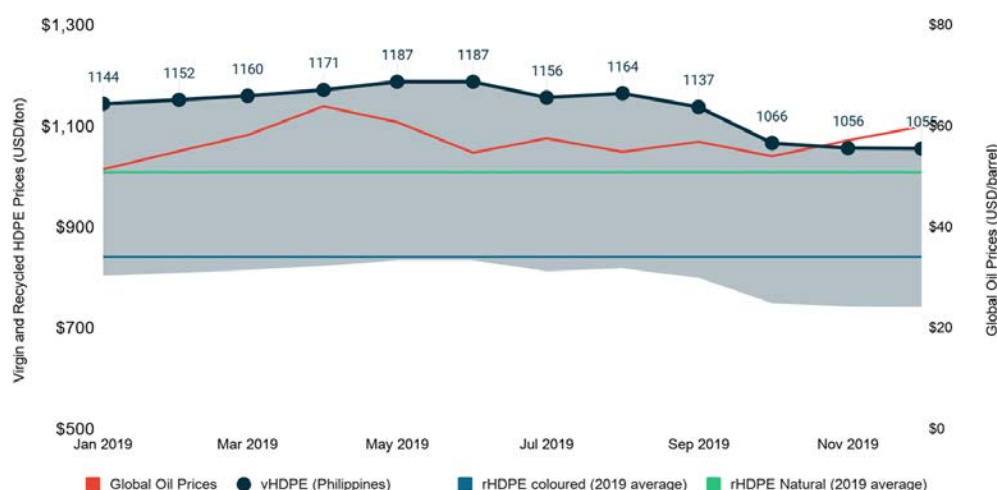
Box 1 provides examples of enabling policies for packaging industry from benchmark countries (the European Union, Japan, India) that lessen the impact of fluctuating virgin resin and oil prices (further details can be found in Appendix 17.2).

47 Plastic Recycling closures over the past years and 2020 include, but are not limited to, Plastic City (PET recycler), San Miguel Corporation PET recycling operation (PET recycler), Davao City Plastic Recycling Inc (PE, PP).



Figure 27.

## COMPARISON OF VIRGIN HDPE AND RECYCLED HDPE PRICES IN THE PHILIPPINES AND GLOBAL OIL PRICES



Source: Federal Reserve Economic Data for Virgin Resin Prices and Recyclers for Recycled Resin prices

Figure 27 Notes:

1. The range of 0-30% reduction against virgin prices (the gray shaded area) can also be higher—for example, some recyclers have reported that they need to sell at 30% less than virgin prices to be competitive.
2. Some recyclers are able to sell at/above virgin prices due to a unique selling proposition (USP) of the recycler (e.g. brand story related to ocean bound plastics or superior quality of their product), however this is the exception, not the rule.
3. Monthly recycled prices are not available and thus 2019 average recycled sales prices obtained from recyclers in the Philippines have been used for comparison.

### BOX 1.

#### POLICIES THAT LESSEN THE IMPACT OF FLUCTUATING VIRGIN RESIN AND OIL PRICES



##### TAX POLICIES

The EU has proposed a €0.80/kg tax covering every kg of non-recycled plastics produced in the EU. The EU Strategy for Plastics in the Circular Economy outlined plans for future targeted sectoral interventions for uptake of recycled plastic content, such as in the construction and automotive sectors. Under this strategy, the European Commission also calls on stakeholders to come forward with voluntary pledges to boost the uptake of recycled plastics. The objective is to ensure that by 2025, 10 million tonnes of recycled plastics will find their way into new products on the EU market.

The UK recently announced that the tax on plastic packaging containing less than 30% recycled content will come into force in April 2022, and will be set at £200/tonne.



##### PACKAGING

The EU Single-Use Plastics Directive specifically requires all PET plastic bottles to meet a 25% recycled content target by 2025 and 30% recycled content target by 2030.

The EU is integrating recycled content into the Ecolabel and Green Public Procurement criteria. The French government initiative Objective to Recycle Plastics (ORPLAST) and Italy's

new rules on public procurement are two good examples of what could be done at a national level. The ORPLAST project of the Environment Agency in France (ADEME) supports 33 industry projects for the reincorporation of recycled plastics by helping manufacturers to study and invest in order to use recycled material, combined with a grant to fill the gap between the price of fossil plastics and the price of recycled ones.

Maharashtra state in India will soon require all manufacturers of industrial plastics to use 25% recycled content.

### 3.1.2 Lack of Local Recycled Content Requirements for Plastics Across All Key Resins

Government and industrial intervention are critical to driving up demand for recycled plastics, as demonstrated by several efforts in the EU that accelerated the demand of recycled PET. The EU's Single Use Plastics Directive, which entered into force in July 2019, mandates a target of 25% rPET usage in bottles by 2025 and 30% by 2030. Ahead of this directive coming into force, in May 2018, the European Federation of Bottled Waters, an industry association of bottlers in Europe, pledged publicly to include at least 25% of rPET into the production of new bottles by 2025. As a direct result of these efforts, demand for food grade rPET has increased in the EU. With this (and also due to some supply shortages) the price of food-grade resins such as food-grade rPET has begun a partial decoupling from virgin PET prices from August 2018 onwards, as shown in Figure 28.

However, as no such specific recycled content targets exist for PP, HDPE and LDPE/LLDPE in the EU, the prices for these recycled resins remain low in comparison to their virgin resin counterparts. Please see Appendix 14 for the EU price comparisons between virgin and recycled material for PP, HDPE and LDPE resins.

Many global brands that use packaging have made voluntary commitments to use recycled content as part of the New Plastics Economy (NPE) commitments. For example, Nestlé, is targeting 50% recycled content in

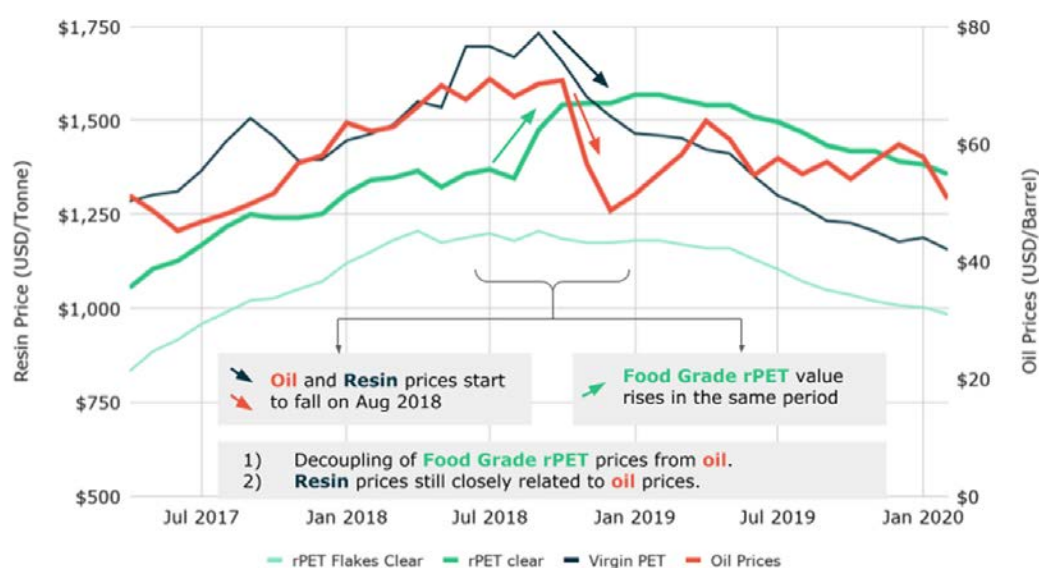
its water bottles by 2025, which will reduce its use of virgin plastics by approximately one-third by 2025.<sup>48</sup> Please refer to Appendix 16.1 for further examples of brand commitments relevant to the Philippines. These voluntary commitments are certainly a step in the right direction, however, government mandates (which cover the whole packaging industry in addition to other plastic consuming industries) are important for significant change. This is illustrated by the following. The voluntary commitments of the companies in the NPE account for 20% of global annual plastic packaging usage. Considering plastic packaging is about 40% of all plastic consumed globally, this means that such commitments account for 8% of all plastic consumption. As recycled content targets are generally 25-50% under the NPE commitments, these commitments would only increase plastic circularity by about 2-4%. Based on interviews as part of this study, brand owners have committed to fulfill their global commitments also in the Philippines.

Countries in the EU as well as the UK, India and several other countries have started to take steps to reduce the impact of oil price volatility on their recycling industries by **mandating recycled content targets**. These mandated requirements acknowledge the fact that voluntary initiatives by the industry do not go far

48 Nestlé - [What is Nestlé doing to tackle plastic packaging waste? \(2020\)](#)

Figure 28.

#### EU PRICE COMPARISON OF VIRGIN PET AND RECYCLED PET



Source: Industry data

enough. In fact, these voluntary initiatives only thrive when supported by a credible prospect of government regulation if industry does not deliver. Additionally, the virgin plastic market prices today do not factor in the environmental impact, the cost of waste management and other negative externalities which are currently borne by the government. The government is the only actor that can fully address this market failure.

### The Need to Stimulate Local Demand for Recycled Content in the Philippines

Currently, there are no recycled content requirements for the packaging industry or other plastic applications in the Philippines. Please refer to Appendix 17.2 for policy examples on packaging across the life cycle. The FDA is currently reviewing the use of rPET in food-grade applications while approval for the other resins of this study will take time according to stakeholder consultation as demonstrated by the quote below. While some traditionally HDPE packaging formats (such as dish washing liquid) are being converted to PET packaging by brand owners, swapping between resins for rigid applications has not yet become widespread. While rPET could be used for HDPE applications, the product's technical requirements and quality standards need to be met.

A Green Public Procurement (GPP) policy with quantified recycled content targets would not only impact the consumption of the government itself, but it would also send a powerful signal through leading the industry by example. In the Philippines Green Public Procurement Roadmap, which aims to integrate green practices into the existing procurement process, 20 prioritized items are targeted. However, the Roadmap does not have resin or plastic specific regulations, and recycled content targets are not quantified. In addition, as shared in a stakeholder interview the implementation of the

Roadmap has been challenged by budget limitations as some "green products" tend to be more expensive.

With regards to recycling capacity in the Philippines to meet recycled content targets, the formal PET recycling capacity is currently able to absorb 39% of the consumed PET packaging and the recycling capacity will grow by 65,000 tonnes/year by 2022, enabling 76% of local consumption to be recycled locally. However, further investments need to be made into existing and/or new plants to enable increased production of food-grade rPET<sup>49</sup>. For the other resins there is currently insufficient recycling capacity in the Philippines to enable 15% recycled content level, as can be seen in the table in Appendix 16.2. This is true across HDPE, LDPE and PP plastic resins individually and as a total, with a recycling capacity gap of 90% (comparing 2019 recycling capacities to estimated 2030 consumption), indicating that investments in recycling capacity need to be enabled in parallel to the implementation of recycled content requirements. Setting recycled content requirements will help to stimulate investments as it better enables businesses to take out bank loans.

It must also be noted that while switching to using recycled content is technically feasible for most applications, some challenges need to be overcome.<sup>50</sup> Sizable investments in recycling technology along with public acceptance of recycled content are examples of such challenges. Further details and additional challenges are detailed in Appendix 16.3.

Without policy interventions in the Philippines to stimulate local demand, CFR rates will continue to remain low, putting growing numbers of existing

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49 Planned food-grade rPET production capacity for 2022 is 45,00

50 Digital Europe - [Best Practices in Recycled Plastics \(2016\)](#)



**As of now, recycled materials are not allowed in any food contact applications. The FDA is currently making a review specifically for the use of rPET in food-contact applications. For other types of materials like PE, PP, it would take some time before the materials can be qualified to be safe for food-contact applications.**

*Plastics Industry Stakeholder*

recyclers at risk of bankruptcy and stalling or delaying the setup of new recycling capacities.

Examples of enabling policies for the packaging industry from benchmark countries (the European Union, Japan, India) that stimulate local demand can be found in section 3.1.1. Applying EPR tools, such as mandating recycled content targets, is key to decoupling recycled plastic demand from fluctuating virgin plastic prices and such mandates are needed to create the enabling environment for investments into plastics circularity. Given China's National Sword Policy and subsequent scrap plastic import bans in several countries that restrict key export routes for plastics waste collected for recycling, the EU recognizes the urgent need to develop a European market for recycled plastics. The EU has pledged to work with the European Committee for Standardisation and with the industry to develop quality standards for sorted plastic waste and recycled plastics.

### 3.1.3 Packaging Mix in the Philippines has a High Share of Low-Value Flexible Packaging

The packaging mix in the Philippines has a high share of flexible packaging as compared to rigids. This consumption pattern is related to the demographics of the Philippines, particularly the large low-income population and rapid urbanization (see Figure 29). Noting this high reliance on flexible packaging, during interviews several stakeholders from the packaging industry in the Philippines referred to the Philippines as a "sachet economy."

As seen in the study "Breaking the Plastic Wave," the consumption of multilayer flexibles is more than four times higher in the low income countries (18%) as compared to the high income countries (4%).<sup>51</sup> The same pattern is evident in the case of the Philippines where 21.6% of the population lives below the poverty line, almost three times that of other Southeast Asian countries such as Thailand and Malaysia<sup>52</sup>, and consequently the per capita consumption of flexibles is considerably higher than that of the other countries. The Philippines has a higher per capita consumption of flexible packaging compared to Vietnam, Thailand and Malaysia, exceeding the average by 65%. A comparison between the Philippines and Thailand demonstrates the high ratio of flexibles: In the Philippines' mix, flexibles

Figure 29.

### INFORMAL SETTLEMENT IN MANILA CITY WITH HIGH CONSUMPTION OF FLEXIBLES PACKAGING AND NO WASTE MANAGEMENT SERVICES



Photo: GA Circular

constitute 61% of units consumed, while in Thailand, flexibles make up only 37% of units consumed. This analysis and visualization can be found in Appendix 18.

In addition, the Philippines' urban population grew by 21.6% between 2009 and 2019,<sup>53</sup> causing a shift of the type of wastes generated by people, from mostly agricultural biomass to mostly pre-packaged ready-to-consume products.<sup>54</sup>

The speed of packaging innovation in multi-layer flexibles has outpaced the capabilities of recycling infrastructure for the same. Between 2010 and 2014, the consumption of flexible packaging grew by 19.3% (by value) in the Philippines.<sup>55</sup> Today, there are no large-scale recycling options nor collection infrastructure for the material. In addition, the lack of solutions and the high consumption rate in low-income communities, often with limited or no access to waste collection, leads to a high tendency of leakage for flexible packaging.

The high proportion of flexible packaging, in particular multilayer flexible packaging, means that a high proportion of overall plastic packaging is consumed,

51 PEW - [Breaking the Plastic Wave \(2020\)](#). Please refer to Appendix 18 for the chart comparing the consumption of plastic types by income levels.

52 World Bank data: [Philippines, Malaysia, Thailand and Vietnam](#)

53 World Bank data - [Urban population - Philippines \(2019\)](#)

54 The Guardian - [Sachets help low-income communities but are a waste nightmare \(2014\)](#)

55 Smithers Pira - [The Future of Global Packaging to 2020 \(2015\)](#)



including key resins in focus are not recyclable, putting a downward pressure on **the CFR Rate**.

Box 2 provides examples of enabling policies and initiatives for collection and recovery of flexible packaging—especially multilayer sachets, in benchmark jurisdictions (further details can be found in Appendix 17.2).

### 3.1.4 Significant gaps in recycling capacity for all key resins

The gap between total resins consumed and formal capacity to recycle the same is equivalent to 902,400 TPY or 85%, as shown in Figure 30.<sup>56</sup> This gap is most pronounced for PE (90% gap), followed by PP (88% gap) and PET (61% gap). Even when accounting for the informal industry, which reportedly may recycle almost as much as the amount processed by formal recyclers, the missing capacity is still significant at 70% of resins consumed.

56 This value is based on a 100% recycling rate that is used for illustrative purposes as targets for recycling and material value extraction are set based on 100% of market inputs/material.

Based on data obtained during interviews with recyclers, the planned (upcoming) recycling capacity across all the key resins add up to 74,700 TPY, reducing the missing formal recycling capacity gap to 78%. However, some of this planned capacity will be negated by the increasing plastics consumption and loss of currently available capacity at risk of bankruptcy/closure in the wake of COVID-19 (see section 3.3).

### The Philippines has Lower Recycling Capacity than Thailand and Malaysia

The Philippines is only able to formally recycle/process 15% of post-use plastics compared to up to 27% in Thailand and up to 58% in Malaysia (please refer to Appendix 19B for the comparison between the three countries' installed recycling capacity). As seen in Figure 31, the Philippines was a net exporter of plastic scrap in 2018 and 2019. This is symptomatic of the vast gap in recycling capacity (where the Philippines is missing 85% of needed recycling capacity). In contrast, Thailand and Malaysia have more recycling capacity, which has resulted in a higher dependence on imported plastic

## BOX 2.

### POLICIES AND INITIATIVES FOR COLLECTION AND RECOVERY OF FLEXIBLE PACKAGING



#### PACKAGING INCLUDING SACHETS

Among the benchmark jurisdictions considered in this study, India is most comparable to the Philippines in terms of consumption of multilayer flexible packaging, especially in the form of sachets. Under India's Guideline Document for Uniform Framework for Extended Producers Responsibility (under Plastic Waste Management Rules, 2016), the definition of Manufacturers (companies engaged in the business of manufacturing of plastic in the form of resin or manufacturing finished plastic packaging material) and Producer, Brand Owners, Importers (PIBO: i.e. companies using plastic packaging—primary as well as secondary packaging—including bottles, pouches, sachets, packets,

jars, tubes, etc., as well as industry using bubble-wraps and other such plastic material for wrapping) have been clarified.

The Indian rules put primary responsibility for collection of used multi-layered plastic sachet or pouches or packaging on PIBO who introduce the products in the market. The rules also require these stakeholders to establish a system for collecting back the plastic waste generated due to their products and for the plan of collection to be submitted to the State Pollution Control Boards while applying for Consent to Establish or Operate or Renewal.

In the EU, over 160 European companies, associations and organizations representing the entire value chain of flexible packaging have started the project The Circular Economy for Flexible Packaging (CEFLEX) initiative to make all flexible

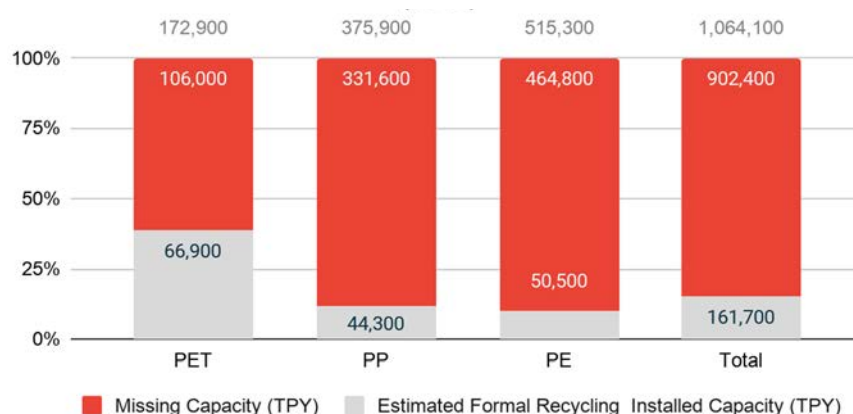
packaging in Europe circular by 2025. CEFLEX's 'Mission Circular' commits to collection of all flexible packaging and over 80% of the recycled materials channeled into valuable new markets and applications that substitute virgin materials.

A 5-step roadmap to build a circular economy for flexible packaging has been endorsed by CEFLEX stakeholders, together with a set of actions needed by each part of the value chain to make it happen.

