Action Plan on Plastic Waste Management Phase II (2023 - 2027)

Pollution Control Department
Ministry of Natural Resources and Environment

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Chapter 1
Introduction

1.1 Background

Plastic waste management is one of the most major environmental challenges which the government inevitably copes with issues. In the Cabinet Meeting on 17 April 2018, Prime Minister (General Prayut Chan Ocha) has mandated Ministry of Natural Resources and Environment to collaborate with pertinent stakeholders including public sector, private sector, and general public, to promote prevention of plastic waste and develop solutions to tackle plastic waste problems in an integrated manner.

Ministry of Natural Resources and Environment by Pollution Control Department, as the secretary of the Plastic and Electronic Waste Management Subcommittee under the National Environment Board, had coordinated with relevant agencies to conduct Action Plan on Plastic Waste Management "Phase 1" (2020 – 2022) under the Roadmap on Plastic Waste Management 2018 – 2030. The Roadmap was approved by the Cabinet on 15 February 2021 used as a framework and direction to address the country's plastic waste management issues. The Action Plan was driven through collaboration of all sectors across plastic value chain from production, distribution and consumption stages to post - consumption management. In order to mitigate the environmental impacts of plastic waste on land and at sea, and to achieve substantial outcomes, government agencies and private sectors jointly implemented sustainable plastic waste management and developed business models on utilization of plastic waste both at the local and organizational levels.

Figure 1-1 Action Plan on Plastic Waste Management "Phase 1" (2020 - 2022) under Roadmap on Plastic Waste Management 2018 - 2030

Various impediments on plastic waste management were challenging issues, e.g., absence of laws and regulations to prevent and address problems of plastic waste, improper design, using materials in manufacturing on products based on circularity concept, scarce public awareness in reducing single - use plastics (SUP) consumption, excessive consumption of plastic products especially during the coronavirus (COVID-19) pandemic; and leakages of plastic waste into rivers causing water pollution and threatening ecosystems and marine life. Furthermore, current waste management systems have limitation of waste separation and collection for bringing back such renewable materials in circular economy. The Action Plan “Phase I” was implemented in a voluntary basis with collaborations among public and private sectors from producers and consumers along the value chain. Through the above actions, SUP usages were partly reduced and some portion of plastic wastes were collected and utilized.

However, Action Plan "Phase 1" has been ended in 2022, the implementation according to Road Map in Plastic Waste Management shall be continued. Therefore, Pollution Control Department with the collaboration among relevant key governments and private agencies have developed Action Plan on Plastic Waste Management "Phase 2" (2023 - 2027) aiming to continue actions and drive sustainable plastic waste management across the pertinent stakeholder in all plastic value chain aligning with current situations, policies, national goals, international commitments and regional cooperative frameworks, e.g., UN Sustainable Development Goals, National Strategies, Master Plans under the National Strategies, National Economic and Social Development Plan, Government Policies, ASEAN Framework of Action on Marine Debris, United Nations Framework Convention on Climate Change, International Agreement on the Prevention of Plastic Pollution and the Marine Environment according to the resolutions of the Fifth Session of the United Nation Environment Assembly (UNEA 5.2), and Emerging Disease Situations. Furthermore, the Plastic Action Plan “Phase 2” complies with National Waste Management Action Plan “Phase 2” (2022 - 2027) approved by the National Environment Board on 3 August 2022. The Plastic Action Plan “Phase 2” adopts major international principles to manage waste for attaining optimum benefit and resource efficiency, including Bio-Circular-Green Economy (BCG Model), 3R (Reduce, Reuse, Recycle) principle, public-private partnership on waste management, extended producer responsibility (EPR) principle and extended consumer responsibility (ECR) principle.

1.2 Objectives

1.2.1 To serve as a practical guideline for relevant sectors on integrating and driving plastic waste management.

1.2.2 To improve efficiency of plastic waste management across all sectors, including private sector, public sector and general public toward systematic and holistic management from production, importation, distribution, and consumption, to post consumption management.

1.3 Definitions

1.3.1 Plastic products are defined as plastic that has been molded into a variety of shapes, such as plastic bags, water bottles, containers, packaging, furniture, medical equipment, computer components, automotive parts, plumbing, etc.

1.3.2 Plastic waste refers to any pieces of either used or unused plastics that are discarded, unwanted, deteriorated as non-utilizable, or contaminated with other wastes and substances.

1.3.3 Plastic scraps are any pieces, cut pieces and non-usable pieces either used or unused plastics according to Law on Customs Tariff, with Harmonized Code of 39.15.

1.3.4 SUP are plastic products designed to be used once in short period of time before disposed right after used, e.g., styrofoam food containers, food trays or boxes, plastic bags, plastic cups, plastic straws, plastic cutlery, etc.

1.3.5 Compostable plastics are plant-based/cellulose-based plastics that are designed to biologically break down under proper environmental condition to carbon dioxide, water, inorganic compounds and biomass without any leftover of visible plastic pieces or toxins.

Chapter 2

Status and Challenges on Plastic Waste Management

2.1 State of municipal solid waste

In 2021, there was approximately 24.98 million tons of municipal solid waste (MSW), a decrease compared to the previous year, due to the ongoing situation of the outbreak of COVID-19 since 2020, and resulting in a decrease in tourists and daily activities. Only about 3.89 million tons (16%) of MSW were segregated at sources for reutilization before disposal via local administrative organization's collection system; and about 1.58 million tons (6%) of MSW were fundamentally handled in households, particularly, households in sub-district administrative organizations, sub-district municipalities or in remote areas where waste collection service was not available. Hence, 19.51 million tons (78%) of MSW were collected to waste disposal facilities, of which about 4 million tons of recyclable MSW (or 16% of MSW) were separated at Materials Recovery Facilities (MRFs). The remaining 15.51 million tons of MSW were transferred to final disposal sites where are based on the final disposal sanitation techniques. They were found that 9.28 million tons (or 37% of MSW) were properly disposed, and 6.23 million tons (or 25% of the total municipal solid waste) were incorrectly disposed (Fig. 2-1). According to the 2021 investigation on the composition of MSW at waste disposal sites, there were 28% of plastic waste and most of them were disposed in landfills. Since plastic takes hundreds of years to decompose, the occupied landfill space was swiftly depleted. Also impacts to the environment apparently occur, if landfill operation is poor.

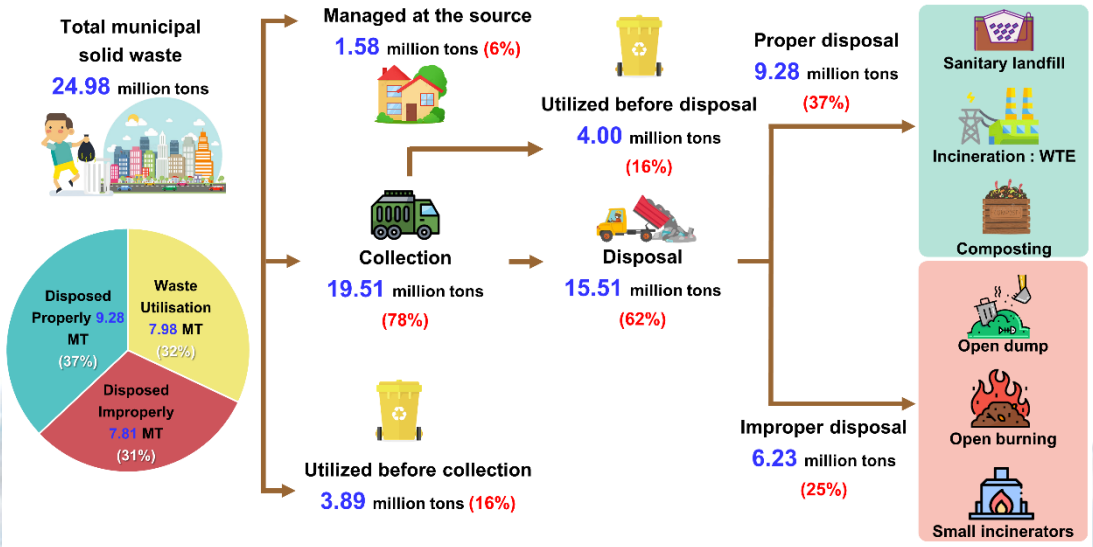


Figure 2-1 Overview of municipal solid waste management in 2021

2.2 State of plastic waste

In 2020, 5.68 million tons of plastic resins were consumed in Thailand with the proportion of 41.1% utilized in packaging products, followed by, 16.4% in electrical and electronic appliances, 15.3% in the construction industry, 5.7% in filament (Non-textile), 5.5% in auto parts, 3.3% in housewares, 2.9% in agricultural equipment, 2.8% in safety & security tools and equipment, 2.4% in recreation & leisure equipment, 1.9% in medical devices, 1.8% in footwear, and 1.5% in other productions, respectively.

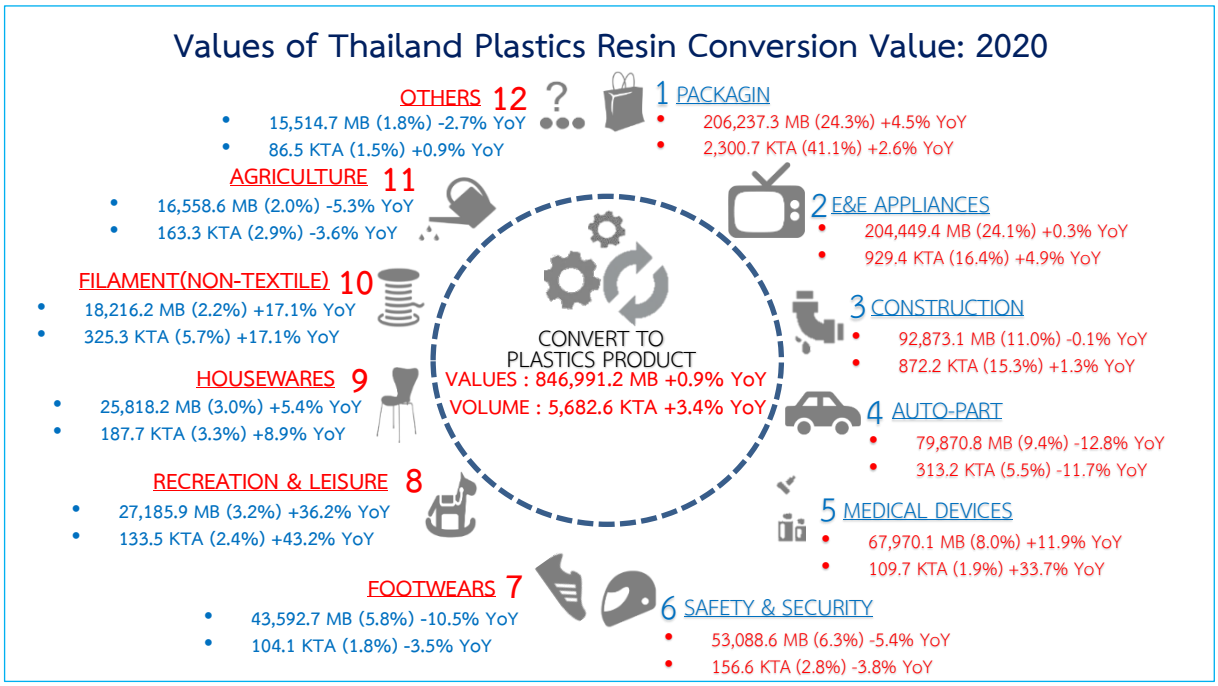


Figure 2-2: Types of plastic utilized in Thailand in 2020

Reference: Petroleum Institute of Thailand (PTIT DATA, Modified by PITH)

In 2021, 2.76 million tons of wastes were SUPs or about 11% of MSW generated. Approximately 19% of SUP – wastes were sorted and recycled while 3% of SUP - wastes were remained in the environment, and 78% of SUP – wastes were transferred to disposal facilities. Majorities of SUP - wastes (62.8%) were plastic bags, i.e., hot/cold food bag and shopping bag, followed by plastic film, e.g., shrink film and bubbled envelope (13.3%). The rest of SUP – wastes (23.8%) were other plastic products, e.g., bottles, caps, cups, bowls, trays and Styrofoam boxes. Although SUP wastes have a recyclable potential, it was not widely collected for trade or bringing back, due to high contamination, light weight, and difficulty to transport which makes it not profitable for garbage collectors/traders. Challenges of SUP - wastes management in Thailand consist of different factors, e.g.,

consumers' excessive use, no segregation at sources, no cleaning before disposal and lack of concerns on environmental impacts. Plastic wastes were thus contaminated and difficult to be recycled. Moreover, due to the outbreak of COVID-19, food delivery services were rapidly expanded and it was contributed to increased usage of SUP packaging. Later on, after COVID-19 becomes a common ailment, people still stay in the "New Normal" manner and continue to use SUP excessively. Therefore, management of plastics is critical to be addressed urgently.

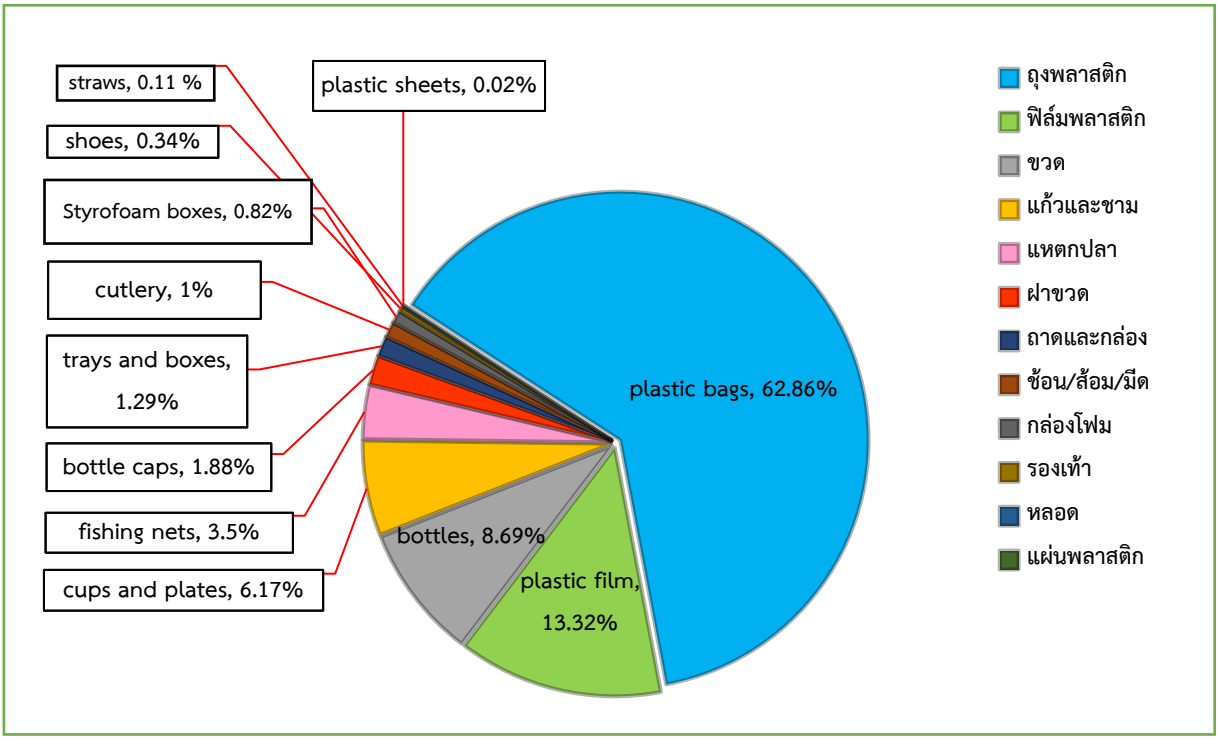


Figure 2-3 Types of plastic waste in landfill sites (2021)
Reference: Material Flow Analysis of Plastics Wastes, 2021 study report

2.3 State of marine debris

There are 23 coastal provinces in Thailand: (1) Bangkok (2) Krabi (3) Chanthaburi (4) Chachoengsao (5) Chonburi (6) Chumphon (7) Trang (8) Trat (9) Nakhon Si Thammarat (10) Narathiwat (11) Prachuap Khiri Khan (12) Pattani (13) Phang Nga (14) Phetchaburi (15) Phuket (16) Ranong (17) Rayong (18) Songkhla (19) Satun (20) Samut Prakan (21) Samut Songkhram (22) Samut Sakhon and (23) Surat Thani.