By 2025, CEFLEX targets an established collection, sorting and reprocessing infrastructure and economy for post-consumer flexible packaging across Europe. It will be based on end-of-life technologies and processes which deliver the best economic, technical and environmental outcome for a circular economy.

Figure 30.

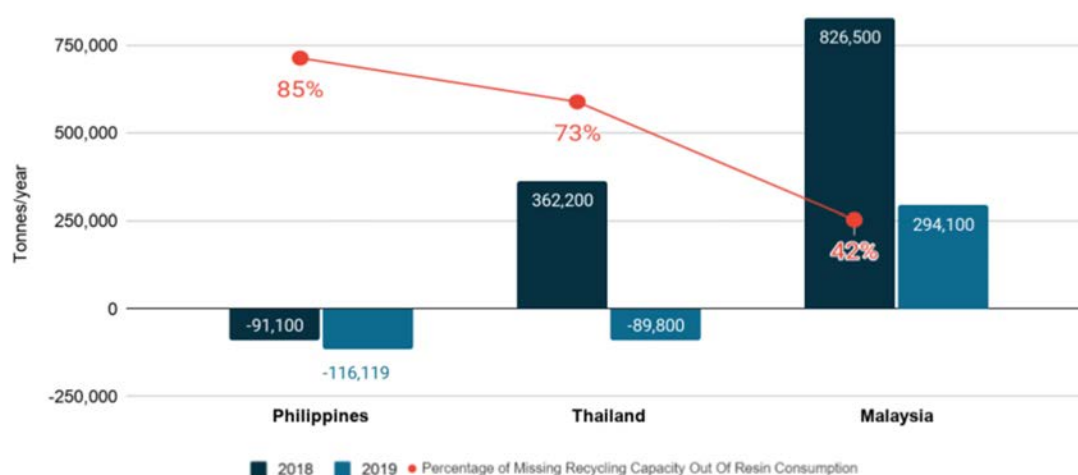
# MISSING CAPACITY VS. FORMAL INSTALLED CAPACITY FOR RECYCLING OF MAJOR RESINS IN THE PHILIPPINES



Note: Please refer to Appendix 19A for the figures and calculation used to derive the recycling capacities.

Figure 31.

# NET IMPORT (ABOVE LINE)/EXPORT (BELOW LINE) OF ALL TYPES OF PLASTIC SCRAP IN THE PHILIPPINES, THAILAND AND MALAYSIA (BASED ON HS CODE 3915)



Note: This is compared with the total country's proportion of recycling capacity over consumption.

scrap for recycling. Malaysia has been a net importer of plastic scrap materials, and this is accompanied by a considerably smaller recycling capacity gap as compared to the Philippines. Similarly, Thailand was a net importer in 2018 and also had a relatively high recycling capacity.<sup>57</sup> Note that Thailand became a net exporter only from 2019 not due to lack of recycling capacity, but due to government regulations limiting scrap plastic imports.

Overseas importers of scrap plastics from the Philippines are likely to have larger capacities, better economies of scale, and lower operational costs (such as electricity and transportation which are exceptionally high in the Philippines, as outlined in 3.2.4), and more effective and efficient recycling processes and policies that create a favorable economic context for recycling as compared to the recyclers in the Philippines. Consequently, the price that exporters get from overseas recyclers is higher than the price offered by domestic recyclers. The export of plastic waste means that the country is exporting valuable materials and jobs and consequently

57 Thailand's shift to becoming a net exporter is the result of a policy prohibiting plastic scrap imports.



It's so much easier for aggregators to just export scrap plastic because they are getting more money out of it than selling it to the domestic recycling industry.

*Philippines Waste Management Expert*

limiting the expansion and strengthening of the plastics recycling industry in the Philippines.

This current 85% gap in recycling capacity in the Philippines is therefore significant and perpetuates the low CFR rate and the poor local demand for recycled plastic content.

Box 3 provides examples of enabling policies from benchmark jurisdictions to stimulate investments into recycling capacities (further details can be found in Appendix 17.2).

### 3.1.5 Investments in the Plastic Recycling Industry Remain Small and Inaccessible

Plastics production requires substantial capital investment and a substantial carbon footprint. Reusing plastics not only reduces these investment needs but can also contribute to reducing total industrial carbon emissions<sup>58</sup>, therefore making a strong case for

investments into plastic recycling. However, in addition to the various pressures outlined, a lack of targeted incentives and market data mean these necessary investments are falling behind.

### Existing Investment Incentives are not Targeting Plastic Recycling Technologies

The plastics recycling industry is eligible for the general investment incentives that are offered by the Board of Investments (BOI) to all businesses. Under the Omnibus Investments Code of 1987,<sup>59</sup> examples of available incentives include income tax holiday, duty exemption on imported capital equipment, spare parts and accessories, tax and duty-free importation of consigned equipment, additional deduction for labor expense and simplification of customs procedures.

On top of this, the BOI has also formulated a 2017 Investments Priority Plan (IPP), which identifies activities

58 McKinsey & Company - [How plastics waste recycling could transform the chemical industry](#)

59 BOI - [Incentives under Omnibus Investments Code of 1987 \(2015\)](#)

## BOX 3. POLICIES THAT STIMULATE INVESTMENTS INTO RECYCLING CAPACITIES



### RECYCLING POLICIES

Many EU member states have already had such EPR schemes for packaging in place for over twenty years, allowing the EU to reach a 67% CFR rate for plastic packaging as of 2017. Policies in the EU that require industry to reach specific recycling rate targets (as outlined in appendices 17.2 and 17.3) indirectly

support the recycling industry by ensuring demand for increased recycling capacity, thus enabling investments.

Understanding that setting targets alone is not enough, the EU Single Use Plastics Directive also requires EU member states to implement Extended Producer Responsibility (EPR) schemes covering the costs of collection, transport, and treatment, cleanup litter and awareness-raising measures for food containers, packets and wrappers, cups for beverages, beverage containers with a capacity of up to three liters, lightweight plastic carrier

bags and fishing gear by 31 December 2024.

India's draft 2019 National Resource Efficiency Policy sets targets for packaging recycling including 100% recycling rate for PET packaging by 2025 and 75% recycling and reuse rate for other plastics by 2030. Additionally, the Uniform Framework for EPR in India 2020 outlines options for producers of packaging in India to set up EPR via either a fee-based model or a Producer Responsibility Organisation (PRO) model. These policies also indirectly support the increase in recycling capacity.



## Most tax incentives are designed for multinationals, and there is no support for SMEs.

### *Recycling Stakeholder*

that will substantially benefit the economy, and gives priority to these when granting incentives. The IPP does not explicitly list recycling as a prioritized area of investment, instead it is included under “All Qualified Manufacturing Activities including Agro-Processing”. To be eligible for the IPP, projects must firstly comply with the Philippine National Standards. In addition, companies need to satisfy at least one item of a set of criteria in order to qualify for registration, including value creation of 50%, importation growth of more than 10% from 2012-2016, and to have an equipment CAPEX to direct labor ratio of \$28,000:1.<sup>60</sup>

However, there are no investment incentives targeting recycling specifically and consequently there is a lack of understanding of available government support for investments into recycling technology amongst recyclers. Many recyclers interviewed either stated that there is no government support available to them or that the support is not given although the recyclers claim to be eligible. In addition, the recycler stakeholders mention that the incentive is better suited for large MNCs implying that the administrative burden and ability to fulfill eligibility criteria is impossible for the typical SME recycler.

As in the case of renewable energy, the idea behind subsidies for recycled or reused materials is to encourage innovation to support a stable market. Once the market is established and recycled materials can compete on cost grounds with virgin material, subsidies could decrease or be phased out.<sup>61</sup> This is especially relevant at a time when the recycled plastics industry is under intense competition with virgin plastics owing to low oil prices (as outlined in section 3.1.1). Under these subsidies, payments can be made either to reprocessors who recycle material or to manufacturers that use recycled or reusable materials. Lack of targeted incentives and subsidies supporting plastic recycling **puts negative pressure on the CFR rate**.

### **Lack of Market Data Creates Uncertainty for Investors**

Aside from the lack of targeted incentives for the plastic recycling industry, the unavailability of both market data in the recycling value chain and detailed production data for plastic products create a poor climate for investments. The absence of industry-led efforts to consolidate plastic data across the value chain is exacerbated by the lack of willingness to disclose information due to concern over competition. Specifically for recycled plastics, information is mostly distributed via informal communications amongst stakeholders and the Philippines lacks independent and authoritative sources of up-to-date price and market information, especially at the processor and recycler stages of the value chain. The volumes (tonnage) and prices of post-consumer resins moving through the value chain are unclear, thus hindering market liquidity and investments into recycling capacity. This **puts negative pressure on the CFR rate**. The lack of market data poses an obstacle for new players looking to enter the recycling market or for existing recyclers to grow their capacities, by making it harder to understand and predict the cycles of the volatile trading market for recycled products.

To enable impactful interventions in the recycling market, participants in the market such as local authorities, waste management companies, recyclers, reprocessors and social economy businesses need information on weekly and monthly pricing trends, size of contracts, and current conditions in the markets for recovered materials. Also, while packaging is a significant end-use industry for all the major plastic resins, a detailed breakdown of the amounts of packaging that producers place in the market each year is not available in the Philippines.

<sup>60</sup> [BOI - Investment guidelines \(2017\)](#)

<sup>61</sup> [Green Alliance - Completing the Circle , Creating Effective UK Markets for Recovered Resources \(2018\)](#)



Other obstacles that are limiting investments in recycling capacity and improved recycling technologies are listed here along with the sections they are discussed:

- Advanced recycling technologies such as chemical recycling are still largely at the pre-commercial stage and the scalability, financial viability, environmental impacts and other risks of chemical recycling have not yet been fully evaluated or demonstrated.
- Other commercialized recycling technologies that produce high-value recycled plastics (such as food-grade rPET, rPE and rPP) require consistent tonnages which is challenged by the complete reliance on collection through informal networks (section 3.1.6) and high transportation costs as compared to other countries in the region (section 3.2.4)
- Feedstock quality is challenged by lack of design for recycling (section 3.2.1)
- Administrative burden and cost (section 3.2.4)

Box 4 provides examples of enabling policies from benchmark countries that support the recycling industry. However, both Japanese and EU commercial banks note that traditional financial assessment methods and tools are not equipped to accurately validate all circular economy business models. For example, Product-as-a-Service is based on contracts instead of assets, which makes them riskier for banks to finance. Banks often prefer hard assets as security for their lending. Also, many circular solutions require collaboration across value chains. Ideally, banks should finance the value chain, where they normally finance single companies.<sup>62</sup>

Box 5 provides examples of enabling policies from benchmark countries that support the development of market data for recycled products and detailed production data for packaging (further details can be found in Appendix 17.2).

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62 EU Commission - [Report on Sustainable Finance for a Circular Economy \(2019\)](#).

## BOX 4.

### POLICIES AND INVESTMENTS SUPPORTING A STRONG RECYCLING INDUSTRY



#### INVESTMENTS

Under the EU Strategy for Plastics in the Circular Economy, more than €5.5 billion has been allocated to improve waste management. This is expected to create 5.8 million TPY of additional waste recycling capacity. One example of this is the >€1.5 million channeled to support the Walloon Region of Belgium, for the ERDF Technopoly Recyclage project implementing an innovative process for recycling rigid plastic waste.

Under the EU's Horizon 2020 funding, more than €250 million for research and

development linked to plastics in the circular economy has been allocated. An additional €100 million by 2020 has been devoted to financing priority actions, including the development of smarter and more recyclable plastics materials, more efficient recycling processes and the removal of hazardous substances and contaminants from recycled plastics.

Under the European Fund for Strategic Investments, a €7.5 million loan was given to GreenFiber International SA to finance a recycling and circular economy project. 280 full-time jobs are to be created and over 50,000 tonnes of waste collected and processed per year.

California's Plastic Market Development Program, which pays up to US\$150/ton to

plastics reprocessors and manufacturers using recycled plastics, has been credited with increasing in state plastic reprocessing by 3,000%.



#### FINANCING POLICIES

Japan follows a policy of the mainstreaming of ESG/SDG financing. Under this policy, which covers not only circular economy but also climate change, a number of guidelines have been developed, for example on company assessment and information disclosure. A high-level panel on ESG finance consisting of top business leaders has also been set up.

## BOX 5.

### POLICIES SUPPORTING MARKET DATA FOR RECYCLED PRODUCTS



#### PACKAGING

Countries in the EU, as well as Japan and Singapore, all mandated producers of packaging and packaged products to collect data on the types and amounts of packaging they place in the market each year and report the packaging data to either a relevant industry-led producer responsibility organization or

to the government as the first step towards more sustainable packaging waste management. This reporting lays the foundation of an Extended Producer Responsibility (EPR) framework for managing packaging waste and also gives an accurate estimate of the amount of plastic in final products that are imported.

As EPR frameworks were implemented and demand for recycled plastics started to grow, market intelligence firms such as IHS Markit, ICIS, S&P Platts, Wood Mackenzie started offering market data services for recycled products in regions such as Europe and North America.

### 3.1.6 Challenging Short- and Long-Term Collection Economics for the Informal Sector

Previous studies in the Philippines and other Southeast Asian countries conducted by this study team in 2017 and 2018 uncovered that in the case of PET the informal sector is responsible for more than 90% of the CFR rate. The situation is similar for other plastics, particularly post-consumer plastics, and other packaging materials. This demonstrates that the informal sector is the backbone of collection in the Philippines and the region. In addition, falling prices of recyclables coupled with increasing costs of living has made collecting recyclables challenging for the

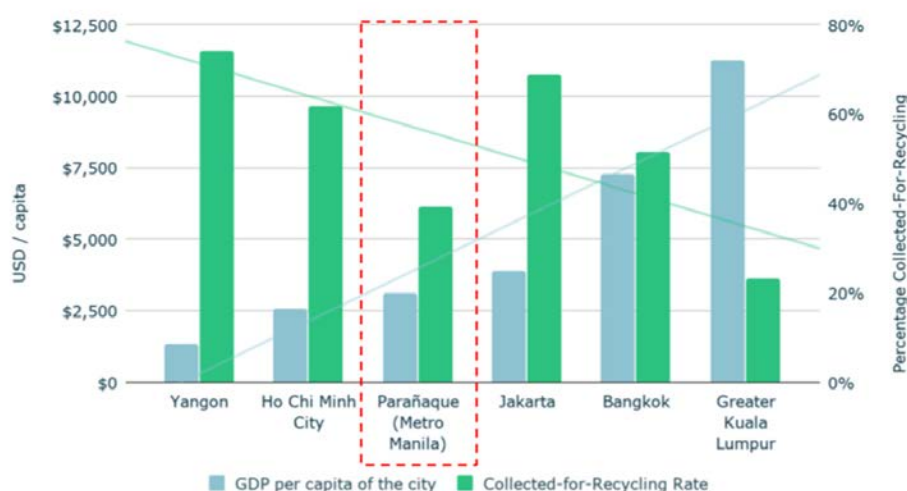
informal workers (see Figure 32).<sup>63</sup> As countries develop and the cost-of-living increases, the low income that collection of recyclable materials provide will become more untenable as time goes on.

If recyclables collection were prioritized and conducted by the formal waste collection system, the CFR rates would—in theory—increase as cities develop. However, this is not the case across Southeast Asia, where CFR rates are typically lower in more developed cities with higher GDP. Therefore, it can be expected that in the Philippines a continued reliance on the informal

63 GA Circular - [Full Circle: Accelerating the Circular Economy for Post-consumer Pet Bottles in Southeast Asia \(2019\)](#)

Figure 32.

#### CORRELATION BETWEEN GDP PER CAPITA AND CFR RATES SUGGESTS THE HEAVY RELIANCE ON THE INFORMAL SECTOR



Source: GA Circular - [Full Circle: Accelerating the Circular Economy for Post-consumer PET Bottles in Southeast Asia \(2019\)](#)

sector will result in **drops in CFR rate** as GDP per capita grows.

Additionally, the informal sector is highly selective in terms of which plastics to collect for recycling. Rigid, high-value plastics are typically preferred over low value flexible plastics as they are easier to collect and yield much more value. When price points for plastics fall, the informal sector will prioritize other more valuable materials such as metal, cardboard, etc. for collection. Figure 33 shows that a high percentage of the informal sector collected and sold PET, HDPE and PP, whereas

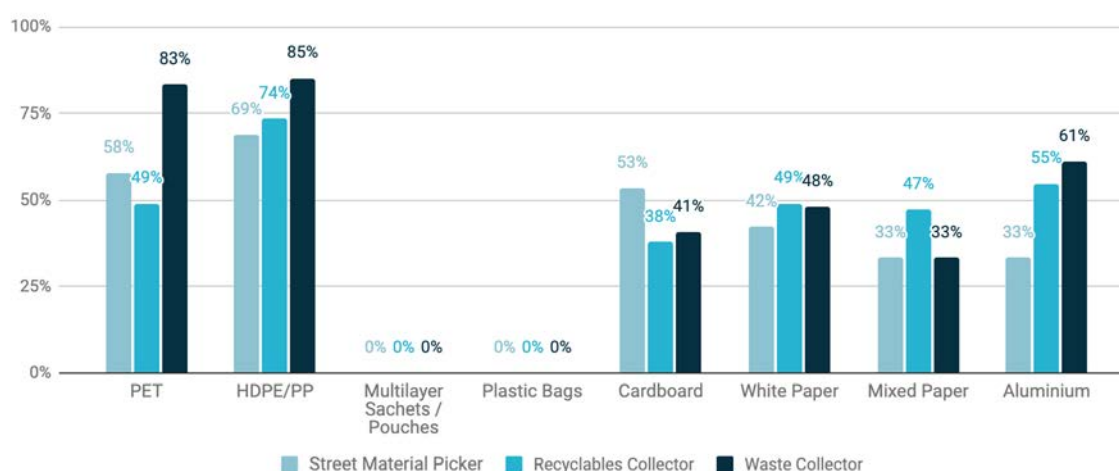
none of the informal sector collected and sold low value plastics such as plastic bags, multi-layer flexible sachets/standup pouches.

The informal sector also lacks the financial resources to purchase equipment to increase their capacities and productivity.

Box 6 provides examples of enabling policies from benchmark countries that support recognition and integration of the informal sector (further details can be found in Appendix 17.2).

Figure 33.

#### PERCENTAGE OF INFORMAL COLLECTORS COLLECTING AND SELLING POST-CONSUMER RECYCLABLE MATERIALS (2019)



Source: GA Circular 2019 research

#### BOX 6.

#### POLICIES SUPPORTING RECOGNITION AND INTEGRATION OF THE INFORMAL SECTOR



##### Uniform Framework for Extended Producers Responsibility in India 2020, under Plastic Waste Management Rules 2016

The guiding principles promote the increased circularity of plastics through incentivizing source separation recycling programs. This includes directly and indirectly supporting improvements in the working conditions and incomes of informal recyclers.

The principles call for any informal sector stakeholders (such as waste pickers, junk shops and aggregators) to be formalized and further strengthened for proper functioning of the EPR model.

Under the guidelines, waste management agencies are required to engage informal waste pickers and create the opportunity for them to participate in the formalized waste management systems having:

- Adequate environmental, health and safe working conditions

- Occupational recognition, respect and dignity
- Appropriate and fair business models
- Auditing waste management operations;
- Communication, education and inclusion initiatives for waste workers
- Other activities involving integration of the informal sector into the formal sector

“

The amounts of additives added to the base material are increasing; calcium carbonate is a big issue. All contamination used to be 13-15%, but has now increased to 20% or more.