The amount of MSW in 23 coastal provinces have continuously increased even though there have been campaigns provided on waste segregation at sources, and reuse and recycle of waste. In 2021, 10 million tons of MSW were produced from the coastal provinces.

2.36 million tons of MSW were not managed properly. Approximately 0.4 million tons of the mismanaged wastes were plastics. It was calculated that about 0.02 million tons of waste could potentially leak into the oceans. About 80% of marine debris was originated from land - based activities such as coastal industrial areas, communities, households and shops. The remaining 20% of marine debris derived from sea-based activities namely shipping transportation cruises, tourist boats, and coastal fisheries.

Department of Marine and Coastal Resources investigated the composition of waste collected along the shorelines in 2021. The top 10 most commonly found were (1) plastic bottles of 16% (2) other plastic bags of 13% (3) foam Insulation of 10% (4) plastic bags of 10% (5) food wrappers/bags of 9 % (6) plastic fragments of 7% (7) accessories of 5 % (8) plastic food containers of 4% (9) Styrofoam food containers of 4% (10) cups, plates, bowls of 3% and (11) others of 19%. There have been continuous efforts to address marine debris activities, including collection of waste remaining in susceptible ecosystems, advocacy on waste segregation in communities to reduce marine litter, waste collection using Boom Innovation, SCG-DMCR Litter Trap and Garbage Boat, and ICC campaign with participation of public and private sectors, general public and local organizations. There were 3,950,904 pieces or 444 tons of garbage collected from the coastal habitats in 2021.

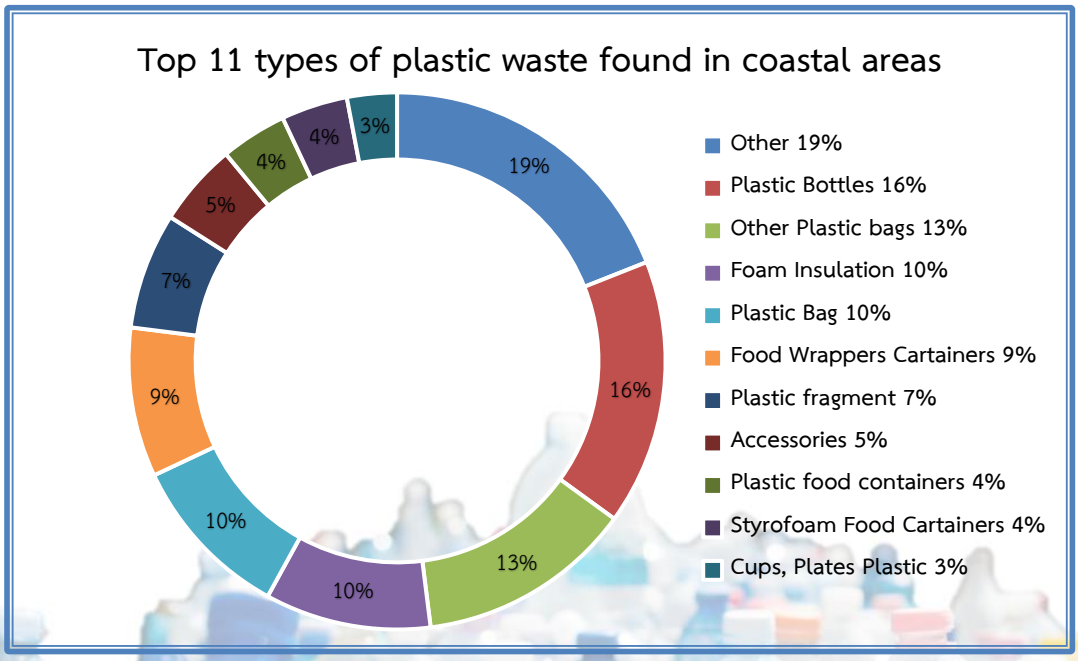


Figure 2-4 Composition of coastal waste in

2.4 Challenges on plastic waste management

The evaluation of implementation of Action Plan "Phase 1" was revealed that challenges were found in different stages from product design, production, consumption, to post – consumption as described below.

2.4.1 Design and production challenges

1) Plastic products were highly heterogeneous. Some products were not designed for reuse. Some had recyclable potentials but there was no collection to retrieve them.

2) Incentives for entrepreneurs to apply Eco-Design in the production were unattractive. Coverage of compostable plastic products is not made to all plastic applications.

3) Prices of compostable plastic were relatively higher than conventional plastic products. In addition, research and development of eco-alternatives for plastic were limited.

4) There were gaps in determining appropriate proportion of recycle content in plastic products and setting up relevant standards.

5) There was no requirement on recycle content in Eco-Design for plastic products.

6) There were no certification standards for compostable plastic products, and Post – Consumer plastic Resins (PCRs) in plastic products, as well as appropriate ratio of recycle content.

7) Systematic plastic database development was in development stage.

2.4.2 Consumption challenges

1) Plastic packaging and plastic products were excessively consumed due to their affordability whereas reuse and recycle are relatively limited.

2) Majority of plastic packaging were food containers that could potentially be recycled. However, the taking – back collection was limited because of high contamination, light weight, and high transportation cost to the recycling facilities.

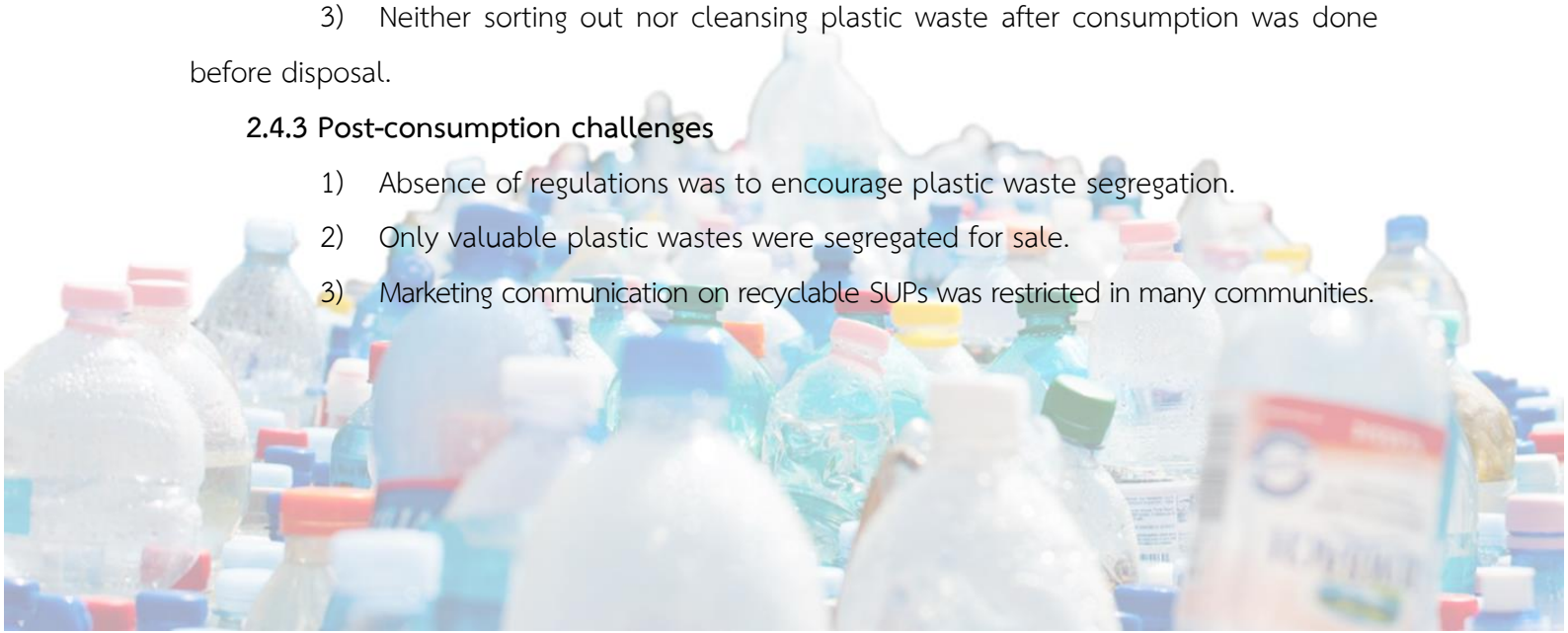
3) Neither sorting out nor cleansing plastic waste after consumption was done before disposal.

2.4.3 Post-consumption challenges

1) Absence of regulations was to encourage plastic waste segregation.

2) Only valuable plastic wastes were segregated for sale.

3) Marketing communication on recyclable SUPs was restricted in many communities.



4) Waste collection system and drop – off stations in communities were not effectively supported for plastic wastes segregation at sources. Hence, such plastic wastes were not retrieved to recycling system.

5) Neither standard nor specification of plastics was prescribed according to the requirements of recycling factories. Moreover, existing sorting systems are insufficiently provided with the different mechanisms. Thus, quality and quantity of sorted plastics are relatively inconsistent.

6) Absence of PCR certification standard caused the import the good grade PCR resins from overseas into the plastic converting industries.

7) There was limited inspection, methodology and certifying body for regulating PCR resin.

8) Uncontrolled plastic wastes were leaked into rivers and seas, and eventually accumulated in the ecosystems.

9) Microplastics were found contamination in the food chain.

Chapter 3

Key Achievements: Action Plan “Phase 1”

The achievements of Action Plan on Plastic Waste Management "Phase 1" (2020 - 2022) implemented by the government, private sector, and publics are described below:

3.1 Measure 1: Reduction of plastic waste at source

3.1.1 Standards for plastic products, compostable plastic and industrial products:

1) Thai Conformity Assessment Standards (TCAS) on Plastic Recycling Traceability and Assessment of Conformity and Recycled Content

2) Thai Conformity Assessment Standards (TCAS) according to the Agreement after Workshop on PET Bottles

3) Standards for Post-Consumer Recycled (PCR) Plastics

4) Voluntary Standard for Compostable Plastic Products, e.g., plastic bags, straws, and plastic food containers

5) Thai Conformity Assessment Standards (TCAS) on Framework for Implementing the Principles of Circular Economy in Organizations-Guide

6) Thai Conformity Assessment Standards (TCAS): Circular Economy Management System for Organization-Requirements

3.1.2 Promoting the use of domestic plastics waste as renewable materials for recycling by amending Ministry of Public Health Notification No. 295, 2005 on quality or standard of plastic packaging containers, developing criteria to allow the use of Polyethylene Terephthalate (PET) as food containers, and improving quality standard of plastic packaging container by Food and Drug Administration (FDA).

3.1.3 Promoting Eco-friendly substitute products: using tax measures to promote compostable plastic packaging. In 2020, Ministry of Finance has issued a royal decree No. 702 in accordance with Revenue Code on tax exemption, to provide certificates on compostable plastic products for converters which can be used by primary buyers for requesting corporate income tax deduction for 1.25 times of compostable plastic product purchasing price. In the fiscal year of 2020, 14 enterprises utilized this tax incentive with a total value of 18,334,022.84-baht, accounting for 3,666,805 baht of state tax deductible. On 15 April 2022, the Cabinet has approved the extension of the tax measure for three years from 9 January 2022 to 31 December 2024 to promote compostable plastic products.

3.1.4 Issuing certificates on compostable plastic products to entrepreneurs by Office of Industrial Economics (OIE) to promote compostable plastic packaging during 2020 – 2022 by applying 125% of corporate tax deduction for expenses paid on purchasing compostable plastic products. A total of 70 certificates have been issued to 6 companies accounting for approximately 10,000 tons of compostable plastic resin per year.

3.1.5 Financial support on production of Eco-friendly plastic products by Thailand the Board of Investment (BOI):

1) Improving measures to promote investment in businesses in accordance with BCG Model, including compostable plastics and food-grade recycled plastics.

2) Promoting plastic packaging manufactured with the following conditions: 1) having plastic molding process and 2) indicating the specification and qualification of plastic packaging, e.g., microwave-safe.

3) Granting benefits such as exemption import tariffs on machinery and raw materials for production of export goods, non-tax benefits for 16 projects by supporting investment promotion in the chemicals, plastics and paper industries excluding plastic packaging target to be reduced or stopped using under the Roadmap.

4) Promoting production of Eco-friendly products from polymers with eco-friendly molding process. Five years corporate income tax exemption to juristic person was applied. In addition, duty exemptions on machinery and raw materials for exports, production of environmentally friendly chemicals/polymers or production of products molded from environmentally friendly polymer production have been effective.

3.1.6 Research to support plastic waste management:

1) Environmental impact assessment throughout life cycle of compostable plastics by National Science and Technology Development Agency (NSTDA) includes Polylactic Acid (PLA) produced from cassavas with the stages from cultivation process, primarily processed, extracted into PLA, and molded into packaging. The comparison of following compostable plastics and fossil-based plastic packaging were investigated (1) PET and PLA bottles (2) PE and PLA handle bags (3) PP and PLA cups.