*Recycling Stakeholder*

“

We can sell recycled plastic made from post-industrial plastics at 5-10 pesos per kg less than virgin [about 5-15% less], whereas when it is made from post-consumer plastics, we need to drop to almost half the price of virgin plastic in order to sell it [up to 50% less]. This is mainly due to the material design issues and lack of segregation [both are contamination issues] for post-consumer plastics.

*Recycling Stakeholder*

### 3.2 PRESSURES IMPACTING VALUE YIELD AND CFR RATE

#### 3.2.1 Recyclables are of Low Quality Due to Lack of Design for Recycling Standards

Recyclers interviewed for this study reported contamination rates of up to 20-30% of the feedstock they receive from within the Philippines. This includes contaminants due to poor segregation practices and also due to poor packaging design.

The contamination and design challenges mentioned by the recyclers fall under five categories that are discussed in Table 4: colored plastics, calcium carbonate and fillers, PVC labels, composite or multilayer materials, and lightweighting. Examples of products with poor design for recycling in the Philippines are also provided in Figure 34.

Contamination due to poor design for recycling lowers the CFR rate and both the volume yield and price yield, and thus also lowers the value yield.

Figure 34.

#### EXAMPLES OF PRODUCTS WITH POOR DESIGN FOR RECYCLING IN THE PHILIPPINES



Sources: iPrice Philippines, Vivek Bhattacharyya Photography, SMI Store, Cosmo Philippines, EverydayMe Philippines

Note: (Left to right) Colored PET bottles with PVC labels; Printed PET cups; Printed HDPE body with aluminum top; Colored bottles with full body labels and pumps with metal springs.

Table 4.

**CONTAMINATION AND DESIGN CHALLENGES AND THEIR IMPACT ON RECYCLING**

Problem	Description	Impact on Recycling
Colored Plastics	When plastics are Colored, it affects the value of the recycled products as the Color of these plastics cannot be reverted to their “natural” Color. Recyclers either keep the same Color or turn it black depending on what customers require.	Recycled plastics made from black or other Colored plastics (e.g. green, orange, etc.) are less valuable than their natural counterparts. Hence, this reduces the <b>value yield</b> of recycling. In some cases, Colored plastics are not able to be recycled at all (e.g. Colored PET bottles cannot be recycled into rPSF). Therefore, in this case, it <b>reduces the CFR rate</b> as Colored plastics act as a contaminant.
Calcium Carbonate (CaCO <sub>3</sub> )	Fillers/additives such as calcium carbonate (CaCO <sub>3</sub> ) alter the density of HDPE flakes and affect its separation during the float-sink separation process and also make the characteristics of the recycled resin produced (e.g. intrinsic viscosity, Color) are more difficult to control.	The contamination losses during the float-sink separation processes increases from a normal 5-10% to up to 20%. Hence, this <b>reduces the CFR rate</b> for HDPE.  As the physical characteristics are harder to control, the quality of the end product falls which reduces its value yield.
PVC Labels	When PVC labels enter a thermochemical recycling process, hydrogen chloride, a strong corrosive acid is produced which damages the internals of the recycling equipment. Therefore, recyclers have to invest in sorting equipment to ensure that PVC labels do not make its way into their recycling operations.	This reduces the CFR rate as labels increase the contamination of the post-consumer materials.
Composite or multilayer materials	Mechanical recycling equipment is only able to recycle a specific resin type at a time. For example, a PET recycler is only able to process feedstock which only includes PET.	This limits the <b>CFR rate</b> as it reduces the amount of materials that can be collected for recycling.
Lightweighting	Lightweighting packaging design is a measure to reduce cost of the product, transportation and use of materials, hence in a sense the environmental impact.	By lightweighting, the material value in each item is reduced. The lower value results in less attractiveness for the informal sector to collect the packaging, thereby limiting the <b>CFR rate</b> .



As a long term view, we're going towards lighter weight bottles. But once it's too light, people will not pick those bottles, which will destroy the entire system where we want every bottle to come back for recycling.

*Recycling Stakeholder*

*Note: Examples of enabling policies for the packaging industry from benchmark countries that support design for recycling can be found in Appendix 17.9.*





Because segregation at source is lacking, the feedstock is too wet for us as cement processors to handle at our processing plants.

*Energy Recovery Stakeholder*

### 3.2.2 Challenges Leading to a Lack of Source Segregation

A recent study derived a national MSW collection average of 40%,<sup>64</sup> suggesting that 9.5 million tonnes of MSW remains uncollected every year. The MSW collection coverage varies widely in the country, from very high coverage of 99% in urban locations down to 30% in rural areas.<sup>65</sup>

The implementation of waste collection in each LGU is subject to constraints (e.g. availability of funding, space for waste management infrastructure, human resources and willingness of political appointees). For example, a mayor can only sign SWM contracts for the duration of his or her three-year term, limiting his or her effect on improvements in waste management infrastructure, which is a long term investment.

Many stakeholders across the plastics value chain have stated the lack of source segregation due to poor legislative implementation as the key contributing factor to low CFR rates and feedstock contaminated by moisture and food waste entering the stream, limiting both CFR and its value yield. Three contributing factors leading to the challenged implementation of source segregation are:

1. Fragmented implementation and enforcement of RA 9003
2. Households' awareness and behavior related to source segregation
3. Low landfill tipping fees

### Fragmented Implementation and Enforcement of RA9003

RA 9003 puts the onus of enforcement and implementation on the 1,634 LGUs and for source segregation specifically in the hands of the barangays. The act imposes enormous responsibilities on the barangays while providing little support for them to effectively comply with the requirements. The

implementation of source segregation is thereby subject to the initiative, capability and priorities of leaders in each barangay, the smallest government unit of which there are 42,046 in the Philippines and 1,710 in just Metro Manila,<sup>66</sup> consequently causing fragmented practices across the country and even within Metro Manila. The National Solid Waste Management Commission (NSWMC) is the major agency tasked to implement RA9003. This includes overseeing the implementation of appropriate solid waste management plans by end-users and local governments as mandated by law. The NSWMC also runs the National Ecology Center which serves as the depot of information, research, database, training, and networking services for the implementation of the provisions of RA9003.

The lack of funding to implement the legislation and infrastructure such as MRFs is cited as the key contributing factor to the failure to have widespread source-segregation.<sup>67</sup> An additional challenge cited by NSWMC is the lack of space to build MRFs, especially in the urban LGUs. In short, some barangays and LGUs do well in implementing RA9003 requirements, while the majority do not, resulting in a fragmented implementation and enforcement of RA9003. These challenges can be demonstrated by the fact that only 14,450 barangays (or 34.4% of all barangays in the Philippines) are served by an MRF.<sup>68</sup> Please refer to Appendix 20 for more data on SWM implementation by LGUs and barangays in the Philippines.

Fragmented implementation of the legislation is a widely understood to be the key cause related to the lack of source segregation in the Philippines, and was brought up by 30% of stakeholders interviewed:

A growing number of LGUs are implementing a "no segregation, no collection" policy that has resulted in higher rates of source segregation and consequently lower contamination levels of the recyclable materials.

64 WWF - [EPR scheme assessment for plastic packaging waste in the Philippines \(2020\)](#)

65 DENR-EMB - [National Solid Waste Management Status Report 2008-2018 \(2018\)](#)

66 Philippine Statistics Authority - No PSGC Update for the Second Quarter of 2020 (2020)

67 ABS CBN News - [50 LGUs face probe for violating Waste Management Act \(2016\)](#)

68 Interview with Crispian Lao representing NSWMC, 2020.11.18

As reported by the EMB in 2018<sup>69</sup>, under the DENR's Environment and Natural Resources Management Project (ENRMP), out of 1,634 LGUs in the Philippines, 128 LGUs (8%) with promising initiatives on the mandatory segregation at source were selected to be regularly monitored on their compliance and performance on their mandatory segregation at source. Amongst these 128 sites, compliance ranged from 43% to 100%. Outside of ENRMP, however, very few regions and LGUs gather information on segregated waste collection rates. As mentioned, most of the LGUs are short on funds and implementation support to access adequate equipment, technical skills and knowledge and these LGUs still practice mixed waste collection.

In addition, as shared by various stakeholders, the backend to collect the materials is not fully set up. Even in cases where households segregate, the collection system is not always equipped for separate collection, resulting in instances of mixing back segregated recyclables with mixed waste.

### Households' Awareness and Behavior Related to Source Segregation

In addition to implementation of an enabling infrastructure, the education, awareness and behavior of households determines the success of the implementation of source segregation. A study in the Philippines (and other Southeast Asian markets) by GA Circular in 2018 revealed that only 18% of 421 respondents in the Philippines engage in source segregation and have access to separate collection, while 6% throw their trash in the bin, and 76% choose to litter. Compared to other Southeast Asian countries (Malaysia [38%], Thailand [31%] and Vietnam [29%]), the Philippines is far behind behavior wise in terms of segregation at source and has 2-3 times the rate of littering. These statistics highlight the need for education, awareness building and behavior change campaigns.

There are success cases of source segregation practices: the city of San Fernando in Pampanga province (diverting approximately 80% of the generated waste)<sup>70</sup> and barangay Bagumbuhay (65% diversion) in Quezon City<sup>71</sup>. These successes are the result of carefully planned and executed community programs where the LGUs were

supported by external stakeholders such as NGOs, religious organizations and the private sector.<sup>72</sup>

### Low Tipping Fee Discourages Implementation of Source Segregation

The tipping fees at sanitary landfills in the Philippines are considered to be among the lowest in Asia at an average of PHP 600 per ton.<sup>73</sup> From a waste management budget perspective, there is little incentive for national and local governments in the Philippines to move upwards in the waste hierarchy from cheap landfill disposal as it currently makes up a small amount of the budget. Furthermore, there are no mandatory recycling targets for the public sector to work towards. Instead, the Philippines has a target to achieve a rate of 80% solid waste diversion by 2022.<sup>74</sup>

### Cost Saving Benefits from Source Segregation

An important additional benefit of increasing sorting efficiency is the reduction in total waste collection costs (OPEX costs) for local governments. Taking Quezon City's waste collection costs as a proxy for urban areas in the Philippines, the following chart indicates the significant shortfall in funding that Quezon City experiences per household due to its current linear system, as shown in Figure 35. Quezon City (2.9 million inhabitants as per 2015) states that the city does not collect fees for waste collection from households. As for the waste collection costs, the LGU spent PHP 1,610 million (USD 34 million) in 2019. Increasing sorting efficiency can reduce the total waste collection costs (OPEX costs) for an LGU by up to 30%.<sup>75</sup> This is primarily due to reduced landfill tipping fee costs due to diversion, increased efficiency of transport logistics (fuel, routing) and reduced manpower costs due to diversion of trucks going into landfills.

This increased sorting efficiency reduces the shortfall for Quezon City by PHP 60 per month for each household, thus saving the LGU a total of PHP 482 million/year (USD 10 million/year).<sup>76</sup>

69 DENR - [EMB Solid Waste Management Report \(2018\)](#)

70 [GAIA: Picking up the baton](#)

71 Vella Atienza - [Review of the Waste Management System in the Philippines \(2011\)](#)

72 Vella Atienza - [Review of the Waste Management System in the Philippines \(2011\)](#)

73 ADB - [Quezon City Waste-to-Energy Prefeasibility Study \(2016\)](#)

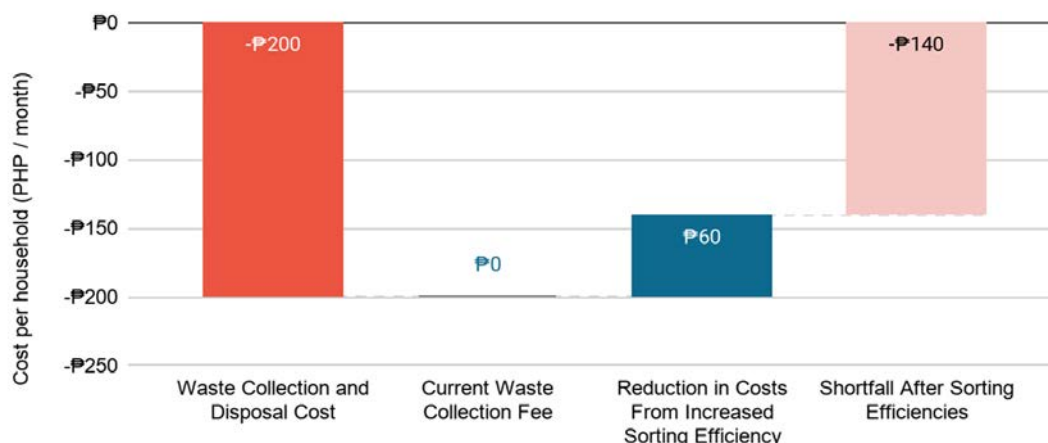
74 NEDA - [Philippine Development Plan 2017-2022 \(2017\)](#)

75 Modeling by GA Circular of Quezon City. The waste collection and disposal cost per household was estimated from the reported collection cost in 2019 by Quezon City's LGU, and the city's population and average household size based on the 2015 population census. The reduction in costs from increased sorting efficiency is based on modeling by GA Circular of the amount of materials that can be diverted due to increased sorting efficiency and the subsequent cost savings.

76 Modeling by GA Circular

Figure 35.

### IMPACT OF SORTING EFFICIENCIES IN COST MODEL FOR QUEZON CITY'S MSW (COST PER HOUSEHOLD)



Note: Population and average household size used in the model are based on the [Philippines Statistics Authority 2015 Census of Population](#). The average household size used is the country's average; data on the Barangay level is not available.

Box 7 provides examples of enabling policies impacting packaging from benchmark countries that support the transition to a circular MSW system (further details can be found in Appendix 17.2).

### 3.2.3 Inability to Capitalize on Growing Demand for Food-Grade Recycled Products

A global 2020 petrochemicals industry assessment by S&P Global Platts shows that despite unfavorable economics, global recycled plastics volumes reached nearly 20 million tonnes in 2020, or 8% of total virgin demand.<sup>77</sup> This is up from just under 18 million tonnes in 2019, or 7% of total virgin demand. A case in point

is the packaging industry. Given that packaging is the largest end-use industry for plastics globally and in the Philippines, global commitments by leading brand owners to increase recycled content usage in their packaging is slowly spurring demand for food-grade recycled resins, which command higher margins amongst recycled products. Please refer to section 3.1.2. and Appendix 16.1 for examples of recycled content commitments.

As demonstrated in the quote by Virginie Helias, the FMCG industry is not only using food-grade materials, there is also a demand for high quality recycled resin for non-food contact applications. However, brands have noted that there is limited supply of high-quality, non-food grade recycled plastic.

77 S&P Global Platts - [Global Petrochemical Trends H1 2020 \(2020\)](#)

## BOX 7. POLICIES SUPPORTING THE TRANSITION TO A CIRCULAR MSW SYSTEM



### ENHANCING CIRCULARITY

The EU Strategy for Plastics in the Circular Economy requires all plastics packaging placed on the EU market to be reusable or recyclable by 2030.

The EU Commission is also initiating work on new harmonized rules to ensure that by 2030 all plastics packaging placed on the EU market can be reused or recycled in a cost-effective manner.

In July 2020, the CEFLEX (Circular Economy for Flexible Packaging) initiative in the EU, launched a comprehensive set of guidelines to help the flexible packaging value chain design recyclable consumer

packaging solutions and accelerate a circular economy. The Designing for a Circular Economy (D4ACE) guidelines have been developed collaboratively with the entire flexible packaging value chain. Providing a catalyst for change across Europe, the new D4ACE guidelines aim to produce higher quality recycled materials to be kept in the economy and used in a wider number of sustainable end markets.



There is a wide spectrum of quality in recycled plastic...Most of the plastic we use is 'food' grade, which, you could argue, is overdesigned. But there is a meagre supply of high-quality recycled plastic, because there is nothing much between food grade and very poor quality. To unlock this supply shortage, the industry must collectively define a wider spectrum of grades, so we don't all go for food grade where supply is limited.

*Virginie Helias, Chief Sustainability Officer at P&G*

Source: Reuters - [Rinse, refill, repeat \(2020\)](#)

The recycling industry in the Philippines is dominated by small and medium enterprises (SMEs)<sup>78</sup> that struggle to meet multinational buyers' requirements on scale, quality, management systems and process demands. Therefore, the sector is unable to capitalize on this growing global demand for recycled resins by the FMCG and packaging sectors. Below are some challenges that recyclers have in meeting the buying requirements of companies such as global FMCG and packaging companies:

- Meeting **quality** requirements:
  - Lack of high capacity and advanced technologies (such as those producing food-grade recycled resins) to produce high quality outputs. Recyclers in the Philippines are typically SMEs and are rarely equipped with advanced recycling technologies or the ability to make CAPEX investments to install such technologies.
  - Use of contaminated feedstock sourced from mixed waste, due to lack of source segregation.
- Meeting **quantity** requirements:
  - Reliance on sourcing of feedstock from the informal sector leads to a lack of continuous and high-quality feedstock tonnage needed to serve large buyers.
  - Contracts to "harvest" feedstock from municipal sources require strong relationships with the city governments.
- Meeting **supplier standard** requirements of multinationals:

- The recycling sector lacks liquidity to accept payment terms of 90-120 days, which is often the standard for multinational packaging or consumer goods companies. For example, the recyclers are buying their feedstock from the informal sector that requires cash-on-delivery or even prepayment. Delayed payments from their buyers by up to 3 months or more requires substantial liquidity that the sector does not have.
- Environmental, Health and Safety requirements that require costly technology, documentation and procedures related to standards compliance.
- Supplier code of conduct requirements can be a challenge in a sector that is closely intertwined with an informal supply chain for feedstock.

For example, in the Philippines, there is currently no production of food-grade rPET for local consumption of exports (Indorama Ventures plant is only expected to begin operations in 2022). This lack of local demand for food-trade recycled products means local CFR rate remains low and recyclers are unable to capitalize on the higher margins and are also more exposed to global price volatility, thus reducing value yield.

### 3.2.4 Greater Challenges to Profitability for Recyclers in the Philippines

Across Southeast Asia, recyclers face similar challenges such as feedstock sourcing challenges due to the lack of source segregation and collection infrastructure, high contamination rates, varying supply from the informal sector, and price pressures due to competition from falling virgin resin pricing (as described in the former sections). In addition to these factors, recyclers in the Philippines face additional profitability challenges

78 DTI, PPIA and BOI - [The Philippine Plastic Industry Roadmap \(2014\)](#)



that cripple their ability to maintain and develop their businesses, in particular: high electricity prices, high transportation costs, and high administrative burden.

### Unfair Competition from the Informal Recycling Industry

Several recycling stakeholders in this study have reported experiencing “unfair competition” from an informal recycling industry, which is said to process up to 50% of all plastic materials collected for recycling. By operating informally, this part of the industry avoids costs such as taxation, permits, costly technology related to environmental regulations, minimum wages and even electricity by illegally connecting to the grid. This poses a considerable cost advantage for the informal recyclers, who consequently can buy post-consumer material at higher prices while selling their recycled products at lower prices, forcing formal recyclers to follow suit and resulting in lower revenues for these formal recyclers.

While unfair competition from informal recyclers is an issue in all Southeast Asian countries, based on stakeholder interviews, this is believed to be a more significant challenge in the Philippines as compared to other markets.

### High Electricity Costs

Electricity costs in the Philippines are among the highest in Southeast Asia and are even considered high by global standards.<sup>79</sup> In addition, the grid stability is poor and blackouts are common. As the recycling industry in the Philippines is operating with relatively low machinery efficiency and at high electricity consumption, the

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79 Asian Power - [Renewables may cut Philippines' electricity rates by 30% \(2019\)](#)



**The informal recyclers are undercutting the formal sector of recyclers – they steal electricity, pay workers less, etc. – so the informal players have less costs and can buy material at a higher price.**

*Recycling Stakeholder*



**The Philippines has one of the highest electricity costs in the world, so it's not attractive to do things with low value. If we move our entire operations to Thailand, our electricity cost will be halved. I think that would be a fair price for electricity.**

*Recycling Stakeholder*

expenses are disproportionately high—reducing the price yield and therefore the value yield.