2) Research and development on production of high quality recycled plastic resin by Thailand Institute of Scientific and Technological Research (TISTR) to improve production processes utilizing Polyethylene Terephthalate (PET) and Polyethylene (PE) in accordance with quality required by downstream industry (quality higher than grade-C). This effort aimed to stimulate domestic production of recycled plastics and to reduce import of recycled plastic from overseas.

3.1.7 Promoting compostable plastic industry by Office of Industrial Economics (OIE) in (1) developing skills on compostable plastic production process for 15 entities, (2) enhancing knowledge and capacity for 60 industry personnel through online training (3) disseminating knowledge in potential areas of 7 provinces: Nakhon Sawan, Kamphaeng Phet, Chachoengsao, Chonburi, Rayong, Khon Kaen and Bangkok through online platforms/social media for 800 participants.

3.1.8 Promoting eco-design by National Metal and Materials Technology Center (MTEC), Plastics Institute of Thailand (PITH) and Plastic Industry Club and the Federation of Thai Industries (FTI), through developing of Eco-design manual and curriculum, organizing Thailand Plastics Awards and pertinent capacity building workshops.

3.1.9 Developing of Material Flow of Plastics database and study on plastic waste in river basins by Pollution Control Department (PCD), Plastics Institute of Thailand (PITH) and related agencies.

3.1.10 Developing of 16 in-depth industrial databases for plastic industries and bio-industries in response to user needs, sharing information, news and knowledge on development and innovation of product industries, and development of Material Flow of Plastics to monitor changes in industrial structure, by Office of Industrial Economics (OIE).

3.1.11 Developing of legislation to reduce and stop using SUP. The Sub-committee on plastic and electronic waste management has assigned Ministry of Industry (MoInd) to implement on 5 legislations, consisting of (draft) MoInd's Notification among the industries including banning industrial use of Oxo-biodegradation additives in production of plastic bags, banning industries from manufacturing Styrofoam products/food containers; specifying quality of plastic bags (> 36 micron) for new or expanded factories, specifying quality of plastic cups (> 100 micron), and banning establishment or expansion of plastic straw manufacturing industries.

3.2 Measure 2 Reduction of SUP at consumption stage

3.2.1 Encouraging department stores, supermarkets, and convenient stores nationwide to stop giving free plastic shopping bags from 1 January 2020. There were 90 department stores, supermarkets and convenience stores participating in this campaign in collaboration with Pollution Control Department (PCD) and Department of Environmental Quality Promotion (DEQP).

3.2.2 Implementing the reduction of SUP use in fresh markets by Department of Environmental Quality Promotion (DEQP) and municipalities across the countries. There are 7,000 municipal markets participating in activities to ban or reduce offering free plastic bags.

3.2.3 Issuing Department of National Parks, Wildlife and Plant Conservation (DNP)'s Announcement to prohibit the carriage of Styrofoam and SUP packaging such as plastic bags (> 36 microns), food containers, cups, straws and cutlery into the National Parks. A fine up to 100,000 Baht will be imposed according to Sections 20 and 47 of National Park Act B.E. 2562 (B.C. 2019).

3.2.4 Encouraging Green Coffee Shop Project by Department of Environmental Quality Promotion (DEQP) in collaboration with Thai Coffee Association Network and coffee shop operators. There were 28 coffee brands with 9,580 branches nationwide, participated in this project for promoting eco-friendly materials to substitute SUP plastic cups and straws.

3.2.5 Implementing waste reduction and segregation project in 152 government agencies and 76 provincial offices with PCD as the examples for private sector and general publics to reduce the uses of SUP.

3.2.6 Raising awareness and sharing knowledge on reducing SUP consumption by Department of Environmental Quality Promotion (DEQP), Government Public Relations Department (PRD) and network:

1) Publicizing through various communication channels such as Facebook, YouTube, infographics, and influencers (artists, actors, singers, actors, Youtubers).

2) E-Learning system on 17 natural resource and environmental management curriculum available through online social networks.

3) Environmental education according to Eco-School approach with a network of cooperation among 291 schools.

4) Curriculum on circular economy and sustainable management of plastic waste.

5) Training sessions to transfer knowledge and technology to address environmental and plastic waste problems in communities.

3.2.7 Promoting understanding of packaging made from paper and compostable plastics among customers through offline and online channels by Thai Bioplastics Industry Association (TBIA).

3.3 Measure 3: Plastic waste management at post-consumption stage

3.3.1 Implementing campaign on Change Plastic to Merit When You Circulate under "Won" Project by Ministry of Natural Resources and Environment (MNRE) and collaborative partner: setting up drop-off point for collecting used rigid plastic containers and flexible plastic packaging for recycle or upcycling in cooperation with government agencies of all ministries, malls, supermarkets, convenience stores, educational institutions (universities).

3.3.2 Promoting magic Hand x Won Project by Thailand Public-Private Partnership for Plastic and Waste Management (PPP Plastics): setting up more than 350 drop-off points "Circulate Bin for Bags" and developing Magic Hand x Won (มือวิเศษ x วน) application to collect plastic bags and film with a network of over 40 participating organizations and 7 recycling operators;

3.3.3 Encouraging Plastic recovering system for circular economy by PPP Plastics: (1) Circular Economy Development Project in Bangkok: Piloting in Khlong Toei and Pathum Wan Districts (2) Circular Economy Development Project in Rayong Province (3) Upcycling by GC Project (4) Recycled Plastics in Roads Study and (5) Artificial Wood/Construction materials from Plastic Waste Project to Promote a Green Industry.

3.3.4 Developing and elevating "Zero Waste National Park" by Department of National Parks, Wildlife, and Plant Conservation (DNP) and private sector, to raise awareness on efficient resource consumption and sustainable waste management, e.g., design of buildings to accommodate solid waste segregation at sources, garbage bin design contest to promote waste separation, Green Road Project to upcycling Khao Shong coffee packaging and plastic waste collected via "Khao Shong Coffee-Upcycling Fight Out Season 2 – campaign.

3.3.5 Escalating innovation to create value from plastic waste by PPP Plastics: using invaluable plastic waste to reinforce strength of asphaltic roads, incorporating into artificial wood, and processing marine debris into fabric clothing.

3.3.6 Promoting recycling business by Pollution Control Department (PCD) and collaborative networks in: (1) developing manual on "Best Practices to Prevent Environmental Impact for Junk Shops" to help junk shop operators in organizing and improving their shops and (2) developing curriculum to escalate junk shops for achieving higher standard.

3.3.7 Advising measures to control import of plastic scraps and to mitigate impacts of the import ban by Pollution Control Department (PCD) in collaboration with the admin of Facebook page "3-Wheels Uncle and Lost Garbage" and Saleng and Recycle Trader Association, to promote the use of domestic plastic scraps as raw materials in factories, and developing mobile app "Hero Recycle" by Green2Get as a marketplace to buy and sell plastic scraps.

3.3.8 Defining the differences between "plastic waste" and "plastic scraps" used in the purpose of classification, control and inspection of import-export of used-plastic materials by the Pollution Control Department (PCD).

3.3.9 Issuing Notification No. 59/2564 dated 29 March 2021 by Customs Department to prescribe conditions for importing plastic scraps from abroad to the duty free zone, namely (1) types of plastic scraps (2) purpose of importing for production and exportation to other countries (3) inspection and approval of quantity of imported plastic scrap in accordance with the production capacity of the operators.

3.3.10 Conducting microplastics and heavy metals study in Satun Global Geopark by National Research Council of Thailand (NRCT).

3.3.11 Mobilizing “Returning Garbage to Shores, Creating Beautiful Seas with Our Hands” done by Department of Fisheries which was able to gather 270,000 kilograms of marine debris, including more than 170,000 kilograms of plastic waste.

3.3.12 Regulating measures on conservation of marine and coastal resources along beaches by Department of Marine and Coastal Resources (DMCR), including banning smoking and the disposal of cigarette butts on public beaches, prohibits of banning disposal of plastic and foam, garbage, paper, food scraps, fabric, sewage, suspended particles, oil stains, pollutants, manure, corpses and pollution.

3.3.13 Implementing measures on marine debris management, reduction and impacts mitigation by Department of Marine and Coastal Resources (DMCR) in collaboration with educational institutions, local government, and public sector: including measures for (1) coastal communities (2) communities located near river mouth and canals (3) artisanal fishing boat groups (4) commercial fishing boat groups (5) sea and coastal tourism entrepreneurs (6) homestay and island tourism entrepreneurs (7) ecotourism.

3.4 Achievements by Targets of Action Plan on Plastic Waste Management Phase 1 (2020 – 2022)

3.4.1 Target

Target 1 Reduce and stop using 4 types of SUP by replacing with environmentally friendly products. By 2022, 4 types of SUP were banned:

1) Plastic bags with a thickness less than 36 microns
2) Styrofoam food containers, except Styrofoam used for cushioning in the industry
3) Plastic cups with thickness less than 100 microns
4) Plastic straws, except for critical uses, i.e. use in children, elderly and patients

Target 2: Recycle at least 50% of target plastics in the country via circular economy by 2022. The 7 types of target plastics were:

1) Plastic bags (HDPE, LLDPE, LDPE, PP)
2) Mono-layer plastic film packaging (HDPE, LLDPE, LDPE)
3) Plastic bottles (all types)
4) Bottle caps
5) Plastic cups
6) Food trays/boxes
7) Plastic cutlery (spoons/forks/knives)

3.4.2 Achievement

Results from performance review conducted in collaboration with Plastics Institute of Thailand (PITH) based on Material Flow of Plastics database up to 2021 are described below:

Target 1 Reduce and stop using target SUP by replacing with environmentally friendly products. In 2021, the achievement was 42% (compared to the baseline): (1) 43 reduction of plastic bags (thickness < 36 microns) (2) 33% reduction of plastic straws (3) 32% reduction of plastic cups (thickness < 100 microns) and (4) 20% reduction of Styrofoam food containers.

Target 2 Recycle target domestic plastics via circular economy. In 2021, there was 25% progress (compared to the baseline). plastic bottles (all types) were utilized the most, followed by mono-layer plastic film packaging, plastic bags, plastic cups, bottle caps and trays/food boxes. Plastic cutlery (spoons, forks, and knives) were not collected for recycled.

Table 3-1 Results from the implementation of Action Plan on Plastic Waste Management "Phase 1" (2020 - 2022)

Targets and Indicators	Baseline 2019	Target/Performance		
		2020	2021	2022
1. Reduce and stop using target plastic by replacing with environmentally friendly products	**100%**	**50%**	**75%**	**100%**
• **Amount and % of 4 types of target plastic reduced**	**384,024 tons**	**37% decrease (142,621 tons)**	**42% decrease (160,176 tons)**	-
1.1 Plastic bags (thickness < 36 microns)	342,522 tons	38% decrease (131,555 tons)	43% decrease (148,699 tons)	-
1.2 Styrofoam boxes for food Packaging	15,176 tons	10% decrease (1,518 tons)	20% decrease (3,035 tons)	-
1.3 Plastic cups (thickness < 100 micron)	22,679 tons	36% decrease (8,227 tons)	32% decrease (7,230 tons)	-
1.4 Plastic straws	3,647 tons	36% decrease (1,321 tons)	33% decrease (1,212 tons)	-

Targets and Indicators	Baseline 2019	Target/Performance		
		2020	2021	2022
2. Recycle target domestic plastics via circular economy	**100%**	**30%**	**40%**	**50%**
● **Among of 7 types of plastic waste brought to recycle**	**1,390,865 tons**	**25% (351,800 tons)**	**25% (352,916 tons)**	**-**
2.1 Plastic bottles (all kinds)		281,431 tons	276,969 tons	-
2.2 Mono-layer plastic film packaging		45,312 tons	51,227 tons	-
2.3 Plastic bags (HDPE LLDPE LDPE PP)		11,920 tons	10,951 tons	-
2.4 Plastic cups		7,529 tons	8,048 tons	-
2.5 Bottle caps		4,698 tons	4,442 tons	-
2.6 Food trays/boxes		910 tons	1,279 tons	-
2.7 Cutlery (spoons/forks/knives)		0	0	-

Chapter 4

Relevant International and National Policies

4.1 International collaboration and agreement

4.1.1 Sustainable Development Goals

Related Topics
SDG 12: Ensure sustainable consumption and production patterns ● By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
SDG 1 4 : Conserve and sustainably use the oceans, seas and marine resources for sustainable development ● By 2025, prevent and significantly reduce marine pollution of all kinds, in particular, from land-based activities, including marine debris and nutrient pollution

4.1.2 Resolutions of the 5th Session of the United Nations Assembly (UNEA 5.2)

The 5th Session of the United Nations Environment Assembly was organized during 28 February – 2 March 2022 in Nairobi, Republic of Kenya.

Related Topic
End Plastic Pollution: Towards an International Legally Binding Instrument

4.1.3 Directive of the European Parliament and of the Council on the Reduction of the Impact of Certain Plastic Products on the Environment : SUP Directive 2019

Related Topics
● Ban or reduce consumption of 10 types of SUP which are mostly found in 276 beaches, 17 Member States since 2021. ● Reduce consumption of plastic food packaging and plastic cup by at least 25% by 2025. ● Apply EPR mechanisms to collect used plastic packaging and raise awareness among consumers. ● Specify recycled content of plastic bottles at least 25% recycled content by 2025 and increase recycled content to 30% by 2030. ● Install separate collection system to collect 77% of plastic bottles by 2025 and 90% by 2030. Deposit-refund schemes may be used to achieve the targets.

4.1.4 The 26th Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 26) on 1 November 2021.

Thailand pledged its intention to step up its climate actions to achieve carbon neutrality goals by 2050 and net-zero greenhouse gas emissions goals within or before 2065 by reducing greenhouse gas emissions by 20 - 25% within 2030.

Related Topic
● Reduce solid waste generation to lower greenhouse gases such as reduction of plastic waste, Styrofoam food containers and organic waste; solid waste separation at source for further utilization; and promoting the eco-design products and usage environmentally friendly packaging.

4.2 Regional Cooperation

4.2.1 Bangkok 3R Declaration Towards Prevention of Plastic Waste Pollution through 3R and Circular Economy

Bangkok 3R Declaration was mutually endorsed at the 9th Regional 3R Forum in Asia and the Pacific during 4 – 6 March 2019 as a manifestation of political commitments of the representatives of Asia-Pacific countries to integrate 3 R Principles and Circular Economy in measures to reduce plastic waste pollution by the following actions.

Related Topics
1. Identify gaps in the existing laws and institutions and regulations, and further reinforce the ongoing 3R and sustainable waste management actions and measures towards the issue of plastic waste, including SUP. 2. Develop effective 3R policies, programmes, including infrastructure development in order to upscale the reusing and the recycling towards circular economic utilization of plastics, and to prevent leakage into the coastal and marine environment. 3. Support various innovative solutions for new and sustainable business models which would promote greening the supply chain and multi-use alternatives, including alternatives to SUP products such as reusable, environmentally friendly biodegradable products, and eco-design of plastic products.