The 2018 Global Retail Electricity Tariff Survey by International Energy Consultants shows that the price level in the Philippines is between 38-67% higher than that of Thailand, Malaysia and Vietnam.<sup>80</sup> Based on data from a recycling stakeholder, the electricity spent is USD 0.0436/kg (PHP 2.12/kg) per recycled product produced. To operate profitably electricity should ideally be 10% of the operational costs or USD 0.0249/kg (PHP 1.21) of recycled product produced which is almost half of the current electricity cost. Please refer to Appendix 21 for a comparison of electricity costs across the Philippines, Thailand, Malaysia and Vietnam.

### High Transportation Costs

An efficient logistics sector for the recycling industry lowers transaction costs and creates more customer value, thus providing firms with opportunities to increase their earnings and enhance their competitiveness. Due to its archipelagic nature as well as the burdensome and sometimes inconsistent regulations, the Philippines currently has the highest logistics cost base among Southeast Asian countries.<sup>81</sup>

The poor logistical performance of the Philippines is the result of underinvestment and has led to a lack of infrastructure (see Figure 36). This is coupled with restrictions on cabotage (the right to operate and transport goods), which results in the high costs of transportation.<sup>82</sup> Despite being an archipelagic nation,

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80 International Energy Consultants - [Global Retail Electricity Tariff Survey \(2018\)](#)

81 Philippine Institute for Development Studies - [Regulatory challenges in the Philippine logistics industry \(2018\)](#)

82 World Bank - [Creating Markets in the Philippines: Country Private Sector Diagnostic \(2019\)](#)

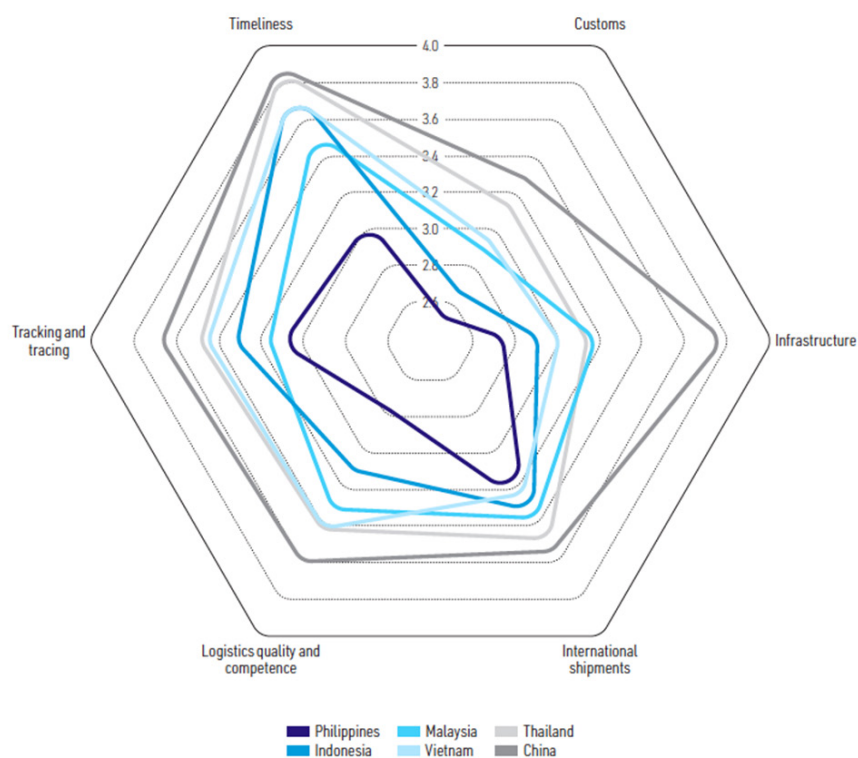
“

In any country that is island-dependent, you have to do the transportation through the sea. Here the ships are smaller, the ports not so developed and mainly managed by smaller players, that’s why the volumes are small. The overall costs are more when you compare to distances in international sea waters. It’s more expensive to ship within the Philippines than if I have to ship from Thailand to the Philippines.

*Recycling Stakeholder*

Figure 36.

**DIAGRAM DISPLAYING PHILIPPINES’ LOGISTICS PERFORMANCE SCORECARD ACROSS MULTIPLE INDICATORS AS COMPARED TO REGIONAL PEERS**



Source: World Bank

where efficient transportation by sea is crucial for the movement of goods, the Philippines falls short and ranks 88th (out of 141) in “Efficiency of seaport services” according to the Global Competitiveness Report 2019.<sup>83</sup> The ports in the Philippines also lack efficiency. For example, only a handful of the hundreds of ports have quay cranes.<sup>84</sup> The high cost of transportation disproportionately impacts businesses

that must transport low value commodities, such as feedstock for recycling, limits the ability of recyclers to collect from remote locations and **reduces the CFR Rate** in remote locations.

### High Administrative Burden of Doing Business Compared to other Countries in the Region

The administrative burden of doing business in the Philippines as compared to other countries in the region is high and this reduces the international competitiveness of recyclers in the Philippines. The Philippines ranked 95th (of 190) in terms of ease of doing business

83 World Economic Forum - [Global Competitiveness Report 2019 \(2019\)](#)

84 World Bank - [Creating Markets in the Philippines: Country Private Sector Diagnostic \(2019\)](#)



I get permits from the national government, including from DENR and LLDA (Laguna Lake Development Authority). After getting permits from the national government, I need to get the same permits from the local government. I have to prepare 2 different reports quarterly—so I either have to hire someone to do it or do it myself. If I do the reporting, there are seminars to attend every year. For the past 5 years I've been going to the seminars which don't have anything new. All these things cost money and take up a lot of time for small business owners.

### *Recycling Stakeholder*

in the World Bank's 2020 Doing Business report, up from 124th place in 2019 following several regulatory improvements.<sup>85</sup> In spite of these improvements, the Philippines still scores lower than all its regional peers for this study. Of a top score of 100, the Philippines scores the lowest at 63 followed by Vietnam 70, Thailand and Malaysia at 80 and 82, respectively. Please refer to Appendix 22 for a comparison of the ease of doing business.

Requirements for new businesses include registration with a minimum of five different agencies as well as the LGUs.<sup>86</sup> For many industries, numerous operating permits or licenses are required from a range of unrelated agencies, and these documents must be renewed annually.<sup>87</sup> This is also true for the recycling industry which in addition must acquire other permits from various levels of government.

### **3.2.5 Lack of Organic Waste Treatment Facilities to Incentivize Source Separation and Diversion**

Of the estimated 15.8 million tonnes of municipal solid waste annually generated in the Philippines,<sup>88</sup> 52.3% comprise food/organic waste,<sup>90</sup> almost all of which is sent to dumpsites or landfills.

The Philippines currently does not have an industrial composting facility or other large-scale waste treatment

infrastructure for organic materials. RA9003 mandates composting and puts the onus of implementation at LGU or barangay level which indicates a scale that often does not reach industrial scale. This is demonstrated in the National Solid Waste Management Report 2008-2018 which describes smaller scale composting facilities as case studies. The Manila Bay Sustainable Development Master Plan includes four large scale composting facilities for separate treatment of organic waste, with an implementation timeframe of 2023-2030 and an expansion phase 2031-2040, however these are early stage plans and a feasibility study has yet to be conducted.<sup>91</sup>

Increasing the capacity to collect and treat organic waste lays the foundation towards less contaminated plastic feedstock and thus **increasing the CFR rate and value yield** for plastic recycling.

Box 8 provides examples of enabling policies impacting packaging from benchmark countries that support source separation and organics recycling (further details can be found in Appendix 17.2).

## **3.3 ADDITIONAL IMPACTS OF COVID-19**

While an assessment of the impacts of COVID-19 on recycled plastics was not part of the scope of work for this study, some initial insights were gained during the course of this study on the short-term and expected longer-term impact of the pandemic and new regulations on the recycling industry in the Philippines.

85 World Bank - [Doing Business 2020 \(2020\)](#)

86 PWC - [Doing Business in the Philippines \(2015\)](#)

87 World Bank - [Creating Markets in the Philippines: Country Private Sector Diagnostic \(2019\)](#)

88 DENR-EMB - [National Solid Waste Management Status Report 2008-2018 \(2018\)](#) Per capita generation 0.4 kg/day

89 World Bank - [Population, total - Philippines \(2019\)](#)

90 DENR-EMB - [National Solid Waste Management Status Report 2008-2018 \(2018\)](#)

91 NEDA - [Manila Bay Sustainable Development Master Plan \(2020\)](#)

## BOX 8.

### POLICIES SUPPORTING SOURCE SEPARATION AND ORGANICS RECYCLING



#### LANDFILLS

The EU's First Circular Economy Action Plan (2018) sets a common EU target for recycling 65% of municipal waste by 2035; a binding landfill target to reduce landfill to maximum of 10% of municipal waste by 2035; a ban on the landfilling of separately collected waste; separate collection obligations are strengthened beyond recyclables and extended to hazardous household waste (by end 2022), bio-waste (by end 2023), textiles (by end 2025). The action plan recognizes that if the waste segregation is not done at source, it would be difficult to expect producers to implement EPR, especially for low-value plastics.

The EU Landfill Directive aims to phase out landfilling for recyclable material by 2025. The EU Strategy for Plastics in the Circular Economy encourages EU member states as well as regional and local authorities in the EU to internalize the environmental costs of landfilling and incineration through high or gradually rising fee, taxes or other economic instruments.

In India, the draft 2019 National Resource Efficiency Policy sets targets for ban on disposal of recyclable waste including

plastics to landfills by 2025. India's Plastic Waste Management Rules 2016 encourages urban local bodies to recover energy from low grade plastics through cement kilns, waste-to-energy plants or waste-to-oil plants. In response, the cement industry in India has targeted increasing the substitution of coal to Refuse Derived Fuel (RDF) containing plastics with a goal to reach a Thermal Substitution Rate of coal to RDF of 25% by 2025 and 30% by 2030.



#### ORGANIC WASTE

In the EU, organics recycling is driven primarily by the Landfill Directive (1999/31/EC), which obliges Member States to reduce the amount of biodegradable municipal waste that they landfill, and by the Waste Framework Directive (WFD, 2008/98/EC), which mandates Member States to take measures to encourage the separate collection of bio-waste for composting or digestion. As plastic residues remaining in compost threaten the quality of the product, which reduces its effectiveness to be applied to soils, separation of organics from plastics is automatically incentivized.

Biological treatment of organic waste techniques may be either aerobic (such as composting), anaerobic (such as anaerobic digestion) or mechanical:

- *Composting*: Composting of separately collected feedstock represents (in EU member states, the USA and Canada) the most widely applied recycling process for separately collected organic waste, both in terms of the number of plants and annual capacity.
- *Anaerobic digestion*: The use of anaerobic digestion to treat biowaste both from separate collection schemes and from mechanical treatment of mixed municipal solid waste is growing. The digestion process produces biogas, a renewable source of energy, a digestate which can be composted or applied to soils directly as a biofertilizer.
- *Mechanical Biological Treatment (MBT)*: This represents an effective technique for treating unsorted wastes to reduce its biodegradable content. It therefore prevents or reduces biodegradable organics being landfilled, which would otherwise generate methane emissions and leachate.

#### 3.3.1 A Significant Proportion of the Recycling Industry is at Risk of Closures or Operating at Low Capacities

Since the COVID-19 pandemic began, the Philippines has been under various degrees of lockdowns ranging from a very strict Enhanced Community Quarantine (ECQ) from mid-March covering the entire island of Luzon (including associated islands), to the slightly eased transition stage of Modified Enhanced Community Quarantine (MECQ) introduced in the second half of May, to the General Community Quarantine (GCQ) where alternative work arrangements and some degree of traveling and gathering is allowed. The restrictions have been lifted gradually from mid-May onwards in locations assessed to have low transmission risk, and on June 1st Metro Manila entered the GCQ phase. However, as of the beginning of August, Metro Manila

and surrounding Bulacan, Cavite, Laguna and Rizal were reverted to MECQ.

During ECQ, the recycling sector was not considered an essential service.<sup>92</sup> More than 85% of the recyclers, aggregators and junk shops interviewed (14 out of 16) stated that they have only been allowed to reopen from the 1st week of June when Metro Manila moved to GCQ level. Market sources estimate the percentage of recyclers open during the lockdown to less than 5%. As of June 2020, 50-80% of the recyclers were back in operation at 30-60% of installed capacity. However, recyclers need to get to about 70% operating capacity for recycling to make any business sense.

<sup>92</sup> GA Circular - [Safeguarding the Plastic Recycling Value Chain: Insights from COVID-19 impact in South and Southeast Asia \(2020\)](#)





We have depleted 100% of our savings and we were forced to apply for a bank loan. Our employees received government assistance, but businesses didn't receive any assistance. Because of our bank loan and low sales, we are losing money at the moment. We cannot undergo a lockdown again. If there is another lockdown or if demand doesn't pick up, we will go bankrupt.

*Recycling Stakeholder*

### 3.3.2 Significant Reductions in Demand throughout the Value Chain

The lockdowns, continued restrictions and poor economic outlook induced by COVID-19 have further reduced recycled plastic demand which was already suffering from the low virgin prices as discussed in section 3.1.1. The fall in demand is significant across all resins and all value chain stakeholders. As shown in Table 5, the demand and volumes traded in the Philippines fell by between 20-90% depending on the material and the stakeholder. The informal collectors have experienced the greatest reductions in volume as a higher number were still operating.

### 3.3.3 Reduced Feedstock Supply Due to Changes in Consumption Patterns

The COVID-19 pandemic has changed consumption patterns. As countries went into lockdowns, recyclers experienced a reduction in the supply of clean post-consumer feedstock and a reduction in demand for recycled plastics as the preference of consumers shifted towards virgin materials.

The streams which have traditionally provided comparatively cleaner feedstock (such as dining service, hotel channels and office buildings) were closed during

the ECQ/MECQ. Meanwhile, consumption shifted to households, which generally have very low levels of segregation and high levels of contamination, making collection and trading of material significantly more challenging for the recyclables value chain.

The lockdown has caused changes in household consumption behavior resulting in a surge in single-use plastic usage.<sup>93</sup> For example, the delivery sector in Manila has boomed during the lockdown<sup>94</sup> service providers such as Grab have shifted its service portfolio from transportation to delivery of packages and food and have been in operation more or less throughout the lockdown.<sup>95</sup> The result of the consumption shift is evident from the informal sector attesting to unusually large amounts of plastic in the waste stream, as well as the difficulty in finding high value recyclables.<sup>96</sup> The same observation was provided by a PET recycler who observed a sharp decline in the supply of post-consumer PET bottles, which is considered a high value plastic.

93 Manila Times - [Plastic's place in the 'new normal' \(2020\)](#)

94 Manila Bulletin - [Delivery firms big winners in quarantine \(2020\)](#)

95 CNN - [GrabFood, FoodPanda resume food delivery services amid Luzon quarantine \(2020\)](#)

96 Aljazeera - [Philippine trash trawlers struggle with virus-led plastic surge \(2020\)](#)

Table 5.

#### FALL IN DEMAND FOR THE VALUE CHAIN STAKEHOLDERS ACROSS THE RESINS IN THE PHILIPPINES

AVERAGE DEMAND REDUCTIONS EXPERIENCED BY RECYCLERS INTERVIEWED (PRE-COVID COMPARED TO POST LOCKDOWNS)					
	All Resins	PET	HDPE	LDPE	PP
Informal Collectors	78%	90%	69%	-	70%
Junk shops	56%	41%	46%	-	77%
Aggregators	38%	50%	27%	-	27%
Recyclers	53%	20%		63%	

Source: GA Circular - [Safeguarding the Plastic Recycling Value Chain: Insights from COVID-19 impact in South and Southeast Asia \(2020\)](#)

For three Metro Manila aggregators interviewed in mid-June 2020, feedstock supply quantities were 27-50% lower post ECQ compared to pre COVID-19 levels. Although the value chain is back in operation, the localized GCQs and reimposed MECQs are limiting the access to feedstock as new processes are put in place, restricting movement and thereby causing logistical obstacles for the collection of feedstock

“

Buying feedstock has been really difficult because of logistics barriers. Almost 50% of our sellers come from Davao, Cebu, Iloilo and other provinces that require air/sea travel to reach us in Valenzuela (city in Metro Manila). Only land travel is allowed for now and thus only a few are able to sell to us. We are waiting for further announcements on this.

*Recycler in the Philippines*

material. While transporting feedstock by land is allowed in the Philippines, market sources report that recyclers are not able to receive feedstock from other islands, as only basic necessities are allowed to be transported by sea and air - and raw materials are not considered essential. With 7,641 islands in the Philippines, this logistical barrier poses significant challenges to recyclers.<sup>97</sup>

### 3.3.4 Lack of Confidence for a Smooth Recovery Due to Low Oil Price Projections for the Foreseeable Future

The projection of low crude oil prices for the next 18 months is the major concern amongst recyclers and the reason that they have low confidence in the future. Recyclers are cash strapped and struggling as of Q3 2020 due to high burn rates during the lockdown, unprofitable prices and lack of demand. In addition to this, they are facing the prospect of continued low oil prices. By January 2022, oil prices are projected to be only 50 USD/barrel and they may never recover to be above 70 USD/barrel (see Figure 37).

97 GA Circular - [Safeguarding the Plastic Recycling Value Chain: Insights from COVID-19 impact in South and Southeast Asia \(2020\)](#)

Figure 37.  
**HISTORICAL AND FORECAST CRUDE OIL PRICES**



Source: GA Circular - [Safeguarding the Plastic Recycling Value Chain: Insights from COVID-19 impact in South and Southeast Asia \(2020\)](#)

Note: Based on the best case of West Texas Intermediate (WTI) prices by US Energy Information Administration (EIA)

### 3.4 ADDITIONAL IMPACTS OF TIGHTENING GLOBAL REGULATIONS ON SCRAP PLASTIC & RECYCLED PLASTIC TRADING

With the increased spotlight on plastic waste as an issue in the region, new developments with regards to regulations on the import of recycled and scrap plastics have emerged. Two key developments, in particular, have already affected the demand and prices of recycled resins.

#### 3.4.1 China's Stricter Regulations for the Import of Recycled Plastic

In addition to the National Sword Policy of 2018 banning the import of waste plastics, China, a major consumer of recycled plastics, has been tightening the enforcement of existing regulations regarding imports of recycled plastics pellets.<sup>98</sup> The stricter regulations, which came into force from 1st September 2020, specify that imports of recycled plastic pellets need to be in "uniform color, size, and packaging." It is understood that this means that pellets cannot be mixed together when imported to China, however, many stakeholders are still trying to confirm what this requirement means. Violations of this rule will result in a fine of more than RMB 500,000 (about USD 74,500). Due to the hefty fines related to this new regulation, recyclers have reduced the amount of exports to China as they wait to observe how the Chinese authorities implement this regulation.

#### 3.4.2 Amendments to the Basel Convention

Secondly, the Basel Convention, a near-universal treaty which regulates the transboundary movements of hazardous wastes and other wastes and of which the Philippines is a signatory, adopted amendments to Annexes II, VIII and IX to the Convention, which deal with the transboundary movement of plastic waste that will come into force on the 1st of January 2021.<sup>99</sup> These amendments aim to make global trade in plastic waste more transparent and better regulated.<sup>100</sup> Thus far, only Hong Kong, China has updated its guidelines to comply with the Basel Convention Plastic Waste Amendments. Under the new controls in Hong Kong, China, certain types of plastic waste listed in the Waste Disposal Ordinance of Hong Kong, China (WDO) and Basel Convention will not require import permits if it is almost free from contaminants (not more than 0.5%) and is destined for recycling in an environmentally sound manner. While those not listed will be subject to the control of permit/ consent and will require a notification for transshipment. Further details of the Basel Convention Plastic Waste Amendments and the updated Hong Kong, China guidelines can be found in Appendix 23.

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98 Resource Recycling - [Report: China clamps down on recycled pellet imports \(2020\)](#)

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99 Basel Convention - [Basel Convention Plastic Waste Amendments \(2020\)](#)

100 Reuters - [U.N. clinches deal to stop plastic waste ending up in the sea \(2019\)](#)



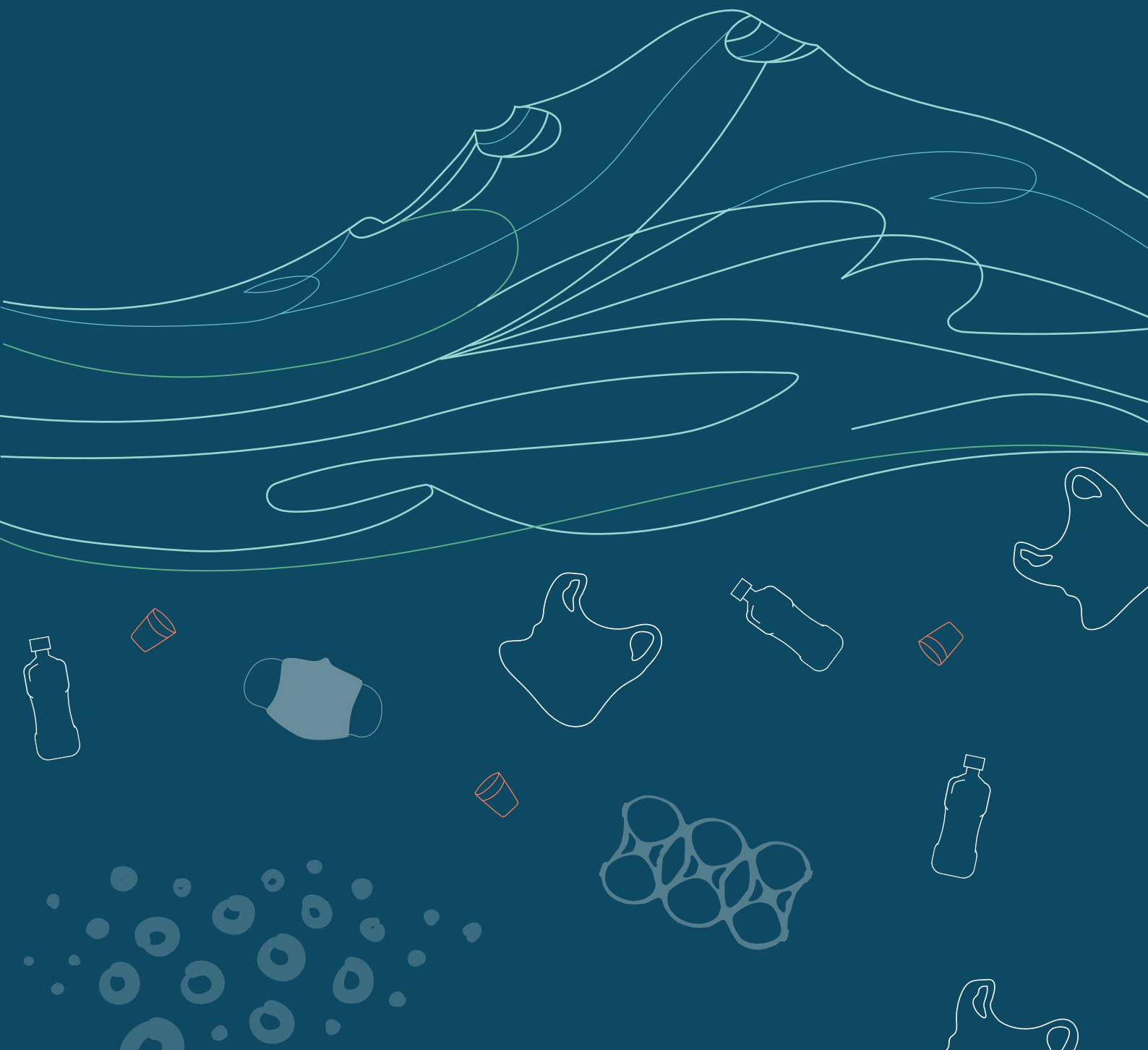


Photo: GA Circular



SECTION 4:

# INTERVENTIONS TO UNLOCK ADDITIONAL MATERIAL VALUE





## SECTION 4:

# INTERVENTIONS TO UNLOCK ADDITIONAL MATERIAL VALUE

This section provides a broad set of recommended interventions that addresses the pressures as described in chapter 3. The interventions are designed to stem this loss by on the one hand addressing the availability and quality of feedstock for the plastics recycling industry through improvements of the waste management system and on the other hand by laying a strong foundation for the recycling industry, strengthening the demand for recycled products and transforming the Philippines' plastics recycling industry into a globally competitive and resilient industry.

Section 4.1 provides an overview of the 2 categories of interventions needed to increase the material value unlocked. Sections 4.2 and 4.3 go into the detailed actions under each of these 2 categories of interventions. Section 4.4 summarizes the interventions and actions in terms of their potential to unlock material value and lays a roadmap of the priority actions that need to be taken. Appendix 24 provides a summary of all the recommended interventions and actions.

## 4.1 OVERVIEW

Figure 38 presents two categories of interventions needed to increase the material value unlocked via the circularity of plastics in the Philippines Figure 37:

- 1. Interventions that increase Value Yield and CFR rate:** Each of these interventions contain actions that release pressure both horizontally and vertically. They enable the area of value unlocked to increase diagonally to the top right. Any actions that increase Value Yield are primarily driven by economics and value creation. It is important to prioritize these actions first as it creates the incentive for increased recycling to occur. Enabling the value chain to understand and realize the value of recycling is a foundational step towards improving circularity.
- 2. Interventions that increase CFR Rate:** Each of these interventions contain actions that release pressure on the horizontal axis. They enable the area of value unlocked to increase horizontally to the right. These actions are longer term in nature and more systemic across the waste management and recycling value chains.

### Notes:

- All the actions recommended below have implications in increasing CFR Rate or CFR Rate and Value Yield to a small or large extent.
- Most of the actions are interdependent on each other. However, for the purposes of this study, they have been isolated and classified into the above-mentioned categories.

- Many of the recommended interventions and actions require cost estimation of infrastructure needs along with barriers but these estimations are out of scope as the key objective of this study is to define the addressable market size of the private sector plastics circularity opportunity. Therefore, once the recommendations of this study are taken forward, a future action should be to conduct a CAPEX and OPEX cost estimation of infrastructure needs along with barriers for each of the prioritized actions.

To assist with prioritization of the actions on the basis of timing, each of the actions under the interventions have been classified under 3 clusters:

- Lay the Foundation:** Actions under this cluster create the necessary foundation for plastics circularity in the Philippines. Suggested timing to implement actions in this cluster is 1-2 years.
- Strengthen the Demand (for recycled products):** Actions under this cluster are high-impact actions that strengthen the demand for recycled products by strengthening CFR Rate and Value Yield.

Suggested timing to implement actions in this cluster is 3-5 years.

- Maximize the Value:** Actions under this cluster help to unlock the maximum possible value from plastics recycling and help build a resilient recycling industry. Suggested timing to implement actions in this cluster is beyond 5 years.

## 4.2 INTERVENTIONS THAT INCREASE VALUE YIELD AND CFR RATE

### A. Increase Waste Collection and Sorting Efficiency of Post-Consumer Plastics

With a net CFR rate of only 28% across all the four key plastics resins (of focus for this study) and considering this is likely overstated (as described in section 1.7), sorting efficiency needs to increase across the post-consumer plastics value chain including the stages of waste disposal, separate collection and transport and sorting materials from mixed sources. The actions outlined in Table 6 are key strategies for implementing an Integrated Solid Waste Management (ISWM) system with increased sorting efficiency of post-consumer collection of plastics.

Figure 38.

### SUMMARY OF TWO CATEGORIES OF ACTION TO INCREASE THE MATERIAL VALUE UNLOCKED BY PLASTICS CIRCULARITY

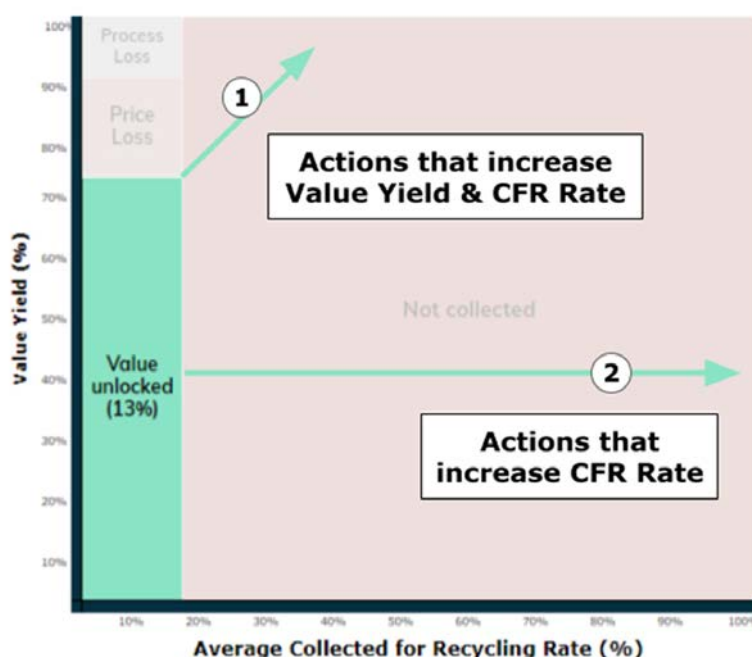


Table 6.

**CLUSTER/TIMING, ACTIONS AND RATIONALE FOR INTERVENTION “A: INCREASE WASTE COLLECTION AND SORTING EFFICIENCY OF POST-CONSUMER PLASTICS”**

Cluster & Timing	Action	Rationale
Lay the Foundation (1-2 years)	1 Enforce source segregation and separate collection standards and targets	<p>Recyclers in the Philippines consistently reported having challenges sourcing high quality plastics due to high contamination rates. At a bare minimum, segregating MSW between wet (organic) and dry (inorganic) waste will significantly reduce contamination as organic waste is the main contaminant of recyclables recovered from the MSW system. Separate collection also ensures higher operational efficiencies for waste collectors.</p> <p>Source segregation and separate collection are mandated by RA 9003. However, the Act is not clear on the distribution of roles and responsibilities between the city/municipality and the barangays.</p> <p>Some LGUs have strictly enforced segregation at source coupled with segregated collection, through a “no segregation, no collection” ordinance. As of 2018, 128 LGUs were selected as pilot sites for the implementation of the ordinance. For these 128 pilot sites, compliance to segregated collection ranges from 53% to 100%.<sup>101</sup> However, the ordinance has yet to be implemented on a national level.</p> <p>A nation-wide standard and support tool for the local governments to implement and enforce source segregation and separate collection combined with access to funding would enable the LGUs’ implementation ability. The NSWMC administers a solid waste management fund for this purpose. However, the fund is empty while it should be financed by imposed fines &amp; permits, donations and grants. More reliable sources must be applied to finance the fund and the implementation of RA 9003.</p> <p><i>Note: This intervention is aligned with the short-term Policy and Regulation actions of the PAP4SCP.</i></p>
	2 Enforce the role of Material Recovery Facilities (MRFs) as part of the waste collection system	<p>Section 32 of RA 9003 mandates the establishment of an MRF in every barangay or cluster of barangays. The MRF should be designed to receive, sort and process solid waste and store compostable and recyclable material efficiently and in an environmentally sound manner, with the residual wastes transferred to a sanitary landfill.</p> <p>Enforcing section 32 can provide economies of scale to sort and segregate dry waste into their respective categories, which can then be sold to their respective recyclers. MRFs also provide secure jobs for workers from the informal collection sector and can be operated as micro-enterprises. As of 2020, only 34.4% of the 42,046 barangays were served by an MRF.<sup>102</sup></p> <p>The required MRF for every barangay or cluster of barangays should be adequately designed based on actual requirements, conditions and available space. The establishments of “dry” MRFs to process potentially recyclable materials from segregated waste collection may be considered to improve sorting and recovery of good recyclables including plastics. This could be established in urban areas. For predominantly rural areas, larger MRFs which can properly process the biodegradables can be established and manned by properly trained barangay residents. This distinction will prevent the proliferation of standard MRFs which process both wastes and which eventually deteriorate into unsightly mini-dump sites.</p>

101 DENR-EMB - [National Solid Waste Management Status Report \(2008-2018\) \(2018\)](#)

102 Based on data received from NSWMC

Lay the Foundation (1-2 years)	2	(continued)	<p>In Metro Manila, the barangays with limited space for MRFs can consider partnerships directly with the junk shops wherein barangay designated eco-aides or equivalent can collect the potentially recyclable materials or recyclables from households and sell them directly to the junkshops without going through the MRFs.</p> <p><i>Note: This intervention is aligned with the short-term Infrastructure actions of the PAP4SCP.</i></p>
Strengthen the Demand (3-5 years)	3	Develop awareness and behavior change campaigns	<p>Awareness and behavior change campaigns that focus on litter prevention, source segregation (e.g. dry vs. wet waste) and recycling are critical to the success of plastics circularity. Voluntary producer responsibility systems (e.g. PRO) and companies from consumer-facing industries that use plastics can partner with the government to identify behaviors to be addressed, levers for changing the behaviors and to ensure consistent messaging and communication. The communications should be backed up with infrastructure that enables citizens to participate in the solutions.</p> <p>For example, the Indian government launched Swachhata-App, a mobile application for consumers to post their complaints about their city's waste management. The app has more than 8 million downloads and is used in over 2,750 cities. In one city, Mysore, up to 90% of consumer waste management complaints through the app are resolved by the city.<sup>103</sup></p>
	4	Provide opportunities for informal sector inclusion	<p>The vast majority of collection of post-consumer resins in the Philippines are by the informal sector. This is due to the absence of any scalable formal avenues of collection of resins for recycling (e.g. source segregation of recyclables). Given the Philippines' continued reliance on the informal sector, the CFR rate for plastics is projected to drop as GDP per capita grows. Thus, it is critical to work on improving the conditions for the informal sector and enabling them opportunities to earn higher incomes, which can be achieved through informal sector inclusion. The informal sector can be included through any of the five best case practices for informal sector inclusion identified by The Ocean Conservancy: (a) NGO-supported micro-enterprises; (b) Cooperatives and collectives; (c) Franchisee development; (d) Supplier development; (e) Independent waste banks.<sup>104</sup></p> <p>Voluntary producer responsibility models developed by industry should also ensure they integrate the informal sector and where possible producer responsibility models that exclude the informal sector should be avoided.</p> <p>There should be strengthened support for the informal waste management sector by registering informal waste workers officially, providing them with ID cards and investing in capacity building to strengthen their ability to collect waste more efficiently. As an example, GIZ supported a project to integrate the informal waste collectors in Iloilo City. The workers received capacity building training to enhance their skills and eventually formed an association, Uswag Calajunan Livelihood Association (UCLA) with the purpose of better organizing their work and to enhance their recognition.<sup>105</sup></p> <p>The establishment of cooperatives and SMEs should be supported by LGUs. An example of such a co-op is SWaCH, India's first wholly-owned cooperative of self-employed waste collectors and other urban poor. It is an autonomous enterprise that provides front-end waste management services to the citizens of the city of Pune in western India. The cooperative covers over 70% of the city ensuring daily segregated waste collection from citizens' doorsteps while generating sustainable livelihoods for one of the poorest and most marginalized sections of society.<sup>106</sup></p>

103 Ocean Conservancy - [Plastics Policy Playbook \(2019\)](#)

104 Ocean Conservancy - [Plastics Policy Playbook \(2019\)](#)

105 Paul et al. - [Integration of the informal sector into municipal solid waste management in the Philippines – What does it need? \(2012\)](#)

106 SWaCH - Website



Strengthen the Demand (3-5 years)	4	(continued)	<p>To promote the welfare and living standards of informal waste pickers initiatives by local governments could include initiatives such as annual health check-ups, life insurance and annual bonuses for collecting more than a certain amount. Waste collection companies can also engage with NGOs in the Philippines such as the Mother Earth Foundation which is already working to provide affordable health insurance for informal waste management across its project locations. . The private companies managing waste collection could be encouraged to meet with the informal waste pickers who work in their districts/barangays to discuss solutions (e.g. access to training, health benefits and safety equipment) for improving the working conditions and how to enable them to more effectively divert waste from landfills, thereby also reducing landfill fees for the private companies and saving them money.<sup>107</sup></p> <p>An example of this is Hasiru Dala Innovations, a private waste collection company in Bengaluru, India. The organization works actively with 3,000 waste-pickers in the city to provide benefits such as social security, health insurance, access to microfinance, etc. to empower them to raise their standard of living.</p> <p>Positive financial incentives could also be developed to encourage the formal and informal sectors to recycle more through subsidies such as pay-as-you-throw programs and curbside reward schemes. Hasiru Dala Innovations in Bengaluru, India provides a first of its kind pricing model for waste collection services comprising of a fixed component and a variable based on the weight of each waste stream – clients (such as apartment complexes, districts, corporate campuses, etc.) pay only as much as they generate and how well they segregate.</p>
Maximize the Value (Beyond 5 years)	5	Digitalize recyclables collection	<p>Demand for responsibly sourced recyclables is expected to increase as brands increase their commitments to use recycled content. This requires increased transparency of the plastics value chain in the Philippines by tracing the flow of materials through the informal collectors, junk shops, aggregators and recyclers via digital tools and thereby increasing the value of plastics. A digital solution would also enable more efficient routing of transport logistics for aggregators and recyclers.</p>

## B. Set Recycled Content Targets Across All Major End-Use Applications

With only 292,000 TPY out of 1.06 million TPY of plastics resins consumed being collected for recycling, the Philippines lacks a strong secondary market for recycled plastics. Additionally, the Philippines' reliance on export markets for demand has exposed the recycling industry to the full brunt of the global price volatility inherent in the recycling industry. Setting recycled content targets will enable the growth of a strong domestic market for recycled products through increasing the demand for post-consumer resin. Therefore, the increased demand

will lead to increased prices of post-consumer plastics which will motivate an increased amount of collection to capitalize on the better prices. The actions outlined in Table 7 are key strategies for implementing an ISWM system by setting recycled content targets across all major end-use applications.

Recycled content targets should be complemented with longer-term measures to discourage the use of virgin plastics in industries where recycled plastics can technically replace virgin plastics without any impact on product performance (e.g. in applications that use rigid PET and HDPE packaging).

107 UNESCAP - ["Closing the Loop" Sai Mai District, Bangkok Case Study \(2018\)](#)

Table 7.