Related Topics
4. Support research and development programmes on bio-based alternatives to promote environment friendly bio-economy bringing in new sustainable business and employment opportunities and influence consumer behavior towards green procurement. 5. Strengthen international agreements, policies, and cooperation towards efficient reduction and impacts of plastic waste pollution by reducing SUP, promoting plastic waste recycle as resources, recyclable materials and waste-to-energy, among others. 6. Promote public awareness programmes and campaigns to discourage the use of SUP as 1st priority; build effective after-use plastic economy and explore ways to utilize end-of-life plastics as valuable resource, contributing to transition towards circular economy. 7. Mobilize funds and investments for cost-effective plastic waste management technologies and plastics waste recycling facilities aiming to protect local environment and ecosystem, including coastal and marine environment which will attract international tourists resulting in increased government revenue generation and local employment opportunities. 8. Promote multi-sectoral collaborations and partnerships such as public-private-partnerships to implement various 3R programmes towards prevention and proper management of plastic waste, including the marine debris; to this regard, strengthen regional cooperation in addressing issues of SUP products, including their detrimental impact on coastal and marine ecosystem.

4.2.2 ASEAN Framework of Action on Marine Debris

Emphasizing on marine debris reduction in ASEAN, the Framework was adopted at the ASEAN Summit on 22 June 2020.

Related Topics
1. Policy Support and Planning: Promote policy measures, laws and agreements; and development a regional action plan on combating marine debris. 2. Research, Innovation and Capacity Building: Compile regional baseline information, develop innovations, and promote integration of scientific knowledge in implementing policies on marine debris prevention and management. 3. Public Awareness, Education and Outreach: Promote awareness on impacts of marine debris and accelerate advocacy strategy to promote behavior change to combat marine debris, as well as, promote platforms for knowledge sharing to combat marine debris. 4. Private Sector Engagement: promote collaborative actions and investment of private sector in innovation, circular economy advocacy and recycling to address marine debris.

4.2.3 Bangkok Declaration on Combating Marine Debris in ASEAN Region

Endorsed at Special ASEAN Ministerial Meeting on Marine Debris on 5 March 2019, Bangkok Declaration on Combating Marine Debris in ASEAN Region aims to promoting cooperation among ASEAN countries in preventing, reducing and managing plastic waste in the country and oceans.

Related topics
● Reaffirming needs to enhance cooperation among the ASEAN Member States to protect marine environments and ensure sustainable use of marine resources. ● Fulfilling common aspiration of ASEAN Member States to implement the UN 2030 Agenda for Sustainable Development, and consensus of related regional and international meetings. ● Promoting efforts of ASEAN Member States to prevent, reduce, and manage marine plastic debris. ● Supporting multi-stakeholder cooperation, knowledge sharing, technology transfer, increasing public awareness and innovation dissemination to combat marine debris.

4.2.4 5-Year ASEAN Regional Action Plan for Combating Marine Debris (2021 – 2025)

Consisting of 14 activities to address plastic issues along the value chain:

Related topics
1. Develop regional guidebook on financial mechanisms for investments in plastic waste management. 2. Develop guiding principles for phasing out selected SUP. 3. Develop a regional guidebook on standards for responsible plastic waste trade, sorted plastics waste, and recycled plastics. 4. Elaboration of best practice manual for development of minimum standards and technical requirements for plastic packaging and labelling. 5. Undertake regional stocktaking of green public procurement. 6. Develop best practice manual for reducing collection and treatment of sea- based litter. 7. Develop guidebook for common methodologies for assessment and monitoring of marine litter. 8. Strengthen ASEAN regional knowledge network on marine plastics. 9. Conduct a regional study on microplastics.

Related topics
10. Coordinate regional training programs on plastics and waste management. 11. Develop a behavioral change communication strategy playbook. 12. Enhance regional awareness for consumers of labeling of plastics and packaging. 13. Establish a regional platform for EPR knowledge and implementation support. 14. Establish a regional platform to support innovation and investments in plastics and plastic waste management.

4.3 National policy and plan

4.3.1 20-year national strategy (2018-2037)

Strategy 5: Eco-Friendly Development and Growth:

Related topics
Guideline 1: Promoting green growth and sustainable development **<u>Promoting sustainable consumption and production</u> through** ● Promotion of investments and behavioral changes in both the consumption and production sides; and encouragement individuals and organizations' ways of thinking and living that take into consideration the effective and economic uses of resources. ● Creating and raising awareness of eco-friendly production and eco-friendly based consumptive behaviors. ● Improving economic mechanisms and social measures to persuade consumers and producers. ● Improving government mechanisms to change citizens and private sector behavior toward eco-friendly and plastic waste segregation at source.
Guideline 2: Promoting sustainable maritime based economy growth **<u>Improving, rehabilitating and developing the entire marine and coastal resource ecosystem</u>** ● Supporting participation of private sector and communities in area management. ● Developing effective monitoring and evaluation systems to address environmental impacts. ● Developing effective inspection, alert, monitoring and assessment systems to reduce negative impacts on the ecosystem.

Related topics
Guideline 4: Developing urban, rural, agricultural, and industrial areas with a key focus on a sustainable growth ● Developing waste management targets from start-to-finish with 3 R (Reduce, Reuse, Recycle), and system to monitor waste and pollution management nationwide.

4.3.2 Master Plan under the National Strategy

Master Plan (18): under the National Strategy on sustainable growth

Related topics
Sub-plan: Promoting green growth and sustainable development **<u>Promoting sustainable consumption and production</u>** ● Producing eco-friendly product with environmental labeling. ● Promoting transformation to environmentally friendly production technology. ● Limiting the use of non- environmentally friendly technology or machines. ● Developing and promote sustainable tourism. ● Implementing economic, social and law enforcement measures to encourage sustainable production and consumption.
Sub-plan: Promoting sustainable maritime based economy growth **<u>Improving, rehabilitating, and developing the entire marine and coastal resource ecosystem</u>** ● Reducing the amount of waste, especially plastic waste into the sea.
Sub-plan: Management of pollution affecting environment and agricultural chemicals of the entire system in accordance with international standards. ● Reviewing and auditing the entire waste management mechanism, and all related stakeholders from producers, importers, service providers, consumers, disposers, to regulators.

4.3.3 The 13th National Economic and Social Development Plan (2023-2027)

Milestone 10: Thailand with circular economy and a low-carbon society: Related Topics
Strategy 1 Development of industries and services by applying circular economy and low-carbon society principles

Milestone 10: Thailand with circular economy and a low-carbon society: **Related Topics**
• Empowering industries and services through developing tools, mechanisms, research and knowledge to improve efficiency on materials circularity. • Improving production efficiency of goods and services, in particular, promoting reduce-reuse-recycle and minimizing waste generation during production and service processes. • Applying financial/capital market mechanisms to promote eco-friendly growth, public-private collaboration and investment in eco-friendly economy.
Strategy 2 Generation of net income for local people, community and farmers from circular economy and low-carbon society. • Supporting community to utilize waste and used materials from agriculture into new products; and facilitating cooperation between community and local entrepreneurs on reutilizing residue from production process in community usages. • Enhancing efficiency of waste management at community level by supporting systematic waste reduction/separation; promoting waste segregation mechanism prior to disposal to recover secondary raw materials; using materials from community production as raw materials for factories; transforming solid waste and residue from production process into energy; creating community model on waste segregation and products processing via adoption of innovation and technology suitable for the area.
Strategy 3 Restoration of natural resources and enhance resources use efficient according to philosophy of sufficiency economy • Using natural resources efficiently and preventing reschedule/waste from industry agriculture and food sector; conducting material flow analysis for efficient waste management from production and consumption; developing mechanism for circulating and reutilizing residue from industry and agriculture; reducing waste generation and food waste prior to consumption; developing platform to connect circular economy entrepreneurs and enhance access to knowledge and innovation; and amending regulations to support reutilization of industrial waste.
Strategy 4 Development of technology, innovation and mechanism to support circular economy and low carbon society • Promoting technology, research and platforms to support circular economy and low-carbon society to enhance efficiency of resource utilization; minimize waste from production processes; develop platform on integrated information management; and strengthen

Milestone 10: Thailand with circular economy and a low-carbon society: Related Topics
collaborative network on technology, eco-design and waste management. • Applying principle of co-investment of private sector in state-owned enterprises; promoting transformation of entrepreneurs to circular economy; creating new businesses which design products and services throughout life expand and use recyclable materials. • Promoting the use of technology and innovation for mono-material packaging, and for enhancing the use of secondary raw materials and upcycles in production.

4.3.4 Action Plan on Driving Thailand Development with BCG Economic Model (2021 – 2027)

The Cabinet approved BCG Action Plan proposed by Ministry of Higher Education, Science, Research and Innovation on 8 February 2022. Strategy 3: Scaling up industrial development via BCG economy for sustainable competitiveness.

Related topics
Circular economy: Applying circular economy concept as a foundation to drive Thailand towards sustainable development, maximize competitiveness and develop new economy by incorporating waste in production processes with 3 target areas such as integrated plastics, agriculture and food, and building materials. 1. Economic development via investment/market opportunities of circular economy business 2. Promotion of research, technology and innovation to invent new products and services from waste re-utilization and recycling. 3. Development of platforms and infrastructure to systematically drive circular economy. 4. Building management system which drive the country's circular economy. 5. Development of capacity and manpower through trainings or courses, and raising awareness on sustainable production and consumption to drive circular economy.

4.3.5 Roadmap on Plastic Waste Management (2018 – 2030)

The cabinet acknowledged the Roadmap on 17 April 2019.

Related Topics
Target 1: Reduce and stop using target plastics by replacing with eco-friendly materials. 1. Banning 3 types of plastics by 2019: (1) plastic cap seals (2) Oxo-degradable plastic (3) Microbeads. 2. Banning 4 types of plastic by 2022: (1) plastic bags (thickness <36 microns) (2) Styrofoam food containers, (3) plastic cups (thin single-use) (4) plastic straws.

Related Topics
Target 2: Reutilization 100% of 7 types of target plastic waste by 2027: (1) Plastic bags (HDPE, LLDPE, LDPE, PP) (2) Mono-layer plastic film packaging (HDPE, LLDPE, LDPE) (3) plastic bottles (all kinds), (4) bottle caps, (5) plastic cups, (6) plastic food trays/boxes, and (7) plastic cutlery (spoons, forks, knives).

4.3.6 National Waste Management Action Plan (2022 - 2027)

Approved by the National Environment Board at No. 3/2022 Meeting on 3 August 2022.

Related Topics

Measure 1 Waste Management at Source

- Promoting public-private-people cooperation on plastic waste management at the source:

1) Specify and classify recyclable or biodegradable plastic products, based on production and usage quantity, and recycling efficiency.
2) Encourage manufacturers to apply eco-design concept in plastic product design and production-including longer lifetime, using recycled materials to reduce new raw materials, easy to reuse, worthwhile to recycle, can be recovered as energy sources or biodegradable through providing incentives for producers and consumer such as tax deductions, BOI benefits and government public relations.
3) Implement Extended Producer Responsibility (EPR) principle in plastic waste management by piloting in plastic products with low recycling rate.
4) Advocate according to "Refuse to accept SUP" campaign by encouraging people to reduce the use of plastic products and use reusable and eco-friendly products such as washable containers, lunch boxes, reusable cups or cloth bags.
5) Scale up initiative to reduce SUP and to sort plastic waste for recycle in government agencies, private offices buildings, shopping malls, convenience stores/local brand shop, fresh markets, food and beverage stores and food delivery services.
6) Support utilization of domestic plastic waste by limiting import of plastic scraps from abroad and promoting plastic waste segregation to bring plastic with high or low recycling rate back into recycling system; improve saleng, junk shop operators, recycling business and recycle hub; and develop digital platforms to serve as marketplace for trading plastic waste.

Related Topics
Measure 3 Development of waste management tools ● Develop circular economy and Extended Producer Responsibility: EPR laws to cover waste management at source and throughout product life cycle from product design, production, consumption and post-consumption management, in order to drive Thailand with the BCG Economic Model.

4.4 Conclusions

4.4.1 Situation of future trends

Socio-economic, environmental and technological changes, as well as emerging diseases affecting the following aspects of plastic waste management:

1) Plastics is used to produce SUP products and packaging with very short lifespan and high disposal rate, as evidenced during Covid-19 pandemic.

2) International obligations and trade force Thailand to adjust the design and use of more eco-friendly products, such as products containing post-consumer recycled (PCR) plastic.

3) Transformation to online businesses results in an increasing amount of plastic packaging waste.

4) Global communities aware of urgency to prevent and address impacts of plastic marine debris on ecosystem, marine animals, and humans (through food chain).

5) Announcement of China and other countries on banning import of plastic waste forces all countries to place measures on prevention of plastic waste and promotion of domestic plastic recycling.

6) Development of technology, innovation and digital systems causes production of new plastic products or packaging which are difficult to dispose (Emerging Waste).

7) Shifting toward green and climate change measures/policies of many countries- such as Singapore's Green Plan policy, South Korea's Green New Deal, Japan's Green Growth Strategy, and EU's policy to prevent import of high-GHG-emission goods- may affect Thai exporters while providing opportunity to develop agreement/criteria/standard of quality products towards more recyclable and minimized environmental impacts, and enhance competitiveness in the world markets.

4.4.2 Challenges

Key challenges in plastic waste management in Thailand are:

1) There was no specific law/regulation on plastic management. Current measures were advocacy campaign and voluntary cooperation. Hence, the government did not have appropriate tool to address waste problems in a timely manner, and progress of implementation was delayed.

2) During the outbreak of COVID-1 9 , most plastics had been used as SUP application for short period and immediately discarded after used. The increasing proportion and quantity of plastic wastes were a challenging factor to achieve the goal.

3) Cooperation and awareness of general public in reduction and separation of plastic waste was sparse. Stimulation of public awareness on waste reduction and segregation is necessary to continuously increase.

4) Measure to reduce and stop using target plastics under the Plastic Action Plan negatively impact plastic producers and may interfere with convenient daily lives resulting in some resistances of the Measure.

5) Incentive for recycled plastic through circular economy is necessary to increase plastic utilization rate.

6) Implementation of international obligations and agreements may be legally binding to prevention of plastic pollution.

Chapter 5

Action Plan on Plastic Waste Management "Phase 2" (2023-2030)

5.1 Introduction

Action Plan on Plastic Waste Management "Phase 1" (2020 - 2022) put an emphasis on changing consumer's behavior toward reduction and disuse of SUP, and recovery of target used-plastic into recycling system by adopting circular economy principle. Results from implementation of Action Plan "Phase 1" have suggested that the goals could not fully be achieved, because most actions were based on a voluntary basis and plastic waste appeared in waste disposal sites was likely to increase due to large consumption of SUP during COVID-19 pandemic. Key activities of Action Plan "Phase 1" consist of public campaigns, network on SUP-reduction, promotion of research and technological development, and collection of plastic waste back to recycle.