**CLUSTER/TIMING, ACTIONS AND RATIONALE FOR INTERVENTION “B: SET RECYCLED CONTENT TARGETS ACROSS ALL MAJOR END-USE APPLICATIONS”**

Cluster & Timing	Action	Rationale
Lay the Foundation (1-2 years)	6 Accelerate policies and standards that allow recycled plastics in food-contact applications across all resins	<p>Food-grade recycled plastics command the highest margins across all the major grades of recycled products from PET, HDPE, LDPE and PP resins. Additionally, major multinational companies have set targets for using up to 50% recycled resin in their packaging by 2025 and beyond, and demand for food-grade resins is expected to grow in the Philippines. However, currently none of the resins recycled in the Philippines are used in food-grade applications thus the potential for a domestic market for recycled plastics in food-contact applications is currently untapped.</p> <p>As of now use of rPET in food grade applications is being allowed by the Philippines’ Food and Drug Administration (FDA) on a case-by-case basis. However, FDA issues permits on a per product basis (i.e. per product per company) as opposed to a resin or industry use basis. By setting standards for food grade recycled resins, the FDA approval process will be facilitated for products containing recycled resins. The Bureau of Philippine Standards (BPS) is the agency responsible to set up such standards.</p> <p>Stakeholders have shared that the standard setting process for HDPE, LDPE and PP will take significantly longer as they believe that there is a lack of technology for producing food-grade recycled content for these resins. It is important to note that significant progress has been made in Europe and the US with regards to technology for producing food-grade recycled plastics for these resins. Examples include the recycling of HDPE milk bottles back in to recycled content for other milk bottles by ALPLA<sup>108</sup> and the chemical recycling of PP into food-grade rPP by Plastic Energy.<sup>109</sup></p> <p>Note that the first food-grade recycling plant that will launch is a food-grade rPET production plant which is planned to open in 2022 as a joint venture between Coca-Cola Philippines and Indorama Ventures Packaging Philippines Corporation. Setting policies and standards for food-contact recycled materials will enable more private sector investments to be made.</p>
	7 Set recycled content targets and standards for major plastic use industries	<p>Recycled content targets enable the gradual decoupling of recycled products from virgin prices. They guarantee a domestic demand and encourage investments into the plastics recycling industry. Numerous private sector stakeholders of the plastics value chain in the Philippines (including plastic converters and brands) have shared during the course of this study that they have held off on making investments into recycling facilities because of the lack of a supportive enabling environment that would give them confidence of a return on investment.</p>

<sup>108</sup> ALPLA - [United Kingdom: Food-Grade HDPE Recycling Champion \(2019\)](#)

<sup>109</sup> ICIS - [First commercially available chemically recycled food-grade rPP pellets enter market \(2020\)](#)

Lay the Foundation (1-2 years)	7	(continued)	<p>One of the key supportive policies noted by stakeholders was the need for recycled content targets, as without this policy, stakeholders are concerned that they will lose money due to the lower overall cost of virgin plastic - and in spending more overall for recycled content they would make their product more expensive than the competition. In summary, recycled content policies provide stakeholders with the confidence to make investments and help to level the playing field amongst competitors, particularly for products which have high cost sensitivities, such as FMCG products.</p> <p>Setting recycled content targets is critical not only for consumer facing industries such as consumer goods packaging, but also for industries where the end application is not customer facing and where the buyer is indifferent to the use of virgin or recycled (for example the agriculture industry). Implementing national standards for recycled products can also promote acceptance of recycled products as consumers feel confident about product performance and safety.</p> <p>Setting recycled content targets is not a one size fits all solution, the targets must be set in consultation with the relevant industries to ensure maintained quality requirements of their products. The DTI is the target setting agency while BPS is in charge of designing standards.</p> <p>A feasibility study is recommended to evaluate and recommend specific recycled content targets and CFR targets (as per Action 23) and milestones for these targets, to assess local SWM infrastructure, policy options, sensitivity analysis on oil and virgin plastic prices and cost-benefit analysis of these targets. Such a feasibility study and modeling would need to be done before any recycled content targets and CFR targets are set.</p> <p>It is also recommended that any recycled content rate targets are set at a resin-level or at an end-use application level - for e.g. recycled content target rate for PET bottles could be made higher as several consumer goods companies are already aiming for 25-50% recycled content rate targets for PET bottles by 2030 and also because the CFR rate for PET Packaging is higher than that of other applications of PET. Recycled content targets can be as effective as the CFR rate targets as they stimulate the local secondary market for recycled products.</p>
Strengthen the Demand (3-5 years)	8	Develop and launch incentives for using recycled content	<p>The government can stimulate demand while mitigating some of the infrastructural costs of incorporating post-consumer resin (PCR) into plastic products through introducing tax benefits for plastic products which contain PCR content above a certain percentage (e.g. above the set recycled content target of action 7). Therefore, brand owners and the rest of the value chain will be encouraged to include PCR content in their products.</p> <p>For example, in the UK, the Treasury offers lower Value Added Tax (VAT) for products or businesses that incorporate a minimum proportion of recycled, reused or remanufactured material. Reducing VAT for recycled content or reuse and repair activities is in line with previous select committee recommendations. In 2014, the government's Environmental Audit Committee recommended that the government should "introduce differential VAT rates based on lifecycle analysis of the environmental impact or recycled content of products, and tax allowances for businesses that repair goods or promote reuse".<sup>110</sup></p>

110 House of Commons' Environmental Audit Committee - [Growing a circular economy: Ending the throwaway society \(2014\)](#)

Strengthen the Demand (3-5 years)	8	(continued)	<p>If incentives for recycled content within the Philippines are not possible due to budget constraints (especially in light of spending during the COVID-19 pandemic), it is recommended to consider intervention #10 below (higher fee for plastic applications without minimum recycled content) as a replacement for this intervention, as intervention #10 has the same effect of making the use of recycled content more attractive but does not require the outlay of limited government funds.</p> <p>The design recycled content incentives are under the purview of DTI with the advice and recommendation of agencies such as EMB. This process is not yet set into motion. Based on interviews, the upcoming NPOA-ML is likely to rely only on voluntary industry commitments<sup>111</sup>.</p>
	9	Define green public procurement (GPP) targets for recycled content specific to plastic products	<p>In the Philippine Green Public Procurement roadmap, only 20 products are prioritized and have been identified for green procurement. The products were selected based on six criteria including (a) market readiness, (b) environmental impact, (c) cost implications, (d) practicability, (e) support to government environmental objectives, and (f) support to the local economy. There are no specific guidelines for plastic products.</p> <p>The implementation of green procurement in the Philippines should be sped up, as it lags behind other ASEAN countries. In addition, to promote green public procurement of recycled plastic products, the conflict between cost and sustainability has to be addressed, as agencies face a dilemma between cost efficient and "green" products which often cost more. By having guidelines that specifically address plastic products, and quantifying targets for green procurement (e.g. minimum 30% recycled content), the conflict between sustainability and cost can be addressed.</p> <p>This recommendation is not suggesting a new GPP policy for the Philippines (which would be a time consuming process), but instead recommending specifications/targets within the existing GPP policy already in place in the Philippines.</p> <p>For example, as outlined in the EU's "Green Public Procurement Manual on Plastic Waste Prevention", governments may specify packaging bought or used by the government must contain at least 75% recycled content. This increases the demand for packaging which meets that criteria.</p> <p>Such target setting within the GPP in the Philippines can also help the plastic recycling industry to obtain cost efficiencies through scaling their operations (economies of scale), thus products with 30% recycled plastic content would be more cost effective than their virgin counterparts.</p> <p><i>Note: this intervention is aligned with the PAP4SCP.</i></p>
Maximize the Value (Beyond 5 years)	10	Higher fee for plastic applications without minimum recycled content	<p>Once recycled content targets are set, and other actions under the "Lay the Foundation" cluster in this table have been implemented, virgin material taxes should be levied on plastic products which do not reach the recycled content targets. Or other actions should be considered which disincentivize the use of virgin plastic and incentivize the use of recycled content (e.g. removing support for the virgin plastic industry).</p> <p>For example, the UK's plastic packaging tax will result in an additional tax of £200/tonne for plastic products with less than 30% PCR content when it comes into force in 2022.</p>

111 On the date of the interview with EMB and NSMWC (2020-11-18) the NPOA-ML was not yet finalised hence is subject to changes.

### C. Mandate “Design for Recycling” Standards for All Plastics, Especially for Packaging

Packaging constitutes 53% of all plastics consumed in the Philippines.<sup>112</sup> Without fundamental redesign and innovation, about 30% of plastic packaging will never be reused or recycled.<sup>113</sup> This amounts to at least 320,000 TPY of plastic packaging in the Philippines locked away from any possible reuse or recycling. The study has identified five design improvements to packaging products that would significantly impact CFR in a positive direction. These include reducing

CaCO<sub>3</sub> concentration from HDPE/LDPE/PP applications (to a degree which optimizes reduced plastic use and increased recycling), choosing clear/neutral plastics over Colored, choosing mono-material over multi-material, phasing out PVC labels from PET bottles and limiting lightweighting.

The interventions in Table 8 are three steps towards phasing-in mandated standards. Firstly, the industry must align on a set of standards, a process which must take into account global standards and those of import countries. Secondly, forward thinking industry stakeholders can commit to the standards on a voluntary basis to accelerate the adoption and to ease transition into the third step, making the standards mandatory in order to drive up the CFR rate on a national scale.

112 DTI, PPIA and BOI - [The Philippine Plastic Industry Roadmap \(2014\)](#)

113 Ellen MacArthur Foundation - [New Plastics Economy: Catalyzing Action \(2017\)](#)

Table 8.

#### CLUSTER/TIMING, ACTIONS AND RATIONALE FOR INTERVENTION “C: MANDATE “DESIGN FOR RECYCLING” STANDARDS FOR ALL PLASTICS, ESPECIALLY FOR PACKAGING”

Cluster & Timing	Action	Rationale
Lay the Foundation (1-2 years)	11 Align industries on “design for recycling” standards	<p>Recyclers in this study have shared a number of contamination issues reducing the recyclability of their packaging plastic feedstock stream, issues which have its origin at the design stage. Non-packaging plastic products are locked away from ever getting recycled due to product design (e.g. use of adhesives instead of screws in industrial plastic products). These stakeholders often reach out to producers requesting design changes but have not been successful because within the Philippines there are no guidelines or requirements for reparability/availability of spare parts, modular design, ease-of-disassembly/design for recycling, or for declaration of substances that are a problem for recycling.</p> <p>To unlock value from plastic applications, “design for recycling” standards that enable recyclability of the plastics produced must be developed and aligned in consultation with the manufacturing and the recycling industries. This study could be led by companies in the plastics value chain and/or the Bureau of Philippine Standards under the Department of Trade and Industry.</p> <p>In addition to design standards, a uniform labeling system that clearly indicates recyclability and identifies resin would enable a wider range of consumers and value chain stakeholders to separate resins correctly and thereby fully reap the benefits from standardization.</p>
	12 Voluntarily adopt “design for recycling” standards for all plastic products	<p>This action can start with voluntary adoption of standards by plastics producers and brand owners (for example producers of packaging). Many manufacturing industry stakeholders are forward thinking and can join voluntarily prior to a government mandate. Especially in the case of multi-material flexible packaging, voluntary steps are needed towards adopting mono-material replacements for multi-material packaging.</p>



Lay the Foundation (1-2 years)	12	(continued)	<p>Stakeholders from the flexible packaging industry in Southeast Asia reported that multilayer films in the market are composed of different materials e.g. PET, Nylon, CPP (cast polypropylene), LDPE, LLDPE, aluminum foil and that collection, sorting and recycling of wastes from such multi-layer, multi-material films is still very rare. The recently developed Biaxially-oriented Polyethylene (BOPE), for instance, allows for stronger mono-material PE flexible packaging, reducing the need for other polymers or materials.<sup>114</sup></p> <p>Brands and/or associations such as PARMS or any future PRO can take the lead in developing design-for-recycling guidelines for voluntary adoption by the plastics value chain. Such efforts will help to increase overall recycling rates and so will support to increase the recycling rates that individual companies can also claim. An example of voluntarily created design-for-recycling guidelines is the PETCO guideline called "Plastics Packaging: Recyclability by Design",<sup>115</sup> which was released in October 2019 and focuses on PET. It has been developed by the PET PRO in South Africa, which engages with over 80% of the PET packaging value chain. PETCO has put these guidelines in place so that PET plastic packaging recycling issues are minimized. Their request to plastic manufacturers is:</p> <ul style="list-style-type: none"> <li>• "For existing plastics packaging, companies are asked to review their current portfolio against these recycling guidelines, highlight any aspects where the design could be improved and then implement changes as soon as possible, as the opportunity arises.</li> <li>• For new packaging, companies are asked to integrate these guidelines into the design process at the start, to minimize cost and maximize the opportunity for compliance."</li> </ul>
Strengthen the Demand (3-5 years)	13	Mandate national "design for recycling" standards for plastic applications	<p>National mandates for design-for-recycling standards for plastic applications such as packaging plastics will eventually create a level-playing field wherein investments and changes towards design for recycling become mainstream and there are no free riders.</p> <p>As it would take significant time to create and mandate nationwide design-for-recycling standards for plastic applications, this last part of this three-phase approach is considered as a mid to longer term intervention (whereas the earlier voluntary approaches should be implemented sooner and lay the groundwork for this final intervention).</p>

## 4.3 INTERVENTIONS THAT INCREASE CFR RATE

### D. Encourage Increase in Recycling Capacities (Mechanical and Chemical)

Increasing the CFR rate in the Philippines is impossible without increasing the formal mechanical and chemical

recycling capacity. This requires a number of interlinked actions, such as the reduction of unfair competition from the informal recyclers, provision of incentives for investments in new recycling technologies and capacity, and accessibility of market prices and volume data. The actions outlined in Table 9 present key strategies and rationale for increasing recycling capacities.

<sup>114</sup> Plastics Recyclers Europe - [Flexible Films Market in Europe, State of Play \(2020\)](#)

<sup>115</sup> Plastics Packaging - [Recyclability by Design \(2019\)](#)

Table 9.

**CLUSTER/TIMING, ACTIONS AND RATIONALE FOR INTERVENTION “D: ENCOURAGE INCREASE IN RECYCLING CAPACITIES (MECHANICAL AND CHEMICAL)”**

Cluster & Timing	Action	Rationale
Lay the Foundation (1-2 years)	14 Incentivize increase in recycling capacity for all resins (PP, PE, PET)	<p>Resins with wide ranging single-use applications have wide gaps for recycling capacity, being 90% gap for PE (i.e. missing capacity), 88% gap for PP and a 61% gap for PET. Note that the gap reduces to 29% for PET once all planned investments are operational by 2022.<sup>116</sup> Thus for PET further investments still need to be stimulated. For the investments currently planned for PE and PP, the planned capacity increases are insignificant, therefore, more support is needed for PE and PP.</p> <p>Recyclers are eligible for investment support in accordance with the Omnibus Investments code of 1987. The 2017 IPP includes recycling as a prioritized investment, however it is categorized under “All Qualified Manufacturing activities including Agro-Processing” which can be easily overlooked by recyclers. Additionally, even though some investment support is in place, the eligibility criteria and the administrative process to apply can be overwhelming for a typical SME recycler in the Philippines, and thereby dismissed. There is also a widespread misconception among recyclers in this study that there is no support available for investments into recycling technology.</p> <p>In order to increase plastic recycling in the Philippines, the BOI should amend the IPP to target the recycling industry specifically (from a naming perspective) and to better suit the nature of the existing recyclers (i.e. SME recyclers). These are elaborated on as follows:</p> <ol style="list-style-type: none"> <li>1. There is a need to make the investment incentive more accessible to the Filipino recycling industry by articulating more explicitly their eligibility and to communicate this to the recycling industry.</li> <li>2. The investment incentive should be used to prioritize increased capacity for technologies that produce high quality recycled resins and investments towards advancing output quality at existing plants (e.g. adding wash technology or optical sorting to enable higher quality output or enhance environmental performance).</li> </ol> <p><i>Note: This intervention is aligned with the short-term actions of the PAP4SCP.</i></p>
	15 Formalize informal recyclers and reduce unfair competition from illegal recyclers	<p>While informal (or unlicensed) plastic recyclers positively contribute to the CFR rate, it must be understood that they may put formal recyclers at a disadvantage. This is because the informal recyclers do not comply with EHS standards and other requirements (such as paying tax) which allows the informal recyclers to avoid the costs associated with compliance. Hence, the informal recyclers have more resources to buy feedstock at higher prices and/or sell their products at lower prices than the formal recyclers. This forces formal (licensed) recyclers to increase their buying prices or risk not having enough supply of post-consumer plastics, or to sell their product at lower sales prices - i.e. unlicensed recyclers jeopardize the business viability of formal recyclers.</p>

<sup>116</sup> Assumes 7.5% growth in market inputs by 2022 (based on 2.5% YoY growth).

Lay the Foundation (1-2 years)	15	(continued)	<p>The competition from informal recyclers in the Philippines is significant. Formal recyclers who have participated in this study have estimated the market share of informal plastic recyclers to be 20-50% thus constituting not only a threat to formal recyclers but also an opportunity for increasing formal recycling capacity by way of formalizing the current informal recyclers.</p> <p>There are two suggested steps to improve this situation:</p> <ul style="list-style-type: none"> <li>• Step 1: Providing a pathway to formalization for illegal recyclers (through technical and administrative assistance) will help provide an incentive for these recyclers to formalize.</li> <li>• Step 2: Enforcing actions to shut down recyclers who do not comply with the relevant EHS regulations to ensure a level playing field.</li> </ul> <p>Step 2 should only be undertaken if a recycler cannot be formalized through best efforts, including with technical and administrative assistance/capacity building.</p> <p>An example of similar actions is found in Penang State, Malaysia where the city council (MBSP) provides temporary licenses to informal recyclers who are able to comply with the set standards and conditions for them to operate before eventually being licensed and thereby offering a transition pathway. In addition, the Malaysian government has recognized the environmental impact of unlicensed recyclers. Since early 2019, the Malaysian government has closed 140 illegal plastic recycling plants that violated the country's Environmental Quality Act 1974.<sup>117</sup></p>
Strengthen the Demand (3-5 years)	16	Provide incentives for investments in new recycling technologies (i.e. matching grants, tax holidays, etc.)	<p>Companies are generally unwilling to invest in new technologies due to the high initial costs of obtaining machines from overseas and the tedious process of obtaining bank loans. Tax holidays<sup>118</sup> and/or matching grants could be granted to companies looking to purchase new equipment to alleviate some of the initial costs.</p> <p>The lower efficiency of outdated machinery/equipment currently used in the Philippines contributes to the higher energy consumption and costs. For example, induction systems for heating machinery (such as for a hot wash line) could reduce energy consumption by up to 20%. Additional technologies to incentivize are those that adhere to high environmental standards, fill the market gap of recycled food grade resins and quality recycled resins which are not necessarily food-grade.<sup>119</sup> These are technologies that allow the Philippines recyclers to access increased global market demand by FMCG companies due to plastic circularity commitments.</p> <p>As discussed under action 14, there are incentives available, however the accessibility to the recycling industry must be addressed (as highlighted in action 14).</p>

117 Recycling Today - [Malaysia closes illegal plastic recycling facilities \(2019\)](#)

118 Temporary reduction or elimination of a tax

119 [Reuters - Rinse, refill, repeat \(2020\)](#)