Action Plan on Plastic Waste Management "Phase 2" (2023 – 2027) focuses on escalating the effectiveness of plastic waste management through regularly promoting prevention and solving related issues of plastic waste according to Roadmap on Plastic Waste Management (2018 – 2030). Action Plan Phase 2 covers life cycle analysis of products, and circular economy concept to prevent plastic waste generation. Promotion of Eco – design, and Sustainable Consumption and Production, encouraging waste segregation with suitable waste disposal, and applying Extended Producer Responsibility (EPR) principle in plastic packaging management are measures to recover secondary resources via material and energy recovery and to minimize final waste disposal.

5.2 Vision

Moving Towards Sustainable Plastic Management by Circular Economy.

5.3 Conceptual framework

Action Plan on Plastic Waste Management "Phase 2" (2023 - 2027) has been developed under the conceptual framework of Waste Management Hierarchy (Figure 5-1) and Life Cycle Management Approach (Figure 5 -2), with measures and management guidelines covering design, production, distribution, consumption, sorting, recycling and safe disposal.

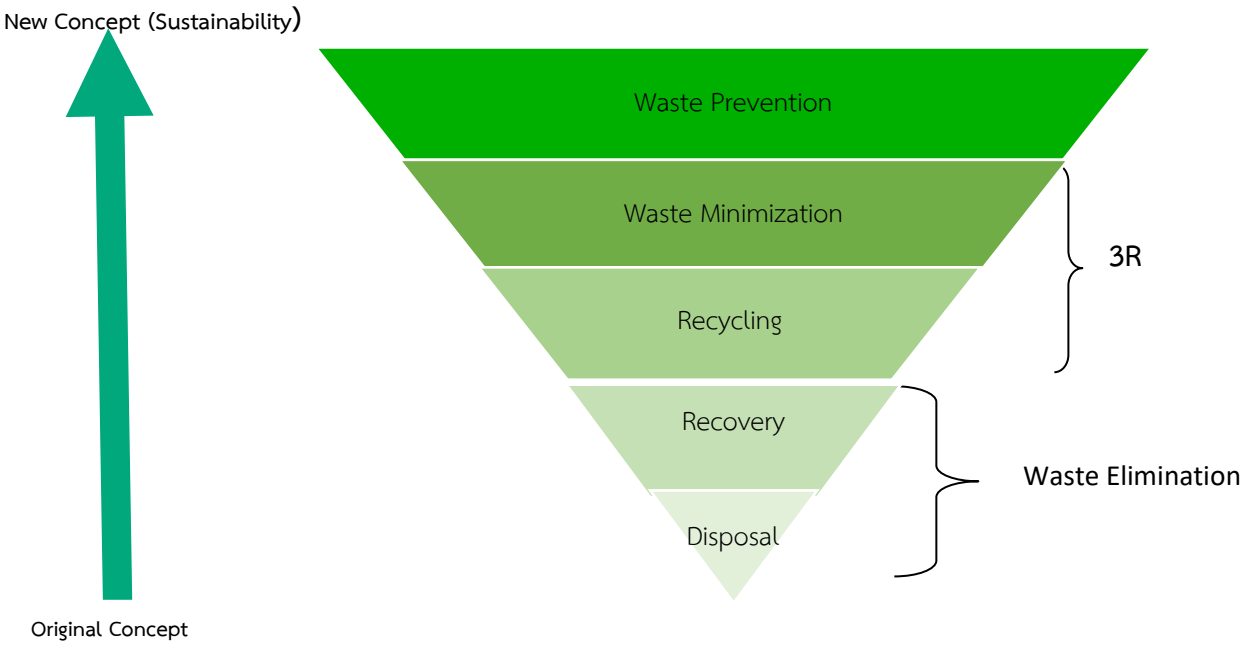


Figure 5-1 Waste Management Hierarchy

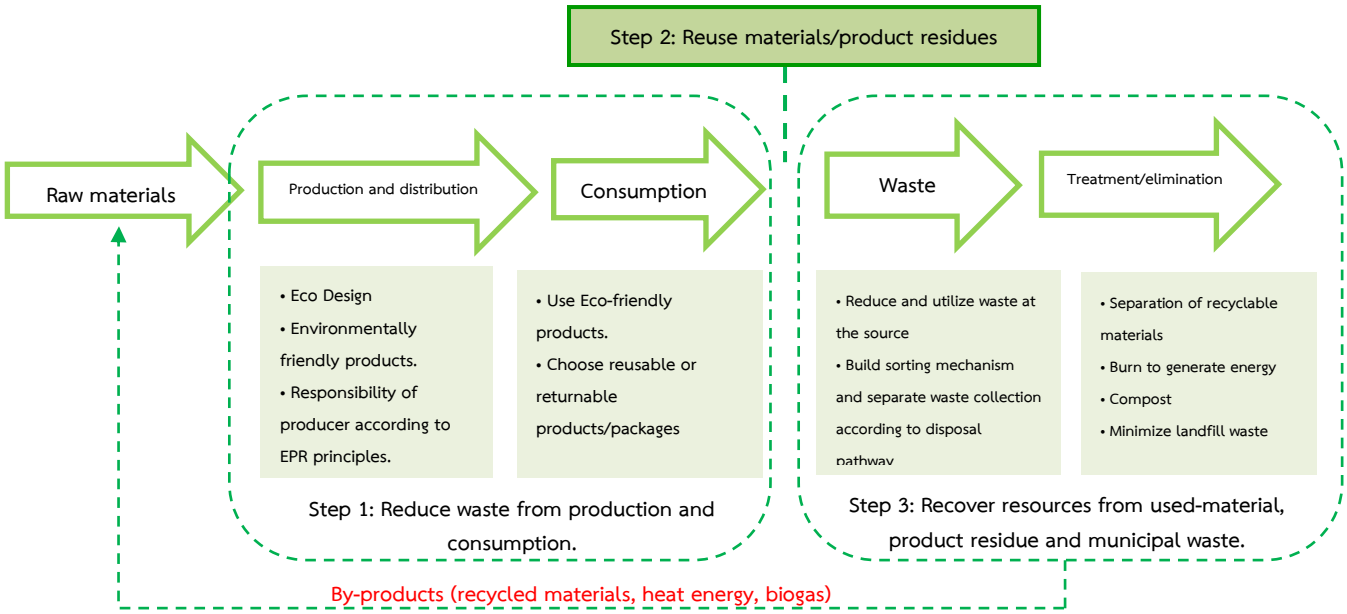


Figure 5-2 Life Cycle Management Approach

5.3.1 Management at source from design, production and distribution by defining share-responsibilities, in managing plastic waste, of related parties, i.e., producers, importers and distributors throughout product life cycle according to Extended Producer Responsibility (EPR) principle.

5.3.2 Midstream Management by promoting sustainable consumption and changing consumer behavior toward choosing Eco-friendly products and recyclable packaging, recovering used products for recycling by business operators, eliminating the use of packaging which pollute the environment and ecosystem, building system for waste segregation at source in line with final disposal pathway, and enhancing resources recovery through material recovery and energy recovery to minimize final disposal.

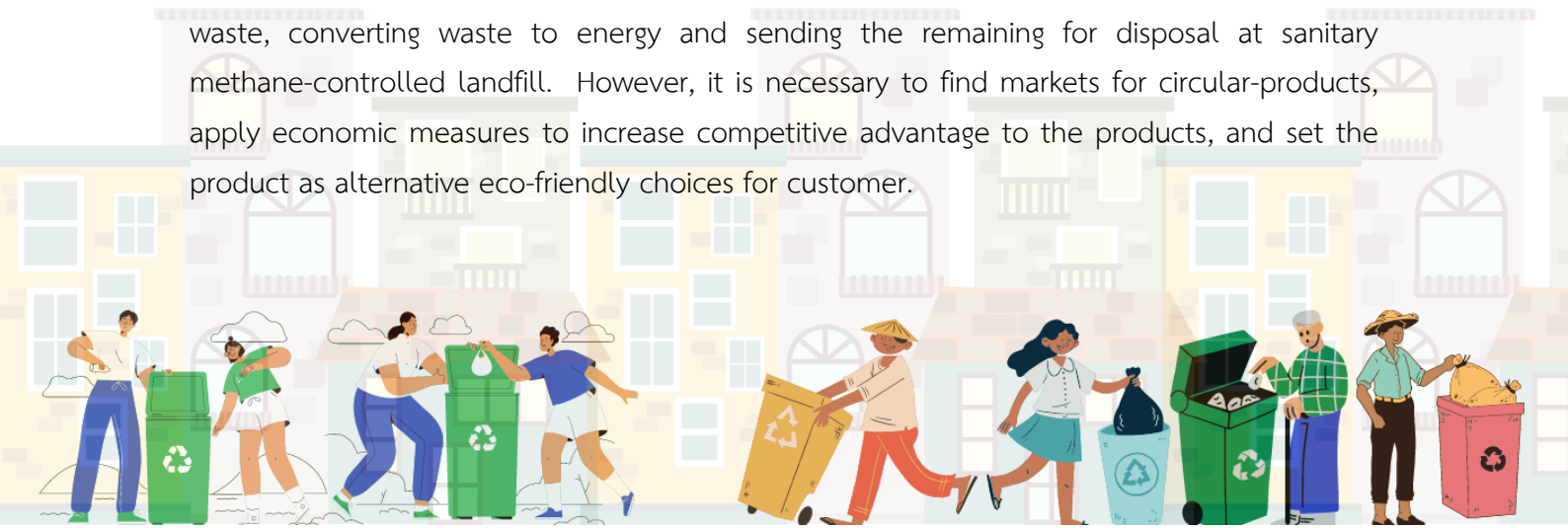
5.3.3 Downstream Management through applying integrated solid waste management approach according to sustainable waste management model which technologies are adopted in sorting and recycling systems; and incineration for energy production and composting of organic waste are applied to minimize waste to landfills.

5.3.4 Development of plastic waste management tools to ensure efficient plastic waste management, such as (1) Extended Producer Responsibility (EPR) model (2) Plastic product standards (mandatory) (3) Guideline/Agreement on product design (4) Eco Mark (5) PCR Mark (6) Standards and qualification of plastic scarps (7) Digital Platform for Recycle (8) List of green products in green procurement system (9) Specific research and development (10) Central-national plastic database.

5.4 Management Principles

5.4.1 Bio-Circular-Green Economy Model (BCG Model) consists of (1) Bio-Economy: application of new technology and innovation to boost up and add more value on biological resources or agricultural products such as development of compostable plastics, production of natural materials to replace plastics (2) Circular Economy: recycle or reutilization of used resources/products in production process or producing new products (3) Green Economy: adoption of Eco-friendly technology in production to produce durable products with long service, recyclable and hazard-free.

Waste management approach according to BCG Model aims to control and prevent the generation of plastic waste including containers or packaging, to reduce of greenhouse gas emissions via recycling waste as resources by using Bio-Conversion to digest organic waste, converting waste to energy and sending the remaining for disposal at sanitary methane-controlled landfill. However, it is necessary to find markets for circular-products, apply economic measures to increase competitive advantage to the products, and set the product as alternative eco-friendly choices for customer.



5.4.2 3R (Reduce, Reuse, Recycle) principle consists of (1) Reduce: Reduction at sources, and in designing, manufacturing and consumption process by using resource efficiently and avoiding waste generation (2) Reuse: reutilization of used-packaging or residual materials without processing or reprocessing (3) Recycle: recovery used-recyclable waste/packaging/residual materials to manufacturing stream and utilizing them as raw materials in production process.

5.4.3 Expanding scopes of responsibility

1) Producer responsibility according to Extended Producer Responsibility (EPR) principle: Specify producer's responsibility on their products throughout product life cycle from production to disposal, e.g., cooperatively pay product management fees, participate in post-consumer product recovery for reuse/recycle, practice Eco-friendly and safe disposal, change the design and production process of products or packaging towards Eco-friendly by restriction of hazardous substances, and designing/manufacturing products long-life, easy to recover, decomposable, or derivable as energy.

2) Customer responsibility according to Extended Consumer Responsibility (ECR) principle: raising awareness and defining responsibility of consumers on choosing Eco-friendly products/packaging, sorting post-consume materials, returning or re-selling used products/packaging to distributors or take-back centers/network/end-of-life handling service providers, sending segregated materials through available systems for proper disposal.

5.4.4 Public Private Partnership: promoting participation of muti-sectoral stakeholders throughout product life cycle from production, import, distribution, consumption and post-consumption management; and facilitating private sector participation in plastic management.

5.5 Targets

Plastic Waste Management Action Plan "Phase 2" (2023 - 2027) consist of 4 targets:

Target 1: Reduce 100% of target plastic waste to landfills by 2027: (1) plastic bottles (all types) (2) bottle caps, (3) mono-layer plastic film packaging (HDPE, LL, LDPE), (4) plastic bags, (5) plastic cups.

Target 2 Recover 100% of target plastic products to recycling system by 2027: (1) plastic bottles (all types), (2) bottle caps, (3) mono-layer plastic film packaging (HDPE, LL, LDPE), (4) plastic bags, (5) plastic cups.

Target 3 Reduce 50% of plastic waste with potential leakage into the sea by 2027.

Target 4 Ensure availability of tools for plastic waste management as specified in the action plan.

Table 5-1 Indicators and target values of Action Plan on Plastic Waste Management "Phase 2" (2023 - 2027)

Target	Target value (percentage)					
	Baseline	2023	2024	2025	2026	2027
1. Amount of target plastic waste entering landfills reduced						
(1) Plastic bottles (all types)	41%[1]			100%		
(2) Bottle caps	90%[1]			100%		
(3) Mono-layer plastic film packaging (HDPE, LL, LDPE)	69%[1]					100%
(4) Plastic bags	94%[1]					100%
(5) Plastic cups	94%[1]					100%
2. Target plastic products recovered for recycling increased (1) Plastic bottles (all types) (2) Bottle caps (3) Mono-layer plastic film packaging (HDPE, LL, LDPE) (4) Plastic bags (5) Plastic cups	33%[2]	60%	70%	80%	90%	100%
3. Amount of plastic waste with potential leakage into the seas reduced.	0.02 million tons[3]					50 %
4. 10 plastic waste management tools developed	1. Extended Producer Responsibility (EPR) model 2. Plastic product standards (mandatory) 3. Guideline/Agreement on Product Design 4. Eco Mark 5. PCR Mark 6. Standards and characteristics of plastic scraps 7. Digital Platform Recycle 8. List of green products in Green Procurement 9. Specific Research and development 10. National Plastics Database (central database)					
Additional benefits	If the targets are achieved, reduction of plastic waste in waste disposal sites contributes to save cost for waste management, fewer requirements of landfill area, and reduction greenhouse gas emissions because plastic is recirculated as new recycled plastic pellets.					