Strengthen the Demand (3-5 years)	17	Invest in chemical recycling capacity for low value plastics	<p>Chemical recycling (pyrolysis) converts waste plastics into cracker feedstocks that could displace naphtha or natural gas liquids (NGL) demand. This type of recycling treats low-value mixed polymer streams and multiple layer plastics (MLPs) that mechanical recycling technologies cannot handle. Outputs of chemical recycling are more resilient to lower oil prices, remaining profitable down to \$50/barrel,<sup>120</sup> as compared to mechanical recycling (down to \$70-\$80/barrel).</p> <p>Technologies that convert plastics back into secondary raw materials or fuels can be considered to fall under 2 broad categories: (a) plastic-to-plastic (via naphtha or monomer recycling); (b) plastic-to-fuel (PTF).<sup>121</sup> Such technologies are still largely at the pre-commercial stage and the scalability, financial viability, environmental impact assessments and other risks of chemical recycling have not yet been fully demonstrated, especially in a Southeast Asian context. These technologies are generating interest as a replacement for unsustainable feedstock sources.<sup>122</sup></p> <p>While harmonized definitions for chemical recycling are still to be developed, even in the EU which leads in the development of these technologies, plastic-to-fuel technologies are considered by the chemical recycling industry to be energy recovery, not recycling; only plastic-to-plastic technologies (such as those that produce naphtha or monomers directly) are considered to fall under existing EU definition of recycling in the EU Waste Framework Directive.<sup>123</sup></p> <p>Chemical recycling technologies are already beginning to enter Southeast Asian countries such as Indonesia and Malaysia.<sup>124</sup> Chemical recycling (plastic-to-plastic) is especially relevant for PE and PP flexible films in the Philippines and should be encouraged to complement mechanical recycling. One example of a potential chemical recycling solution that can be replicated in the Philippines is Multicycle,<sup>125</sup> an EU project which uses the CreaSolv technology to identify potential chemical recycling solutions for plastics in mixed waste.</p> <p>Recycling capacity investment should not be prioritized in facilities that produce plastic-to-fuel (e.g. plastic-to-diesel) as a primary output as this is not considered circular.</p>
	18	Provide market pricing and volume data for virgin and recycled plastics	<p>Market data on pricing and volumes for recycled products gives confidence for new recyclers to enter the market, for current recyclers to grow their capacities and for the plastics value chain to buy recycled products from the Philippines. Market data also makes it easier to anticipate the volatile pricing cycles for recycled products. Market intelligence firms such as IHS Markit, ICIS, S&amp;P Platts, Wood Mackenzie already offer market data services for recycled products in regions such as Europe and North America.</p> <p>A good market pricing and volume data service for recycled products in the Philippines should include:</p> <ul style="list-style-type: none"> <li>• Graphs and tables showing historical weekly price moves for long-term perspective for both virgin and various grades of recycled products (bales, flakes, pellets)</li> <li>• Monthly import and export data on plastics scrap, virgin resins and recycled products</li> </ul>

120 McKinsey - [How plastics waste recycling could transform the chemical industry \(2018\)](#)

121 [A Circular Solution to Plastic Waste by BCG](#)

122 [Flexible Films Market in Europe, State of Play 2020 by Plastics Recyclers Europe](#)

123 [Chemical Recycling Europe](#)

124 [Plastics Energy Press Release on Malaysia](#); [Plastics Energy Press Release on Indonesia](#)

125 [Multicycle](#)

Strengthen the Demand (3-5 years)	18	(continued)	<ul style="list-style-type: none"> <li>Recent spot deals including commodity, price, location, volume</li> <li>Plant data including production and capacity, plant maintenance and shutdowns</li> <li>Weekly market overview and outlook including a brief commentary on the other regional markets</li> <li>Supply and demand analysis of domestic and international supply and demand</li> <li>News on force majeure and other plant disruptions, closures, openings and expansions</li> </ul> <p>This recommendation would need to be implemented by industry associations and/or DTI, as DTI is the lead for trade information.</p>
Maximize value (Beyond 5 years)	19	Streamline permits and reporting to government bodies	For wastewater treatment and other operations, recyclers are required to obtain permits from multiple levels of government and report data to multiple government authorities during the year. A streamlined and simplified reporting process with coordination at the national and local government levels would promote new businesses and support continuing operations by SME recyclers.

### E. Create Industry-Specific Requirements to Increase Plastic Waste Collection and Recycling Rates

One of the main challenges to plastics circularity in the Philippines is the lack of industry-specific collection/take-back requirements for the major end-use industries. This lack of producer responsibility results in CFR rate

being completely left to market forces. The prices for recycled products are thus always under constant cost pressure from virgin plastics providing little incentive to increase the CFR rates. Thus, CFR rate needs to be decoupled from this cost pressure on recycled plastics. The actions outlined in Table 10 present key strategies and rationale for creating industry-specific requirements to collect post-use products.

Table 10.

#### CLUSTER/TIMING, ACTIONS AND RATIONALE FOR INTERVENTION “E: CREATE INDUSTRY-SPECIFIC REQUIREMENTS TO INCREASE PLASTIC WASTE COLLECTION AND RECYCLING RATES”

Cluster & Timing	Action	Rationale
Lay the Foundation (1-2 years)	20 Set up voluntary producer responsibility system for all major end-use application industries for plastics	<p>The obligated industries should on a voluntary basis increase the collection-for-recycling and/or recycling of products/packaging which uses plastic. Private sector companies, especially in the packaging and electronics sectors, have decades of experience in many regions and over 68 developed and developing countries in operating voluntary producer responsibilities schemes.<sup>126</sup> Industry-led pre-competitive PROs provide the private sector with the flexibility to implement various economic tools to increase CFR while ensuring that the funds collected are directed towards increasing recycling rates.</p> <p>As an example, four FMCG brands, one packaging producer and Packaging and Recycling Association for Indonesia’s Sustainable Environment (PRAISE) founded the Indonesian PRO, as a voluntary effort to increase CFR for packaging materials in the country. Similarly, in Vietnam, a PRO has been founded by nine companies, with eight being FMCG brands and one being a packaging producer with a goal to drive increased waste collection rates for various packaging materials and formats</p>

126 [GA Circular - Full Circle: Accelerating The Circular Economy For Post-consumer Pet Bottles In Southeast Asia \(2019\)](#)



Lay the Foundation (1-2 years)	21	Mandate reporting framework for plastic products	<p>PSA has a very effective data collection system in place at the resin level. This should be extended to the product level where producers and retailers declare the amount of plastic products (e.g. packaging) they introduce into the market by polymer used, tonnage and end-use sector. This allows for an accurate understanding of plastic products entering the country each year.</p> <p>Mandatory packaging reporting should also be aimed at raising greater awareness among companies on the benefits of packaging waste reduction and to spur companies to take action to reduce the amount of packaging used and packaging waste disposed of.</p> <p>For example, Singapore will require all companies putting packaging into the country to declare the plastic resin type and tonnage from 2021 onwards. The requirements will apply, for a start, to brand owners, manufacturers, importers of packaging and packaged goods, as well as supermarkets with an annual turnover of more than \$10 million. Accurate reporting of consumption of resins and plastics products (especially for packaging products) supports the tracking of EPR targets for industries using plastics.</p> <p>The development of a reporting framework for plastics (which enables better tracking of plastic, especially finished products which is currently not possible) should be done in parallel to other key efforts. Implementation of policies should not be delayed in preference for perfect data.</p>
	22	Plastics value chain to incentivize co-processing of post-consumer low-value plastics	<p>With an existing co-processing capacity estimated to be between 1.2 million and 1.6 million TPY, it would be possible to process around six times the amount of multilayer flexibles that are currently consumed in the country. This indicates that the cement industry in the Philippines holds an untapped potential to process very large amounts of post-consumer low-value plastics.</p> <p>Incentivizing the cement industry to replace traditional fuels, such as coal, with RDF made from post-consumer low-value plastics has two benefits: 1) replacing unsustainable fuel sources and 2) providing a processing solution/end market for post-consumer low-value plastics. The incentivization of the cement industry to use RDF should be done by the plastic value chain. Some FMCG companies have already started incentivizing the collection and co-processing of low-value plastics via the plastic credit initiative (initiated by Plastic Credit Exchange). This system works with the local informal sector and LGUs in order to collect low-value plastics to be used in cement kilns as substitute to coal.</p> <p>This intervention should be accompanied by an update of the Clean Air Act. The implementation of Waste to Energy projects (which co-processing falls under) is under the discretion of DENR, which can decide whether they can operate. An update of this act, requiring that only the best-in-class technologies with the lowest environmental impact for co-processing can operate, could permit the absorption of a consistent part of the low-value plastic that is currently either disposed or leaked.</p> <p>It must be noted that prioritizing this intervention only, without also prioritizing circularity interventions such as design-for-recycling (actions 11-13) and reduce/reuse/new delivery models (action 27), would have the effect of prioritizing a linear solution over more circular solutions. Thus, to enable both reductions in plastic leakage and increased plastics circularity, it is critical that this intervention (action 22) is accompanied by equal or greater focus and progress in actions 11-13, 27 and other circularity interventions for low-value plastics. Please see section 4.4.3 for a summary of interventions which target multilayer flexible packaging (a subset of low value plastics).</p> <p><i>Note: This intervention is aligned with the short-term Infrastructure actions of the PAP4SCP.</i></p>

Strengthen the Demand (3-5 years)	23	Mandate collection targets specifically for packaging and other key plastic use industries	<p>Packaging accounts for 53% of the end-use industries in the Philippines,<sup>127</sup> (from a revenue perspective) and their products are generally of a 1-3 year lifespan (i.e. shorter lifespan compared to construction, automotive and filament industries). Collection targets mitigate the challenge of free-riders and require the entire obligated industry to participate in increasing CFR. The targets should be calibrated based on how recyclable the resins and products are and how developed the recycling infrastructure is. These collection targets will, in effect, mandate Producer Responsibility.</p> <p>When mandating collection targets, it is important to ensure the design and implementation of specific economic models of the EPR system is not prescriptive and instead is left to the respective industry. This ensures the funds collected from the industry remain in the hands of the respective industry to make the necessary interventions. Also, the targets must encourage eco-modulation within the economic model of the EPR to accelerate progress. For example, in developing the economic model for the EPR system, the industry must be required to pay a higher fee for lower-value, non-recyclable plastics (such as multi-material, multi-layer flexible packaging) as compared to higher value, recyclable plastics (such as rigid PET, HDPE and PP bottles and containers).</p> <p>The voluntary producer responsibility system (above action #20) can be an excellent testing ground for designing and implementing the economic model at a national-level.</p> <p><i>Note: this intervention is aligned with the short-term Policy and Regulation actions of the PAP4SCP to institutionalize EPR and incorporate "polluters-pay" principle. In addition, Senate Bill No. 1331 seeks to institutionalize the practice of EPR for plastic packaging material. The bill is currently under discussion by Senator Villar (author of the bill), DENR and the private sector.<sup>128</sup></i></p>
	24	Mandate a compliance scheme to meet obligations	<p>PROs may not be a one-size-fits-all solution for all companies to fulfill their obligations (for example, small to medium consumer goods companies may struggle to participate meaningfully via PROs).</p> <p>Companies may choose to join a PRO entity to fulfill their obligations for collection targets or choose to do so in other ways - for example, directly engaging with recyclers to meet their collection obligations.</p> <p>Therefore, a compliance scheme, which lists various options that companies have to fulfill their obligations and necessary certification processes, must be mandated to ensure the targets can be enforced.</p>
	25	Use "soft" approaches such as recognizing best practices and business awards	<p>To encourage government and business to become more circular, the use of "soft" nudging policy approaches can be included. This could be to recognize best practices and business awards (e.g. of circular LGUs or barangay awards, circular economy business awards for sustainability reporting practices).</p>

127 DTI, PPIA and BOI - [The Philippine Plastic Industry Roadmap \(2014\)](#)

128 Interview with NSWMC and EMB on 2020.11.18 and [Senate bill no 1333](#)

## F. Restrict Disposal of Plastics

A large majority of the non-recycled plastics in the Philippines ends up in sanitary landfills, dump sites or worse, leaks into the environment across the country. One of the first steps towards becoming a resource efficient society should be to eradicate the landfilling

of any waste which can be used as a resource. This requires a phase out of recyclable and other recoverable waste from landfills. The actions outlined in Table 11 present key strategies and rationale for creating industry-specific requirements to restrict disposal of plastics.

Table 11.

### CLUSTER/TIMING, ACTIONS AND RATIONALE FOR INTERVENTION “F: RESTRICT DISPOSAL OF PLASTIC”

Cluster & Timing	Action	Rationale
Lay the Foundation (1-2 years)	26 Improve reporting and tracking against HS codes reporting for import/export of recycled plastic resins, semi-finished products and scrap plastics	Import/export data based on 6 to 8 character HS codes enable an accurate breakdown of the trade of resins and products, thus ensuring that consumption data can be more accurately recorded and therefore more realistic and accurate EPR targets can be set for the industry. However, in the Philippines, recycled resins and virgin resins currently share the same HS codes and it is impossible to differentiate between them. An improvement of the HS code tracking system will also help to make trade of plastic resins and products more transparent and better regulated.
	27 Incentivize reduction of plastics (e.g. phase-outs where relevant) and reuse systems (e.g. refillable bottles, new delivery models)	Some LGUs have passed ordinances and started implementing plastics regulations since 2011. According to the NSWMC, as of 2019, there are 489 cities and municipalities which have some form of policy in place to regulate the usage of plastics, in particular plastic bags. <sup>129</sup> To introduce a phase-out on a national scale, one must ensure that there are suitable alternative products at an acceptable price point and implement policies that suit the range of demographics in the Philippines and learn from the success and failures of past phase-out initiatives. The “Implementing Rules and Regulations of RA9003” puts the onus of determining which materials are non-environmentally acceptable (i.e. subject to phase outs) on the NSWMC, and this decision should be based on scientific, technical and environmental e.g. life cycle assessment and economic analysis. <sup>130</sup> The proposed alternative should cost no more than 10% more than the cost of the original material according to section 29 of RA 9003. GAIA Philippines, in its policy brief on regulating single-use plastics in the Philippines, outlines policy recommendations on phasing out the usage of specific items. <sup>131</sup>  Reduction of plastics can be accomplished via the introduction of refillable bottles, which is in line with the consumer demand for more eco-friendly packaging. There are several ways a refill-reuse model could work, such as using an in-store dispensing machine at a supermarket or implementing a deposit-return scheme where people can return packaging at a store/drop-off point. Coca-Cola has adopted the reusable model in Brazil, replacing 200 million single-use bottles per year. Customers pay an indirect deposit when purchasing soda in a refillable bottle by receiving a discount on their next purchase when they return the empty bottle to the store. This reward system ensures a high return rate of above 90%. Retailers store the empty bottles and give them back to Coca-Cola during the delivery of a new order. Coca-Cola brings the multi-branded mix of bottles back to a bottling facility where paper labels are washed off and bottles are cleaned, refilled, and rebranded with a fresh label.

129 [WWF - EPR scheme assessment for plastic packaging waste in the Philippines \(2020\)](#)

130 [DENR Administrative Order 2001-34: Implementing Rules and Regulations of RA9003 \(2021\)](#)

131 [GAIA Philippines - Regulating Single-Use Plastics in the Philippines \(2020\)](#)

Lay the Foundation (1-2 years)	27	(continued)	<p>Filipino brand Human Nature set out to sell their personal and home care products in refillable packaging and establish refill stations at retailers. However, FDA regulation which currently puts the onus on the producer to deliver a packaged product, only allows refilling in the manufacturer's own stores by the staff (as the action is considered as part of the manufacturing process due to safety reasons). This should be amended to more broadly enable refilling practices in the Philippines.</p> <p>The Swedish government uses reduction of VAT to encourage reuse behaviors, by more than halving the VAT on repair services for selected goods thus making repair a more attractive option.<sup>132</sup> This type of relief is a suitable incentive for industries that invest in new delivery systems.</p> <p>Based on stakeholder consultations, FMCG brands operating locally did not indicate any specific plans to establish reuse/refill/new delivery models or related pilot efforts in the Philippines. Their key concerns with regards to reuse and refill models are 1) product quality, safety and hygiene concerns, 2) challenges and costs for new reverse logistics systems and 3) consumer behavior change and buy-in. Some brands interviewed are of the opinion that using recycled resins will be a more scalable business model for emerging economies than refillable/returnable systems.</p> <p>This again emphasizes the importance of incentives to encourage a voluntary phase-out of non-recyclable products where other environmentally sound alternatives exist. These incentives can enable alternatives to become economically viable for consumers (in line with the RA 9003 requirement that the alternative should cost no more than 10% more than the cost of the original material, as highlighted above).</p> <p><i>Note: Reuse and reduce practices are also part of the actions of the PAP4SCP for policy and regulation and R&amp;D, however refilling is not explicitly mentioned in the policy and thus it is recommended that refilling be included in the policy.</i></p>
Strengthen the Demand (3-5 years)	28	Invest in treatment of organic waste	<p>Plastic recycling will be more successful if investments are made in parallel to organic waste treatment such as industrial-scale composting, anaerobic digestion or mechanical biological treatment (MBT) in order to create value from organic waste. Segregating organics from the remaining waste stream results in less contaminated plastic feedstock and hence increasing the material value yield. An added benefit is that organic waste treatment facilities have the potential to process post-consumer bioplastics, which is growing in its usage.</p> <p>The Manila Bay Sustainable Development plan includes 4 large scale composting facilities as part of its efforts to improve SWM in the area through diversion. The next step is to conduct a feasibility study starting 2021 and implementation and expansion in the 2023-2040 timeframe. The plan encourages the provincial governments to partner with the private sector from feasibility studies to construction and operations.</p>
Maximize the Value (Beyond 5 years)	29	Increase landfill tipping fees	<p>Increased landfill tipping fees can encourage diversion of recyclables to reduce costs for the LGU. Currently landfill tipping fees in the Philippines are low, for example Payatas Landfill charges 600 PHP/ton.<sup>133</sup> Landfilling thus remains economically attractive as a waste disposal option and consequently puts a disincentivizing price pressure on alternative processes that diverts plastic waste to energy recovery or recycling.</p>

132 Swedish Tax Agency - [Repairs of Certain Goods \(2020\)](#)

133 ADB - [Quezon City Waste-to-Energy Prefeasibility Study \(2016\)](#)

Maximize the Value (Beyond 5 years)	29	(continued)	Increases in the landfill tipping fee need to be considered on a LGU basis, as some states with lower budgets are reliant on open dumpsites thus increasing landfill tipping fees for such states may increase the occurrence of illegal dumping for example.
	30	Mandate targets to reduce sanitary landfill disposal rates for MSW	Setting reduction targets for sanitary landfill disposal rate encourages local governments to support alternative treatment methods and energy recovery.

## 4.4 SUMMARY OF INTERVENTIONS

Based on the model developed by this study team, the increases in CFR rate and Value Yields are possible by implementing the previously-mentioned interventions. Please see Appendix 24 for a summary of all the recommended interventions and actions, and Appendix 25 for modeling assumptions.

### 4.4.1 Each Intervention has the Potential to Unlock USD 128 Million to USD 638 Million/Year

Each of the interventions taken by itself has the potential to increase the material value unlocked by between USD 128 million to USD 638 million/year. However, these interventions can overlap so the combined unlocked value would be lower than the sum of the

single intervention values. This analysis only shows the *potential* benefit of each intervention to unlock material value because a detailed cost-benefit analysis for each intervention has not been performed. Figure 39 and Table 12 summarize the various interventions and their effect on increasing CFR rate and value yields.