Note: Data source

[1] Data from report on Material Flow Analysis of Plastics Waste (Plastic Institute, 2021) calculated from a comparison between amount of target plastic waste found in landfill systems and amount of plastic products produced for domestic use.

[2] Data from Report on Material Flow Analysis of Plastics Waste (Plastic Institute, 2021).

[3] Calculated from amount of improperly disposed plastic waste with potential leakage into the seas in 23 coastal provinces using the following formular:

$$A = B \times C \times D \times E/100$$

where,

A = Amount of plastic waste from disposal sites with potential leakage into the seas (tons/year)

B = Amount of waste entering waste mismanaged disposal sites with a distance of 50 km from the coast in 23 coastal provinces (tons/year)

C = Composition of plastic waste in landfills in each province, and average number of plastic waste (28.13% or 0.2813)

D = Average moisture of municipal solid waste (40% or 0.40)

E = Probability of plastic waste leakage (5% or 0.05)- information from a study by World Bank

5.6 Measures

Action Plan on Plastic Waste Management "Phase 2" (2023 - 2027) manages plastic waste throughout life cycle from production, distribution, consumption and post-consumption, including managing plastic waste in the ocean through the following 4 measures:

5.6.1 Measure 1: Production of Eco-friendly plastic products

1. Classify and specify types of plastic products based on amount of collection, recycle and recyclability rate.

1.1 Products with high collection and recyclability rate are plastic products with high usage, high demand in recycle market and high purchase price as incentives for segregation and collection for recycling. Mutual agreement on Eco-design for this product group shall be applied. Examples of the products are

1) PET beverage bottles.

2) HDPE bottles i.e. fabric softener bottles, shampoo bottles.

3) Beverage cups i.e. coffee cups.

1.2 Products required support to recover for recycling or converting to energy are plastic products commonly found at waste disposal sites or in the environment due to limited recycling, difficulty to manage, lack of collection systems and contamination with food. Recycling efficiency shall be enhanced through:

1.2.1 Providing sorting system to allow collection/recycling of mono-layer plastic film packaging such as plastic bag, shopping bag, wrapping film for water bottle or UHT carton, plastic postal envelope, bubble wrap, Ziplock/medicine bag, bread bag, sugar bag, ice bag, and fruits and vegetable bag.

1.2.2 Changing productions according to demands of recycling market and according to resource use efficiency:

1) Cap and lid/plastic film cover using the same type of plastic material.

2) Recyclable plastic bottles for fermented milk.

3) Thick plastic bags with can be recovered for recycling.

4) Food box/tray with same type of plastics (PP) according to demand of recycling market.

5) Avoid over packaging when design for convenient collection such as using proper size or using same size/shape of package.

6) Change plastic bags/envelopes from different material types such as aluminum, metallized plastic and multi-layer/multi-material plastic to products with same type of plastic, or reduce types of material uses to enhance recovery for recycling.

7) Change from refill bag of laundry/dish washing/cleaning liquid to bottle.

8) Stop producing drinking water in cups or replace them with bottles.

9) Reduce and eliminate Styrofoam food packaging as it is not recyclable.

10) Reduce or avoid using plastic straws to reduce environmental impacts.

1.2.3 Utilizing in energy production or other benefits such as hot-cold food bags, plastics utensil (spoons/forks/knives) and other types of plastic.

1.3 Compostable Plastics which are contaminated with food and not profitable to recycle must be labeled with industrial product standards (TIS 17088 - 2562) or equivalent standard; and should be utilized by composting such as paper coated with compostable plastics, food wrap films, food preparation gloves, garbage bags, plastic bags for planting and mulch films.

2. Set up criteria and standards for plastic products, and scale up to mandatory standards:

2.1 Guideline for Eco-design and avoiding over packaging, starting with plastic products with high collection and recyclability rate.

2.2 Product standards requiring at least 30% of recycled plastic contents and certifying bodies for Post-Consumer Recycled (PCR) raw materials or products.

2.3 Mandatory standards for compostable plastics.

2.4 Standards for food grade plastics, especially SUP packaging for food and beverage.

3. Use symbols on plastic products to distingue recyclable and other plastics for proper sorting; and enhance awareness of general public.

4. Develop system and assign responsible agency for certifying raw materials or plastic products containing Post-Consumer Recycled (PCR).

5. Encourage producers to use plastic products according to the classified group and compile with relevant standards; and encourage brand owners to use packaging with Post-Consumer Recycled (PCR) content through providing incentives (tax deductions and BOI privileges) and government public relations.

6. Promote investment of comprehensive compostable plastic industry to reduce production cost; and expand producers and customers.

7. Promote the use of packaging with Post-Consumer Recycled (PCR) contents among Brand Owners; and expand Refill Stations in inconvenience stores, shopping malls, laundromats, retail stores, condominiums, dormitories and apartments.

8. Amend rules and regulations to support operation and expansion of refill stations for broader product types to meet consumer's need and generate profit to private investment.

9. Adopt Extended Producer Responsibility (EPR) principles in plastic packaging management, starting with non-recyclable plastic products as they are abundant in waste disposal sites, contribute to marine pollution, and cost huge government budget for collection, transfer and disposal. These plastics are such as Styrofoam food boxes, food contaminated product group, plastic bags or envelopes containing many material/plastic types and mono-layer plastic film packaging.

10. Conduct specific studies and research to support plastic waste management, including

10.1 Product design with long use life according to Value Hill and Circular Economy principals.

10.2 Guidelines on plastic reduction aligning with climate actions.

10.3 Studies on quantity and potential of recyclability rate.

10.4 Innovations for management or production to reduce resource uses, increasing recyclability rate, alternatives to plastics, and prevention and reduction of microplastics.

11. Develop laws and regulation to promote circular economy in product and packaging management (including plastic packaging) from upstream (production), midstream (distribution/use) and downstream (post-consumption).

12. Prepare database on plastics and recycling in Thailand, update the information annually and report it to the public.

5.6.2 Measure 2: Reduction of plastic waste at consumption stage

1. Continue collaboration with department stores, shopping malls and convenience stores, both large brand owners and local brands to promote reduction of plastic waste by:

1) refraining from providing SUP bags, OXO bags, spun-bond bags.

2) reducing excessive use of plastic packaging.

3) providing area for selling Eco-design alternative products to plastic.

4) supporting deposit-refund scheme for reusable container and refill station.

2. Launch campaign to facilitate cooperation from food and beverage industry such as restaurants, cafes, food courts, fast-food chains, hotels and food delivery businesses, to support reduction of plastic waste by:

1) When dining in, providing re-usable containers instead of SUP, such as plates, bowls, cutlery and cups which are durable, can be washed and be reused; and providing drinking water in glass bottles to reduce plastic bottles.

2) For taking-away, using packaging efficiently and minimizing the use of SUP packaging

3. Facilitate cooperation from government/local administration organization/private sector owned-fresh markets and shops in markets on plastic waste reduction

1) Campaign on using big bags/baskets/cloth bags/reusable bags for shopping.

2) Not offer SUP bags, pack items in customer's big bags, baskets, cloth bags.

3) Use reusable/washable containers and utensils (plates/bowls/cutlery/cups) and glass bottles drinking water for dine-in customers in food stalls to reduce plastic bottles.

4) Minimizing the use of SUP packaging for take-out foods.

4. Facilitate public cooperation on reduction of plastic waste:

1) Reducing/avoiding the use of SUP products, and only use them if necessary.

2) Using reusable/washable containers, i.e. lunch boxes, reusable cups.

3) Using alternatives to plastic bags such as cloth bags/baskets or others.

4) Supporting and using services from shops which promote reduction of and refraining from giving plastic products.

5) Purchasing and using Eco-friendly products, and using refill station service.

6) Disposing used plastic containers/packaging properly according the symbols of plastic types.

5. Promote government agencies and shops in government offices as model for reducing SUP, using reusable and easy to recycle products, using plastics only when necessary, sorting used plastic for recycling and disposing waste properly.

6. Launch national campaign to communicate with the public on "Neither providing nor accepting for the reduction of SUPs" and communicate to sellers, shops and the public on understanding groups of plastic products and how to properly discard them after use.

7. Encourage private companies in driving organizations to reduce the uses of SUP.

8. Include additional green products according to Green Procurement and Circular Mark criteria under this Action Plan.

5.6.3 Measure 3: Management of plastic waste post-consumption

1. Issue local ordinances for sorting waste from homes, buildings and offices according to the new model and in conjunction with proper disposal pathway.

2. Promote understanding among public on symbols of recyclable and non-recyclable plastic products and disposal pathways, especially compostable plastics as described below:

2.1 Plastic product which must be returned to recycling system: separate from general and organic waste, and bring to circular economy.

2.2 Mono-layer plastic film package: set sorting system to recover for recycling.

2.3 Plastic products used to produce energy (Waste to Energy: WtE).

2.4 Compostable Plastics: separate from general waste, dispose with organic waste and send to composting system in households, communities or waste disposal sites of local government organizations.

3. Support building of composting plants at waste disposal sites of local government organizations and industrial composting plants by private sector to accommodate compostable plastics and organic waste management.

4. Improve efficiency of plastic waste collection system to encourage the use of domestic plastic scraps by:

4.1 Developing standards for plastic scraps according to requirements of recycling plants, and standards for modest price of plastic scarps with pathway to recycling or WtE.

4.2 Scaling up sorting/collecting capacities of Saleng, junkshops, and garbage collectors to improve quality/quantity of domestic plastic scarps as raw materials for recycle.

4.3 Linking collection system of low-value plastic waste collected by local administrative organizations to recycling plants.

4.4 Developing community recycling businesses and building Recycle Hub industries at the regional level to bridge gaps of logistics system in order to bring plastic waste into the circular economy.

4.5 Mainstreaming collaboration with vocational institutes/universities to encourage youths and students to invent innovations on plastic waste management such as grinders and cutters to support transportation and reutilization.

5. Promote development of recycled plastic industrial estates and businesses, and develop technologies and innovations in recycling industries such as chemical recycling to obtain high quality recyclable raw materials or avoid using heat energy from fuel to melt or burn plastic scraps in order to reduce energy consumption and air pollution.

6. Launch campaign to promote and expand projects to collect recyclable plastic scarps back to recycling stream and generate value such as Won Project, Magic Hands X Won Project, Change Plastic to Merit when You Circulate Project and other models which facilitate collaboration among local governments and communities.

7. Develop recycle market place on digital platform for buyers and sellers targeting junk shops, local administrative organizations and recycling factories to collect high quality plastic scraps in sufficient quantities as raw materials for recycling business.

8. Develop business and market for upcycling plastic products such as clothes, bags and personal protective equipment (PPE).

5.6.4 Measure 4 Management of plastic marine debris

1. Prevent plastic marine debris by surveying area and waste transport system of local administrative organizations along canal/river banks and coastal areas in 23 provinces where plastic wastes leak into the sea, and increases access to the areas.

2. Implement waste management measures on islands focusing on waste separation before disposal and control waste transportation to disposal on mainland.

3. Set up systems for sorting, collecting and managing plastic waste and other types of waste for tourist boats and travelers, and define disposal pathway on land.

4. Place systems to prevent and collect plastic waste leaking into the sea such as installing buoy trap to collect waste at river mouths, and garbage collections in the sea and coastal areas.

5. Establish collaboration among associations, fishery entrepreneurs and recycling plants to bring fishing gear into recycling system, and cooperate with disposal companies to utilize waste in pyrolysis or Refuse Derived Fuel (RDF).

6. Develop data collection system and Marking Gear inspection and recall system for fishing gear to reduce marine.

7. Manage and control microplastics in water bodies, on land and in the seas.

5.7 Action plan “Phase 2”

The Action Plan “Phase 2” consists of activities, indicators, and goals/outputs, duration and responsible agencies as described in the table on page 5-40 to page 5–65.

Action Plan “Phase 2”: Measure 1 Production of Eco-friendly Plastic Products

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
1. Classifying and specifying types of plastic products to increase reuse and recycling.	Plastic products in the markets classified according to recycling/ Management approaches.	1. Develop criteria for classifying plastic products in the market as follows:	/					- Plastics Institute of Thailand - Plastic Industry Club - Thai Plastic Industries Association - Thai Bioplastics Industry Association	- Pollution Control Department - Thailand Institute of Packaging and Recycling Management for Sustainable Environment
		1.1 Products with high collection and recyclability							
		1.2 Products require alternative production methodology to increase recyclability plastics							
		1.3 Products can be converted to energy							
		1.4 Products require segregation and collection system to recover for recycling							
		1.5 Compostable Plastics							
		1.6 Products require reduction/stop production							
		2. Determine characteristics of plastic packaging production according to classifications in Activity 1.	/	/	/	/	/	- Plastics Institute of Thailand - Plastic Industry Club - Thai Plastic Industries Association - Thai Bioplastics Industry Association	- Pollution Control Department - Thailand Institute of Packaging and Recycling Management for Sustainable Environment

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		3. Set agreement between entrepreneurs and related associations on producing products according to classification in Activity 1.	/					- Thailand PPP Plastics - Thai Plastic Industries Association - Thai Bioplastics Industry Association	- Plastic Industry Club - Federation of Thai Industries
2. Setting criteria and standards for plastic products.	At least five types of criteria and standards for production of plastic packaging developed.	1. Issue criteria or standards for plastic packaging according to characteristics specified to cover plastic products according to Activity 1 of Measure 1.	/					- Thai Industrial Standards Institute - Plastics Institute of Thailand	- Plastic Industry Club - Thai Plastic Industries Association
		2. Issue criteria and guidelines to certify “Eco-design” and “Non-oversize Design” packaging.	/	/				- Federation of Thai Industries - National Metal and Materials Technology Center	- Thailand Environment Institute Foundation - Thai Industrial Standards Institute
		3. Issue standards for raw materials or products containing Post Consumer Recycled (PCR) plastics.			/	/		- Plastics Institute of Thailand - Thai Industrial Standards Institute	- Thailand Environment Institute - National Metal and Materials Technology Center
		4.Scale up mandatory standard for certain types of plastic products to at least 30% of recycled plastic content.					/	- Thai Industrial Standards Institute	- Plastics Institute of Thailand - Thailand Environment Institute - National Metal and Materials Technology Center

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		5. Scale up standards for compostable plastic to mandatory standard.		/	/			- Thai Industrial Standards Institute	- Plastics Institute of Thailand - Thai Plastic Industries Association - Thai Plastic Industries Association
		6. Issue standards for food contact SUP such as food packaging and drink bottles.	/	/				- Thai Industrial Standards Institute	- Plastics Institute of Thailand - Thai Plastic Industries Association
3. Assigning symbols for plastic products to support sorting and management.	Eco Mark to support sorting of plastic product developed.	1. Design and determine Eco Mark for plastic products such as recyclable plastic, biodegradable plastic, and other plastics (WtE or composible).	/					- Thailand Environment Institute -Thailand Institute of Packaging and Recycling Management for Sustainable Environment	- Thai Industrial Standards Institute - Plastics Institute of Thailand - Plastic Industry Club - Pollution Control Department
		2. Issue Ministry of Industry's announcement on adopting Eco Mark as a standard in Thailand.		/				- Thai Industrial Standards Institute	- Plastics Institute of Thailand - Pollution Control Department
		3. Disseminate information on Eco Mark to the public.		/	/	/	/	- Department of Environmental Quality Promotion - The Government Public Relations Department	- Department of Local Administration -Local administration Organizations - Department of Health -Related associations

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
4. Setting up systems and assigning responsible agencies to certify raw materials or plastic products containing Post Consumer Recycled (PCR) plastics.	Certification systems and agencies to certify raw materials or plastic products containing PCR established	1. Develop certification system for raw materials or plastic products containing PCR accepted nationally and internationally.	/	/				- Thai Industrial Standards Institute - Plastics Institute of Thailand	- National Metal and Materials Technology Center - Chula Unisearch, Chulalongkorn University.
		2. Issue announcement of criteria and methods for certifying raw materials or plastic products containing PCR.		/	/			- Thai Industrial Standards Institute - Plastics Institute of Thailand	- National Metal and Materials Technology Center -Chula Unisearch, Chulalongkorn University.
		3. Select agencies and prepare them for product's certification.	/	/				- Thai Industrial Standards Institute - Plastics Institute of Thailand	- National Metal and Materials Technology Center -Chula Unisearch, Chulalongkorn University.
		4. Increase/expand agencies qualified as certify body for raw materials or plastic products containing PCR.		/				- National Metal and Materials Technology Center	- Plastics Institute of Thailand - Thai Industrial Standards Institute - Chula Unisearch, Chulalongkorn University.
		5. Publicize certification system		/	/	/	/	- Plastic Industry	- Thai Plastic Industries

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		for raw materials or plastic products containing PCR to operators in plastic industry throughout supply chain.						Club - Federation of Thai Industries	Association - Thailand Institute of Packaging and Recycling Management for Sustainable Environment
5. Encouraging manufacturers to produce plastic products according to classification and standards defined in this Action Plan.	Number of manufacturers produce plastic products according to classification and standards increased.	1. Set criteria, methods, conditions and incentives for producers and brand owner who comply with the specified standards.	/					-The Board of Investment Office (BOI) - Fiscal Policy Office	- Related associations
		2. Develop incentive program to grant rights and benefits to entrepreneurs that produce plastic products according to the specified standards.		/	/	/	/	- Board of Investment Office - Department of Industrial Works - Office of Industrial Economics	- Related associations
		3. Designate products with recycled plastic ratio and Eco-design as 'Green Product' in the public procurement system.	/	/				- Pollution Control Department	- Thailand Environment Institute
6. Supporting investment in comprehensive biodegradable	Number of manufacturers and users of biodegradable plastic	1. Study cost effectiveness of investment in biodegradable plastic industry and appropriate locations.	/					- Thai Bioplastics Industry Association -Industrial Estate Authority of Thailand	- Plastic Industry Club - Federation of Thai Industries

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
plastic industry.	products increased.								
		2. Support establishment of comprehensive biodegradable plastic industrial estate according to study results from No. 1.						- Industrial Estate Authority of Thailand	- Federation of Thai Industries
		3. Provide of benefits, funding sources, and tax benefits for manufacturers of biodegradable plastic products that comply with required standards.	/	/	/			- Board of Investment Office - Industrial Estate Authority of Thailand - Revenue Department	- The Federation of Thai Industries - Thai Bioplastics Industry Association - Department of Industrial Works - Fiscal Policy Office
7. Encouraging brand owners to use packaging with PCR ratio.	Number of Brand owners using packaging with PCR content increased.	1. Determine criteria, methods, conditions, and incentives for brand owner using packaging with PCR ratio.	/	/	/	/	/	- Fiscal Policy Office - Office of Industrial Economics - Revenue Department - Plastics Institute of Thailand - Brand owner	- Thai Industrial Standards Institute - Plastic Industry Club - Thailand Institute of Packaging and Recycling Management for Sustainable Environment

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		2.Issue announcements and incentives to support brand owners, such as tax deductions from purchasing raw materials or plastic products containing PCR, and corporate income tax exemption.	/	/	/			- Fiscal Policy Office - Revenue Department	- Plastics Institute of Thailand
		3. Government agencies provide support on organizing trade fair, exhibition booth, and public relations.		/	/			- Department of International Trade Promotion - Department of Internal Trade of Thailand.	- The Government Public Relations Department
8. Supporting brand owner to establish refill stations.	Number of refill stations increased.	1. Develop business models for refill stations.	/					- Brand owners	- Department of Industry Promotion
		2. Improve and issue regulations to support refill stations for more products.	/	/	/			- Food and Drug Administration	- Office of The Consumer Protection Board. - Pollution Control Department
		3. Extend refill stations in convenience stores, shopping malls, laundromats, retail stores, condominiums, dormitories, and apartments		/	/	/	/	- Brand owners	- Department of Internal Trade - Provincial Commerce Office - Related associations • Entrepreneurs • malls • convenience stores

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
9. Adoption of Extended Producer Responsibility (EPR) principles in plastic packaging management.	EPR system to manage plastic packaging in Thailand established.	1. Appoint committee and working group on packaging management according to circular economy and EPR principle.	/					- Pollution Control Department - Thailand Institute of Packaging and Recycling Management for Sustainable Environment	- Department of Local Administration - Department of Environmental Quality Promotion - Office of National Higher Education Science Research and Innovation Policy Council - Fiscal Policy Office - Department of Industrial Promotion - Office of Industrial Economics - Thailand Environment Institute - National Municipal Association of Thailand - Thai Retailers Association - Thai Beverage Industry Association - PPP Plastics - Plastics Institute of Thailand
		2. Establish developmental framework for packaging waste management mechanisms based on EPR principles, covering definition, guidelines for establishment and operation of Producer Responsibility Organization (PRO), and relevant regulations.	/						
		3. Implement pilot projects on EPR for target plastic products.	/	/					

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		4. Disseminate knowledge and raise awareness on packaging management among producers, importers, brand owners, online sellers (E-commerce), collectors (private sectors/organizations and local government organizations) and the public.	/	/	/	/	/		- Plastic Industry Club - Food Industry - Cosmetics Industry - Thai Pulp and Paper Industries Association - Glass packaging industry - Plastic Packaging Industry -Aluminum packaging industry - Beverage packaging industry
10. Research studies on plastic waste management related topics	Research results for application in plastic waste management	1. Study and research on product design with long lifetime according to Value Hill principals.	/	/	/	/	/	- National Metal and Materials Technology Canter	- National Research Council of Thailand - National Science and Technology Development Agency - Chulalongkorn University
		2. Conduct research on developing plastic reduction guidelines aligning with climate actions.	/	/	/	/	/		
		3. Study and assess quantity and potential of plastics recyclability rate.	/	/					

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		4. Develop plastic products and/or alternative products which reduce resource consumption and increase recyclability rate.			/	/	/		
		5. Study technology and innovation on reducing microplastics from various activities such as laundry business, etc.		/	/			- Educational institutions with research and development agencies.	
11. Developing laws to promote circular economy for product and packaging management (including plastic packaging).	Circular Economy Promotion Law for product and packaging management developed.	1. Develop law on promoting circular economy in packaging waste management.	/					- Pollution Control Department	- Office of the Council of State - Chulalongkorn University
		2. Present the law to ministry committees, cabinet and Council of State for consideration.		/	/				
		3. Enact laws on promoting circular economy in packaging waste management.				/			

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		4. Prepare draft subordinates and draft criteria in accordance with law on promoting circular economy in packaging waste management.			/	/	/		
12. Development of Thailand's Database on Plastics	Thailand's Database on Plastics developed	1. Update Database on Plastics.	/	/	/	/	/	- Plastics Institute of Thailand - Pollution Control Department	- National Metal and Materials Technology Center - Thailand Institute of Packaging and Recycling Management for Sustainable Environment
		2. Continuously analyse situation of plastic waste management, annually.	/	/	/	/	/		
		3. Report situation of plastic waste management to the public.	/	/	/	/	/		

Action Plan “Phase 2”: Measure 2 Reduction of Plastic Wate at Consumption Stage

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
1. Campaign to continue and expand collaboration with department stores, shopping malls and convenience stores to promote reduction of plastic waste.	Number of prominent and local entrepreneurs who participated in the activities increased.	1. Organize campaign to facilitate cooperation among department stores, shopping malls and convenience stores (Inter Brand) on reduction of plastic waste by:	/	/	/	/	/	- Department of Environmental Quality Promotion	- Thai Retailers Association - Department store, shopping malls, and convenient stores - Bangkok Metropolitan Administration - Local government organizations - The government public relations department
		1.1 Refraining from providing SUP bags, OXO bags, spun-bond bags.	/						
		1.2 Reducing excessive use of plastic packaging.	/	/	/	/	/		
		1.3 Providing areas for selling Eco-design alternative products and refill stations.	/	/	/	/	/		
		1.4 Stopping the use and sale of SUP, especially Styrofoam food packaging; and use/sell environmentally friendly containers instead.	/						
		1.5 Supporting deposit-refund scheme for reusable container and fill stations.	/	/	/	/	/		
		1.6 Implementing point accumulation/redemption system for customers who bring their cloth bags.	/	/	/	/	/		

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		1.7 Requesting cooperation to serve as drop-off points for rigid and flexible plastic to collect them back in recycle system.	/	/	/	/	/		
		2. Expanding cooperation to department stores, shopping malls and local convenience stores to reduce plastic waste using approach in Activity 1.	/	/	/	/	/		
2. Campaign to facilitate collaboration with food and beverage entrepreneurs on reduction of plastic waste.	Number of food and beverage entrepreneurs participating in the activities increased.	1. Organize campaign to facilitate cooperation from food and beverage industry such as restaurants, cafes, food courts, fast food restaurants, hotels and food delivery business, to reduce plastic waste by:	/	/	/	/	/	- Department of Environmental Quality Promotion - Department of Tourism	- Association of Thai Travel Agents - Thai Hotels Association - Thai restaurant and street food association. - The government public relations department - Bangkok Metropolitan and Administration and Local government organization - Department of Health
		1.1 When dinning in, using only reusable containers.							
		1.2 Implementing point accumulation/redemption system for customers who bring their cups.							
		1.3 Using environmentally friendly food containers for take-away food.							
		1.4 Requesting cooperation to serve as drop-off points for rigid and flexible plastic to collect them back in recycle system.							
		1.5 Using deposit-refund system for reusable containers in food delivery services.							

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
3. Campaign to facilitate cooperation with government /private owned-fresh markets, and shops in markets on reduction of plastic waste.	Number of government /private owned-fresh markets, and shops in markets participating in the activities increased.	1. Organize campaign to facilitate cooperation of government/local administrative organizations/private owned-fresh markets to reduce plastic waste by:	/	/	/	/	/	- Department of Environmental Quality Promotion	- Pollution Control Department - Bangkok Metropolitan Administration - Local government organizations - Department of Health
		1.1 Launching campaign on using one-big bags/baskets/cloth bags/ reusable bags for shopping.							
		1.2 Reducing SUP bags by putting goods together in customer's big bags/baskets/cloth bags/reusable bags.							
		2. Organize campaign to facilitate corporation of food and beverage vendors in fresh markets to reduce plastic waste by:						- Department of Environmental Quality Promotion	- Pollution Control Department - Bangkok Metropolitan Administration and Local government organizations - Department of Health
		2.1 When dinning in, using only reusable containers.							
		2.2 Using environmentally friendly food containers for take-away food.							
4. Requesting cooperation from the public on reduction of plastic waste.	Number of people participating in the activities increased.	1. Communicate with the public at the national level to share knowledge and raise awareness on reduction of plastic waste by:	/	/	/	/	/	- Department of Environmental Quality Promotion - Government Public Relations Department	- Pollution Control Department - Bangkok Metropolitan Administration and Local government organizations
		1.1 Reducing the use of and saying no to SUP products, and using only when necessary.							

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		1.2 Using washable/reusable containers such as lunch boxes and reusable cups.							
		1.3 Using alternatives to plastic bags such as cloth bags, baskets, backpacks, and tote bags.							
		1.4 Choosing services from stores that cooperate in reducing the use of and refraining from providing SUP products.							
		1.5 Using environmentally friendly products and refill station services.							
		1.6 Disposing containers or plastic packaging according to symbols on disposal approaches.							
		2. Develop curriculum on plastic waste reduction aligning with Activity 1 for all educational levels.	/	/	/			- Ministry of Education	- Department of Environmental Quality Promotion
5. Scaling up government agencies as SUP Reduction Model.	Government agency scaled up as SUP Reduction Model.	1. Set indicators on plastic wate reduction and segregation for government agencies; and expand MSW reduction and segregation measures to local administrative organizations.	/	/	/	/	/	- Pollution Control Department	- Government agencies in all departmenta and all provinces - Local government organizations

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		2. Disseminate knowledge on reduction and segregation of MSW in organizations.	/	/	/	/	/		
		3. Evaluate performance of MSW reduction and segregation in organizations.	/	/	/	/	/		
6. Launching national campaign to communicate with the public on "not providing – refusing and reducing SUP".	Campaign on plastic waste reduction widely recognized by the public.	1. Collaborate with ThaiHealth Promotion Foundation (ThaiHealth) and large brand owners to produce advertisements to change people's behaviour.	/	/	/	/	/	- Department of Environmental Quality Promotion - Government public relations department	- Pollution Control Department - Thai Health Promotion Foundation - Large private sectors
		2. Invite environmental influencers to join national campaign for the public.	/	/	/	/	/	- Department of Environmental Quality Promotion - Government Public Relations Department	- Pollution Control Department - Thai Health Promotion Foundation
		3. Communicate to vendors, shops, and the public on simple classification of plastic products and proper disposal pathway.	/	/	/	/	/	- Department of Environmental Quality Promotion - Government Public Relations Department	- Pollution Control Department - Thai Health Promotion Foundation

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
7. Promoting reduction and stop using SUP in organizations, offices, establishments and private sectors.	Numbers of organizations, offices, establishments and private sector participated in the initiatives increased.	1. Encourage policy on promoting eco-friendly products and reducing SUP in organizations.	/	/	/	/	/	- Federation of Thai Industries -Related private associations	- Thai Hotels Association - Tourism Council of Thailand - Thai Restaurant Association - Thai Restaurant and Street Food Association.
		2. Invite organizations to organize activities on SUP reduction.	/	/					
8. Including products with Circular Mark in the green procurement system.	Number of eco-friendly plastic products in green procurement system increased.	1. Select Eco-friendly plastic products.	/					- Pollution Control Department - Thailand Environment Institute	- Plastics Institute Of Thailand
		2. Incorporate draft standard criteria for Eco-friendly plastic products in green product list.	/	/					
		3. Encourage entrepreneurs who produce Eco-friendly plastic products to register in Green Procurement system.	/	/					
		4. Include list of Circular Mark products in Green Procurement system		/					