These numbers represent the total possible impact through the various interventions. For example, increasing recycling capacity from 15% to 100% of consumed plastics means that the recycling rate is no longer limited by the capacity to recycle and can theoretically reach 100%. However, only increasing recycling capacity will not achieve an increase in plastics recycling by itself. Instead, it must be done in synergy with implementation of the other 5 interventions, particularly interventions which create a demand pull for

Figure 39.  
**SUMMARY OF RECOMMENDED INTERVENTIONS AND THEIR IMPACT ON INCREASING CFR RATE AND VALUE YIELDS**

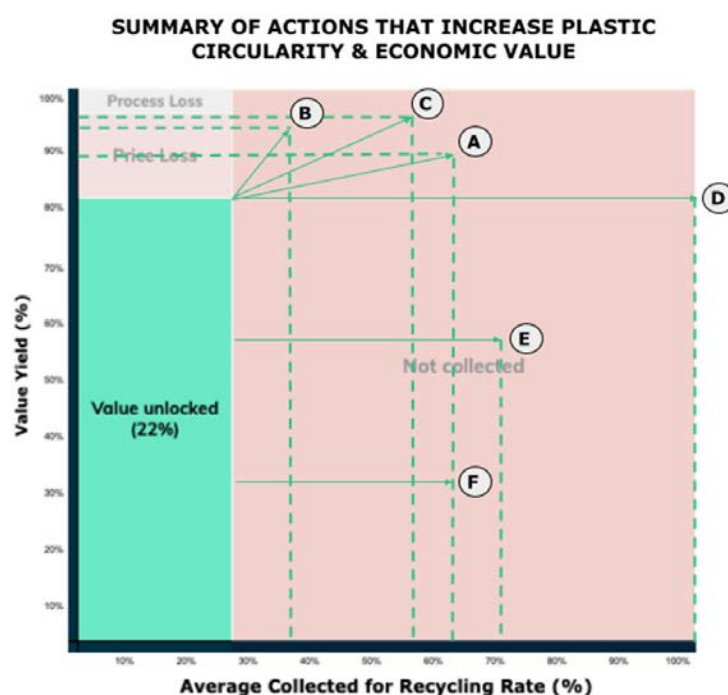




Table 12.

**SUMMARY OF RECOMMENDED ACTIONS AND THEIR IMPACT ON INCREASING CFR RATE AND VALUE YIELDS**

Summary of Interventions	Increase in Value Yield	Increase in CFR Rate	Potential Additional Material Value Unlocked
<b>1. Interventions that increase CFR Rate and Value Yield</b>			
A. Increase sorting efficiency of post-consumer collection of plastics	8%	36%	USD 378 million
B. Set recycled content targets across all major end-use applications	12%	9%	USD 128 million
C. Mandate “design for recycling” standards for all plastics, especially for packaging	14%	30%	USD 351 million
<b>2. Interventions that increase CFR Rate</b>			
D. Encourage increase in recycling capacities (mechanical and chemical)	-	72%	USD 638 million
E. Create industry-specific requirements to collect post-use products	-	44%	USD 387 million
F. Restrict disposal of plastics	-	36%	USD 321 million

recycled plastics (e.g. intervention B (recycled content targets), interventions E (industry-specific requirements to collect post-use products) and intervention F (Restrict disposal of plastics into landfills and dumpsites) and which enable increased volumes of plastic to be available for recycling (e.g. intervention A (increased sorting efficiency) and intervention C (design-for-recycling)). Please see Appendix 25 for the detailed assumptions and calculations of the interventions.

Please see Appendix 26 for a non-exhaustive list of existing industry-led and international efforts in the Philippines around plastic waste.

## 4.5 Next Steps

### 4.5.1 Twelve Priority Actions Towards Unlocking Material Value

Figure 40 summarizes all the actions by interventions and clusters. It also highlights who (i.e. government or private sector or both) is mainly responsible for undertaking each of the actions.

Based on analysis by the study team and stakeholder feedback in terms of practicality of implementation in the next 1-5 years, potential to comprehensively support growth of plastics recycling and unlock material value, the 12 priority actions in Table 13 (from among the 30 total actions) were identified.

Figure 40.

# SUMMARY OF INTERVENTIONS AND ASSOCIATED ACTIONS PER CLUSTER TIMELINE AND HIGHLIGHTING ACTIONS OF HIGHEST IMPACT

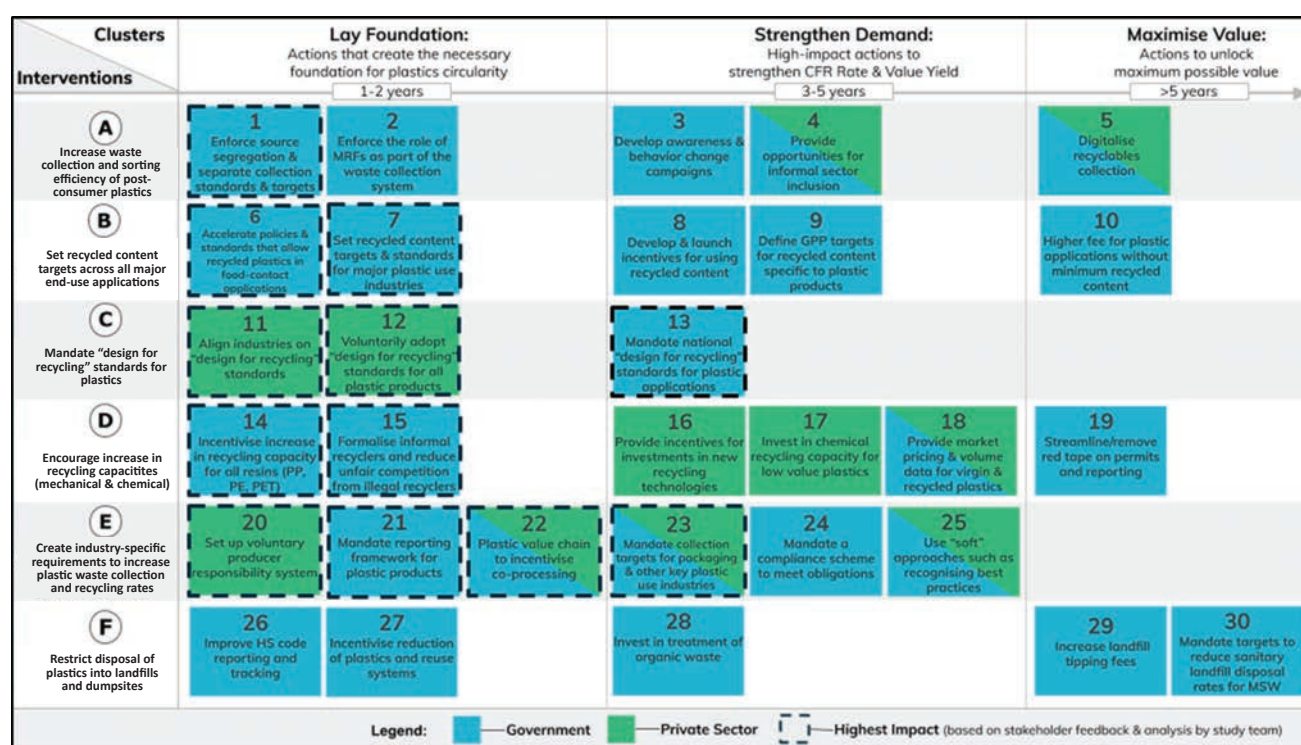


Table 13. SUMMARY OF THE PRIORITY ACTIONS UNDER THIS STUDY BASED ON STAKEHOLDER FEEDBACK

Action	Priority Actions Based on Stakeholder Feedback	Lead Stakeholder for the Action
1	Enforce source segregation and separate collection standards and targets	Government
6	Accelerate policies and standards that allow recycled plastics in food-contact applications across all resins	
7	Set recycled content targets & standards for major plastic use industries	
13	Mandate national "design for recycling" standards for plastic applications	
14	Incentivize increase in recycling capacity for all resins (PP, PE, PET)	
15	Formalize informal recyclers and reduce unfair competition from illegal recyclers	
21	Mandate reporting framework for plastic products	
22	Plastics value chain to incentivize co-processing of post-consumer low-value plastics	
23	Mandate collection targets for packaging and other key plastic use industries	
11	Align industries on "design for recycling" standards	Private Sector
12	Voluntarily adopt "design for recycling" standards for all plastic products	
20	Set up voluntary producer responsibility system for all major end-use application industries for plastics	

## 4.5.2 Summary of Actions Relevant to Multilayer Flexible Packaging

Table 14 provides the key public and private sector actions that are relevant to flexible packaging—targeting flexible packaging in order to increase plastics recovery and recycling. Please see the “rationale” text of each of the relevant actions in order to understand further how each of these actions are relevant to multilayer flexibles.

As of September 2020, bills which are currently being considered in the Philippines’ House/Senate related to multilayer flexible packaging are either mainly focused on single use plastic bans, levies on plastic bag use or encouraging the shift towards biodegradables packaging. The actions outlined in Table 14 are specifically relevant to all circularity aspects of multilayer flexible packaging.

Table 14.

**SUMMARY OF ACTIONS RELEVANT TO MULTILAYER FLEXIBLE PACKAGING**

Action	Actions Relevant to Multilayer Flexible Packaging	Rationale on Relevancy to Multilayer Flexible Packaging	Lead Stakeholder for the Action
1	Enforce source segregation & separate collection standards and targets	As the private sector moves towards making their packaging more recyclable, source-segregation and separate collection standards and targets are important enabling tools to ensure recyclable packaging gets collected.	Government
7	Set recycled content targets and standards for major plastic use industries	Recycled content targets and standards enable the growth of the secondary market for recyclable multilayer flexible packaging and ensure market-based collection.	
13	Mandate national “design for recycling” standards for plastic applications	“Design for recycling” standards create a level-playing field for brand owners/converters to ensure all products placed in the local market are truly recyclable. These standards could also incentivize the switch to monolayer flexible packaging which can be mechanically recycled unlike multilayer flexible packaging.	
14	Incentivize increase in recycling capacity for all resins (PP, PE, PET)	PP, PE and PET is widely used in multilayer flexible packaging (and would be used in mono-material flexible packaging) and recycling capacities for these resins are in shortfall.	
17	Invest in chemical recycling capacity for low value plastics	Given the technical challenges in separating the resins in multilayer flexible packaging, chemical recycling (plastic-to-plastic via naphtha or monomer recycling) can enable these resins to be recycled.	
21	Mandate reporting framework for plastic products	Since the Philippines is a net importer of finished products, a reporting framework for plastic products provides an accurate picture of the annual consumption tonnes of different resins.	
22	Plastics value chain to incentivize co-processing of post-consumer low-value plastics	While mechanical and chemical recycling capacities are built, co-processing of low-value, multilayer flexible packaging provides an interim market-based collection mechanism to prevent these plastics from entering landfills or the open environment.	
23	Mandate collection targets for packaging and other key plastic use industries	Given that the Philippines has a “sachet economy”, collection targets provide the incentive and level-playing field to the industry to ensure multilayer flexible packaging gets collected.	

27	Incentivize reduction of plastics (e.g. phase-outs where relevant) and reuse systems (e.g. refillable bottles, new delivery models)	Reuse and new delivery models are critical pathways for reducing consumption of both multilayer flexible packaging and monolayer flexible packaging, which in turn reduces plastic leakage and increases circularity.	Government
11	Align industries on "design for recycling" standards	"Design for recycling" standards create a level-playing field for brand owners/converters to ensure all products placed in the local market are truly recyclable. These standards could also incentivize the switch to monolayer flexible packaging which can be mechanically recycled unlike multilayer flexible packaging.	Private Sector
12	Voluntarily adopt "design for recycling" standards for all plastic products		
20	Set up voluntary producer responsibility system for all major end-use application industries for plastics		

One potential area for further study specifically on multimaterial sachets will be to explore the technical (e.g. recycling ability), functional (e.g. barrier properties, tensile strength) and economical aspects of replacing complex design, multimaterial sachets with monomaterial multilayers with at least 90% of a single monomer by weight, or multimaterial but more recyclable blends such as PP and PE blends. Figure 41 provides a few examples of structures that can be further studied for potential replacements.

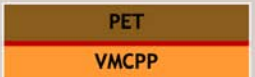
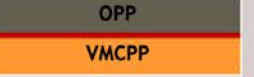
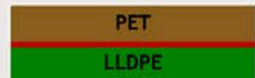
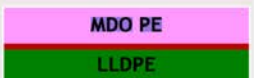
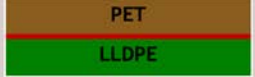
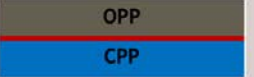
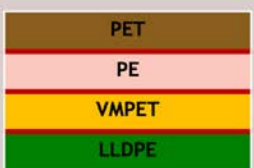
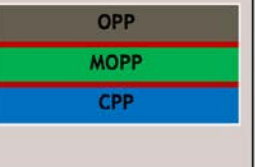

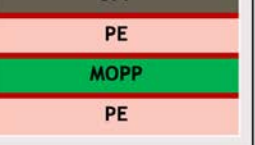
Multimaterial sachets made from OPP and VMCPP or from MDOPE and LLDPE have been reported by a

few plastics value chain stakeholders in the Southeast Asia region as being easier to recycle. Having such a study done at a national or regional level in Southeast Asia can provide specific insights on the barriers to moving towards more recyclable structures for sachets and can enable local converters and brand owners to develop and adopt design for recycling standards.

Another important area for further work is a roadmap to transition to alternative delivery models for multimaterial flexible packaging in the Philippines or at a wider Southeast Asia level. A fundamental barrier for adoption of alternatives to multimaterial flexible packaging is

Figure 41.

#### EXAMPLES OF POTENTIAL RECYCLABLE STRUCTURES THAT CAN REPLACE NON-RECYCLABLE MULTIMATERIAL, FLEXIBLE PACKAGING STRUCTURES IN SOUTHEAST ASIA

No	Non Recyclable structure	Recyclable Structure
1		
2		
3		
No	Non Recyclable structure	Recyclable Structure
4		
5		

Source: [Daibochi Presentation \(2020\)](#)

Note: (Legend) VMCPP (Vacuum-Metallized Cast PP); OPP (oriented PP); MDOPE (Machine-Direction Orientated PE); CPP (Cast PP); VMPET (Vacuum-Metallized PET); MOPP (Mono-Oriented PP)

the affordability of more expensive alternatives for low- and middle-income populations in the Philippines and the region. The roadmap could address factors such as (i) economic viability and scalability of alternatives to multimaterial packaging, including sachets; (ii) regulations that discourage refilling initiatives and which therefore need to be amended; (iii) policy incentives for product refill systems such as tax breaks or preferential tiering in EPR systems; (iv) technical support needs for small businesses (e.g. sari sari stores) in transitioning to reuse and refill systems; and (iv) R&D needs for environment-friendly and innovative alternative materials and closed loop systems.<sup>134</sup>

#### 4.5.3 Summary of Private Sector Financing and/or Investment Opportunities

Table 15 provides the key private sector financing and/or investment opportunities based on the current market situation (i.e. growing demand for food-grade

and high quality non-food grade recycled content by large brands, particularly in the packaging sector) and the current policies in place in the Philippines.

If the Philippines government were to implement the policies recommended in this report, additional private sector financing and investment opportunities would become available. For example:

- If there were incentives to reduce plastics and increase reuse systems (action 27), investments into businesses which provide refillable or new delivery models would be more attractive and there would be further focus by private sector stakeholders to develop reuse/refill models to replace sachets.
- If modulated fees were charged for unrecyclable plastics and lower fees charged for plastics with recycled content (action 10), investments into recyclers would be stimulated further.

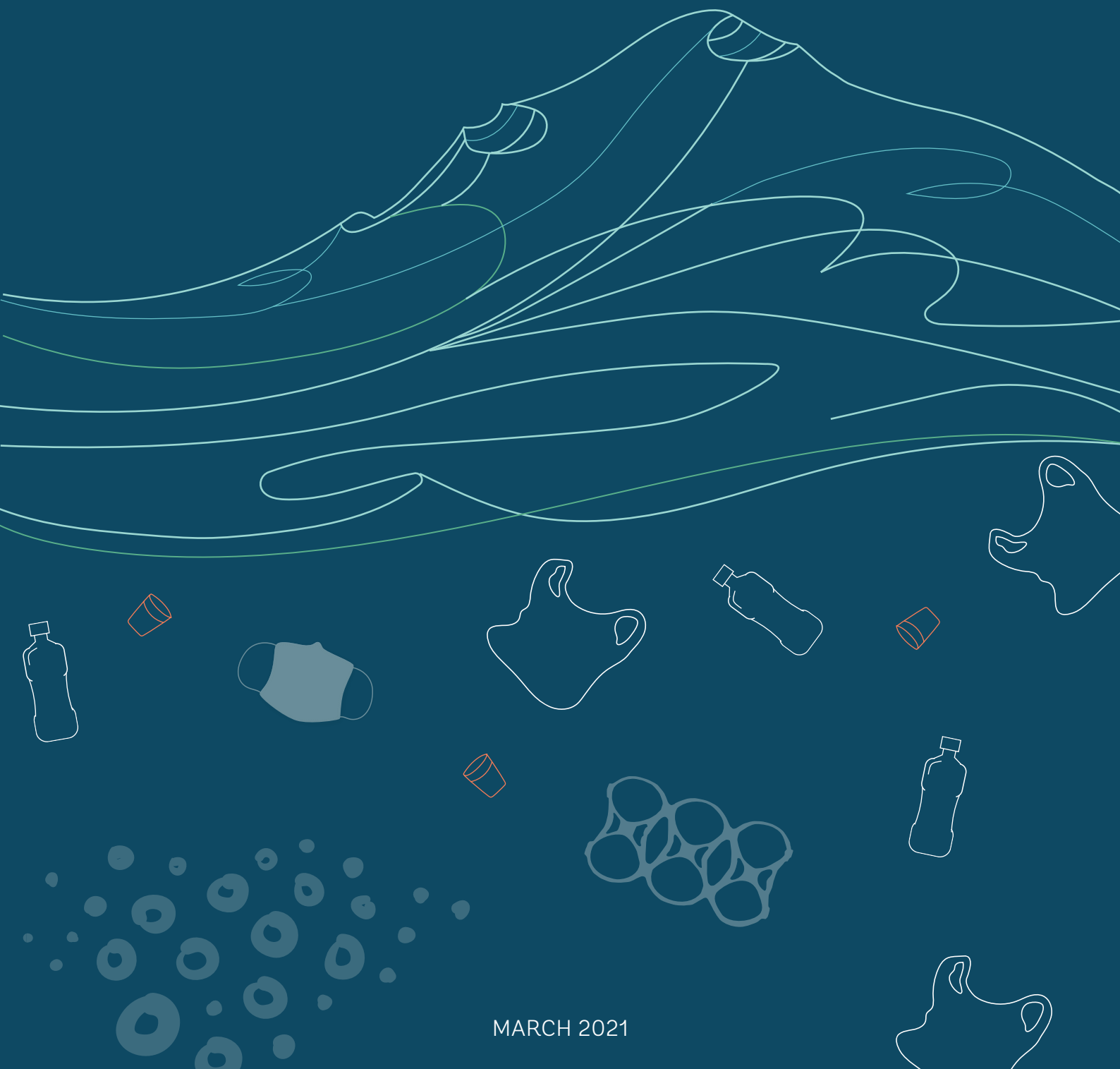
<sup>134</sup> GAIA Philippines - [Regulating Single-Use Plastics in the Philippines \(2020\)](#)

Table 15.

#### SUMMARY OF PRIVATE SECTOR FINANCING AND/OR INVESTMENT OPPORTUNITIES

Horizon	Private Sector Financing/Investment Opportunities
Short-term (1-2 years)	PET bottle to bottle recycling facilities for food-grade applications (either new facilities or upgrades to existing PET recyclers)
	Equipment upgrades/advancements for existing HDPE, LDPE and PP recyclers to produce higher quality output (non-food grade)
Mid-term (3-5 years)	Food-grade recycling facilities for HDPE, LDPE and PP <i>Note: This is on a slightly longer horizon than food-grade PET, as setting up the policies and standards for food-grade HDPE, LDPE and PP will take slightly longer than for PET policies due to much of the feedstock from HDPE, LDPE and PP being from non-food grade applications. Also, chemical recycling technologies would have to be fully commercialized for food-grade HDPE/LDPE and PP recycling applications.</i>





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