Action Plan “Phase 2”: Measure 3 Plastic Waste Management Post-Consumption

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
1. Issuing local ordinance on sorting waste from homes, buildings and offices according to the new model and align with proper disposal method pathway.	Number of local governments issuing local ordinances increased.	1. Improve issuance of local regulations to include provisions for waste separation.	/					- Department of Local Administration - Pollution Control Department	- Local government organizations
		2. Support issuance of local regulations for waste sorting.	/	/	/	/	/		
2. Enhancing understanding among the public and local administrative organizations on symbols of plastic products indicating recyclable, and other disposal pathway, including compostable plastics.	The public and stockholders have knowledge and understanding on symbols for separation/disposal pathway of plastic products.	1. Organize public relations activities to build knowledge and understanding on symbols for separation of plastic products as follows:	/	/	/	/	/	- Department of Environmental Quality Promotion - Department of Local Administration - Pollution Control Department	- Government Public Relations Department - Thai Bioplastics Industry Association - Department of Local Administration
		1.1 Recyclable plastic product sending to recycling system							
		1.2 Plastic products sending to energy production (Waste to Energy: WTE)							

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		1.3 Compostable Plastics must be separated from general waste.							
		2. Organize training for local administrative organizations on symbols of plastic products for separation/disposal pathway: recyclable, compostable plastics or other disposal pathways.	/	/				- Pollution Control Department	- Department of Environmental Quality Promotion
		3. Prepare and disseminate manuals for local government organizations on MSW sorting and collection approaches.	/	/				- Pollution Control Department	- Department of Environmental Quality Promotion
3. Supporting construction of composting plants for management of compostable plastics and organic waste.	Number of municipalities with composting plants increased.	1. Support establishment composting plant in waste disposal area of the local administrative organization.	/	/	/	/	/	- Department of Local Administration	- Pollution Control Department - Local government organizations
4. Improving efficiency of plastic waste collection systems to encourage the use of domestic plastic scraps.	System for collecting plastic waste established.	1. Support budget for waste classification and collection system of local government organizations.	/	/	/	/	/	- Department of Local Administration - Office Of Natural Resources and Environmental Policy and Planning	- Office of the Decentralization to the Local Government Organization Committee

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		2. Increase drop-off points to collect plastic scraps (Local adminstrative organizations/ schools/temples/ fresh markets).	/	/	/	/	/	- Local government organizations	- Pollution Control Department
		3. Specify list of plastic products which junk shop should buy or types of plastics recycling plant requires.	/					- Saleng and Recycle Trader Association	- Pollution Control Department
		4. Determine characteristics of suitable plastic scraps for recycling.	/					- Pollution Control Department	- Plastics Institute of Thailand
		5. Develop capacity of Salang, junk shop and garbage collector on sorting and collecting of high quality of domestic plastic scraps.	/					- Pollution Control Department	- Local government organizations - Thai Health Promotion Foundation - Saleng and Recycle Trader Association
		6. Generate tools linking data on amount of plastic waste between local government organizations and recycling plants.		/	/			- Plastics Institute of Thailand - Pollution Control Department	- Local government organizations -Department of Industrial Works
		7. Build Recycle Hubs to bridge gaps on plastic waste transportation and expand them to regional level.				/	/	- Industrial Estate Authority of Thailand - The Federation of Thai Industries	

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		8. Develop community recycling businesses to bridge gaps on transportation and enhance recovery of plastic waste to recycling plants.	/	/	/			- Department of Local Administration - Local government organizations	- Pollution Control Department
		9. Develop technology and innovation in plastic waste management to facilitate transportation and reuse.		/	/			- Office of the Vocational Education Commission.	- Ministry of Higher Education, Science, Research and Innovation - Ministry of Education
5. Promoting establishment of recycled plastic industrial estates and businesses related to recycled plastic; and developing technology and innovation for recycling industry.	Number of recycled plastic industrial estates and businesses related to recycled plastic.	1. Study economic worthiness of investing in recycled plastic industry and businesses related to recycled plastic, and suitable area for setting up the industry/business.	/					- PPP Plastics –Department of Industrial Works -Industrial Estate Authority of Thailand	
		2. Identify pilot area for establishing recycled plastic industrial estates according to the results of study under Activity 1.		/					
		3. Expand recycled plastic industrial estates in appropriate areas at the regional level.	/	/	/				

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
		4. Develop plastic recycling technology for chemical recycling by transforming used plastics as raw materials to reduce energy consumption and air pollution emissions.			/	/	/	- Plastics Institute of Thailand - National Metal and Materials Technology Center	- PPP Plastics - Federation of Thai Industries -Department of Industrial Works
6. Launching campaign and expanding projects and drop-off points to retrieve plastics for recycling.	Plastic drop-off points for recyclables expanded throughout the country.	1. Organize public relations activities, campaigns and support to expand projects and drop-off points to retrieve plastic for recycling, such as - Won Project (private sector) - Magic Hand x Won (private sector) - "Change plastic to merit when you recycle" project (governmental sector) - Green Road Project	/	/	/	/	/	- PPP Plastics - Department of Environmental Quality Promotion	- Local government organizations
		2. Develop collaborative model between local administrative organizations and communities to collect plastics and bring them back to recycling system for value generation.	/					- Department of Local Administration	- Local government organizations

Measures	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
7. Developing recycle marketplace on digital platform for buyers and sellers.	Number of digital platforms to increase efficiency of waste sorting and collection for recycling.	1. Develop digital platforms for the public, Salang, junk shop, garbage collector, recycling business operator, and local administrative organizations.	/	/	/	/	/	- Plastics Institute of Thailand - Private sectors - Federation of Thai Industries - Saleng and Recycle Trader Association - PPP Plastics	- Thailand Institute of Packaging and Recycling Management for Sustainable Environment - Thai Health Promotion Foundation - Pollution Control Department
		2. Disseminate information on the digital platform to all relevant sectors and the publics across the country	/	/	/	/	/	- Department of Environmental Quality Promotion - Pollution Control Department - The government public relations department	- All related parties.
8. Developing production businesses/markets for upcycling plastic products.	Number of upcycled plastic products increased.	1. Promote investment and markets to develop production businesses and markets for upcycling plastic products such as clothes, bags, PPE suits and shoes.	/	/	/	/	/	- PPP Plastics - Department of Industry Promotions	
		2. Encourage government agencies to use products made from upcycled plastic, such as shirts, hats, and shoes.	/	/	/	/	/	- Department of Environmental Quality Promotion -The government public relations department	Government Agencies

Action Plan “Phase 2”: Measure 4 Management of Plastic Debris

Measure	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
1. Surveying waste collection and logistics system of local administrative organizations along canals, rivers, and seashores and waste disposal systems in 23 provinces.	Establish waste collection and logistic system covering all area of local government organizations along the banks of canals, rivers, and seashores.	1. Encourage installation of waste collection and logistic system of local administrative organizations along the canals, rivers, and coastlines in 23 provinces.	/	/				- Department of Local Administration - Local government organizations	- Office Of Natural Resources and Environmental Policy and Planning - Pollution Control Department
		2. Provide advice on waste disposal and improve MSW disposal sites of local administrative organization and private sectors to ensure proper management.		/	/	/	/	- Department of Local Administration - Pollution Control Department	- Local government organization
2. Implementing waste management measures on islands.	Plastic waste on islands reduced, sorted and recycled.	1. Promote plastic waste reduction, separation and reuse on islands.	/	/	/	/	/	- Local government organizations	- Department of Local Administration
		2. Set up systems to control, monitor and inspect waste transportation to shores for disposal.	/	/	/			- Department of Local Administration	- Pprovincial Administration
		3. Support establishment of waste disposal facilities for integrated solid waste management on islands.				/	/	- Department of Local Administration	- Local government organization - Pprovincial Administration

Measure	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
3. Setting up systems for sorting, collecting, and managing plastics and other wastes for tourist boats and tourists.	Sorting, collecting, and managing systems for plastic and other wastes in a certain number of tourist boats installed.	1. Set up a system for sorting, collecting, and managing plastic and other wastes on tourist boats and for tourists.	/					- Pollution Control Department - Marine Department	- Local government organization - Department of Tourism - Association Of Domestic Travel
		2. Establish mutual agreements for tourist boat operators and tourists on reducing, sorting, and collecting plastic and other wastes according to specified criteria.		/				- Marine Department - Department of Tourism	- Association Of Domestic Travel (ADT)
		3. Determine collection point for garbage from boat for appropriate disposal.		/				- Local government organizations	- Marine Department
4. Installation of appropriate system for prevention, collection and transportation of plastic waste.	Proper prevention, collection and transportation system for plastic waste established.	1. Set up systems to prevent, collect and transport marine plastic litter such as installing buoys at river mouths and collecting garbage in the ocean and coastal areas.	/	/				- Department of Marine and Coastal Resources - Local government organizations	- Department of Local Administration
		2. Develop agreements with local government organizations to proper manage collected plastic waste.		/					
		3. Monitor protection and collection of plastic marine debris and send to proper management.			/	/	/		

Measure	Target/Output	Activities	Timeline					Responsible Agencies	
			2023	2024	2025	2026	2027	Leading	Supporting
5. Developing collaboration to retrieve fishing gear into recycling system, and collaboration with disposal companies to utilise fishing gear in Pyrolysis or RDF.	Number of broken fishing gear retrieved into recycling system or manged properly.	1. Develop joint agreements among associations, fishery entrepreneurs and recycling manufacturers to bring fishing gear into the recycling system.	/					- Department of Fisheries	- National Fisheries Association of Thailand - Saleng and Recycle Trader Association - Pyrolysis or RDF companies
		2. Set up mutual agreement with disposal companies to utilise damaged fishing gear in pyrolysis or RDF.		/					
6. Development of data collection system and Marking Gear inspection and recall system to reduce marine debris problems.	Data collection system and Marking Gear inspection and recall system for fishing gear developed.	1. Develop data collection system and Marking Gear inspection and recall system for fishing gear.	/					- Department of Fisheries	- Fishery entrepreneurs - National Fisheries Association of Thailand - Environmental Justice Foundation : EJF
		2. Set up mutual agreements for fishery entrepreneurs to register in the system.		/					
		3. Monitor and inspect Marking Gear recalling system			/	/	/	- Department of Fisheries	- Pprovincial Administration
7. Management and controlling microplastics in water, on land and in the sea.	Monitoring report on Microplastic in water, on land, and in the ocean compiled.	1. Monitor situation of microplastics in marine and coastal ecosystems and surface water sources.	/	/	/	/	/	- Department of Marine and Coastal Resources - Pollution Control Department	
		2. Set standards for microplastics in water sources.	/	/	/			- Department of Marine and Coastal Resources	- Pollution Control Department

Chapter 6
Implementation of the Action Plan

6.1 Implementation

The following mechanisms are key guidelines for attaining successful implementation of Action Plan on Plastic Waste Management:

6.1.1 Disseminating information on key elements and contents of the Action Plan on Plastic Waste Management among all relevant sectors through national campaigns for the public, meetings, and communicating materials specific to audience groups. Also sharing the Action Plan among executives, keypersons, operational staff and relevant stakeholders at all levels are to build understanding, gain ownership and get support on implementation, and coordinate with all agencies related to implementation of the Action Plan to ensure that Action Plan on Plastic Waste Management is further practiced in the levels of organizations, planning projects, and budgets.

6.1.2 Facilitating participation of public and private sectors in the implementation

1) Encouraging plastic producers, brand owners, and retailers to participate in plastic waste management, i.e., reduction of amounts of SUPs causing negative impacts to the environment by improving the production process, design of packaging according to Eco-design approach, and development of innovation to reduce the use of plastic, e.g., using of reusable packaging for refill stations.

2) Encouraging recycling businesses to participate in improving quality of sorting and collection of domestic plastic waste to obtain high quality plastic scraps as raw materials in recycling business sector in sufficient quantities, e.g., developing Recycle Marketplace digital platform, creating business meeting spaces for buyers and sellers, promoting recycling industry center or Recycle Hub, strengthening operational capacity of junk shop, and establishing standards for recycled plastic products.

3) Building capacity of local agencies/personnel, and administration system for integrated waste collection and recyclable sorting by issuing a local ordinance on waste segregation at sources (homes, buildings and offices) according to disposal pathways. Rules, regulations, and practices for tourism business operators and maritime transportation in relevant area must be set up to prevent discarding of waste into the sea.

6.1.3 Adopting of the following tools and mechanisms:

1) Administrative mechanisms through any Committee, sub – committee, and working groups, e.g., National Environment Board, Pollution Control Committee, Sub-committee on Plastic Waste and Electronic Waste Management under the National Environment Board, Working group on Development of Mechanism for Plastics and Electronic Waste Management, Working Group on Promotion and Public Relations Campaign of Plastic Waste and Electronic Waste Management, and Working group on Plastic Waste Development and Utilization.

2) Fiscal measures

2.1) Budget allocation: Bureau Of the Budget to incorporate Action Plan in considering annual appropriate budget allocation for related agencies at the ministerial, department, and provincial levels to ensure continuity and sufficiency on implementation, and to consider pertinent funds, e.g., Environmental Fund and Energy Conservation Promotion Fund to support implementation under Action Plan's activities.

2.2) Obtaining financial supports for actions to prevent and solve plastic waste problems in the country and the ASEAN region under international cooperation projects, including cooperation with international organizations, e.g, World Bank, Asian Development Bank (ADB), German International Cooperation Agency (GIZ), by Pollution Control Department and Department of Marine and Coastal Resources which are coordinating agencies.

2.3) Incentives, e.g., tax deductions for manufacturers who comply with specified criteria and standards, and BOI privileges.

3) Social tools via using Social Media and Social Networking, e.g., Facebook, Twitter, and YouTube to disseminate information, news, exchange knowledge, and sharing forum on lesson-learned or best practices and monitoring result – based evaluation among the public, producers and entrepreneurs.

6.2 Monitoring and Evaluation

Sub – committee on Plastic and Electronic Waste Management under National Environment Board shall monitor the result – based evaluation under Action Plan Implementation. Monitoring and evaluation of measures and activities shall be conducted annually in order to revise and review the implementation according to Action Plan on Plastic Waste Management "Phase 2" (2023-2027) in accordance to the situation. The Sub – committee shall report problems, obstacles, and solutions to Pollution Control Committee and National Environment Board, and share the information to the public.

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