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The Indonesian Legal Framework to Mitigate Marine Plastic Debris

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Abstract

This study aims to analyse and identify the problem of plastic marine debris in Indonesia and in the ASEAN Frame. This research employed a normative approach involving the implementation of the ASEAN Framework, Law No. 32 of 2009 concerning Environmental Protection and management, based on the principle of sustainability. The government and the local Government's duties are to ensure that marine debris will be implemented in a good manner and based on environmentally sound management, as in line with Presidential Regulation No. 83 Year 2018 on Marine Debris Management. This study also uses qualitative methods to explain and analyze the phenomena and social dynamics of marine plastic debris. The ASEAN framework involves the encouragement of the preparation of regional action plans to combat marine plastic debris. This is important, considering that the four ASEAN countries (Indonesia, Vietnam, Thailand, and the Philippines) are the largest producers of marine plastic debris in the world, while Indonesia is involved in every stage of environmental diplomacy in ASEAN. The research results show that the measures taken by ASEAN range from the initiation stage to the implementation of the ASEAN Regional Action Plan to Combat Marine Debris in ASEAN Member States 2021 – 2025 including in Indonesia. Every state performs its own marine debris management, depending on the Area, population, mastery of technology and state budget.

Keywords: *Marine Plastic Debris, ASEAN Framework; Sustainability;*

Abstrak

Penelitian ini bertujuan untuk menganalisis dan mengidentifikasi permasalahan sampah plastik di laut di Indonesia dan dalam kerangka ASEAN. Metode penelitian yang digunakan adalah pendekatan normatif, peraturan perundang-undangan dengan mengimplementasikan Kerangka ASEAN, Undang-Undang Republik Indonesia No. 32 Tahun 2009 tentang Perlindungan dan Pengelolaan Lingkungan Hidup, berdasarkan prinsip keberlanjutan. Tugas Pemerintah dan Pemerintah Daerah adalah menjamin pengelolaan sampah laut dilaksanakan dengan baik dan berdasarkan pengelolaan yang berwawasan lingkungan, Peraturan Presiden Nomor 83 Tahun 2018 tentang Pengelolaan Sampah Laut. Penelitian ini juga menggunakan metode kualitatif untuk menjelaskan dan menganalisis fenomena, dinamika sosial sampah plastik di laut. Kerangka kerja ASEAN adalah dengan mendorong penyusunan rencana aksi regional untuk memerangi sampah plastik di laut. Hal ini penting karena keempat negara ASEAN (Indonesia, Vietnam, Thailand, Filipina) merupakan penghasil sampah plastik laut terbesar di dunia. Indonesia terlibat dalam setiap tahapan diplomasi lingkungan hidup di ASEAN. Hasil penelitian menunjukkan, Di ASEAN mulai dari tahap inisiasi hingga implementasi Rencana Aksi Regional ASEAN untuk Memerangi Sampah Laut di Negara Anggota ASEAN 2021 – 2025 termasuk di Indonesia. Dalam melaksanakan pengelolaan sampah laut tidak selalu sama di setiap Negara, terdapat empat unsur yang membedakannya tergantung pada Luas Wilayah, jumlah penduduk, penguasaan teknologi dan anggaran pendapatan Negara.

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Keywords: Sampah Plastik Laut, Kerangka Kerja ASEAN; Keberlanjutan,

A. INTRODUCTION

According to The International Union for Conservation of Nature (IUCN), over 400 million tons of plastic are produced every year for use in a wide variety of applications. At least 14 million tons of plastic end up in the ocean every year, and plastic makes up 80% of all marine debris found from surface waters to deep-sea sediments. Marine species ingest or are entangled by plastic debris, which causes severe injuries and death. Plastic pollution threatens food safety and quality, human health, and coastal tourism, and contributes to climate change.[1] There is an urgent need to explore new and existing legally binding agreements to address marine plastic pollution.[2] Based on the ASEAN Post, Indonesia is currently ranked second as the largest contributor to plastic pollution in the world, one rank below China.[3]

Based on data from the Indonesian Ministry of Environment and Forestry, Indonesia's total landfills reached 68.5 million tons in 2022, and 3.2 million tons of plastic waste will be in the sea.[4] World Economic Forum predicts that Indonesia's seas have the potential to be full of plastic waste by 2050 if significantly better management is not carried out.[5]The Indonesian Institute of Sciences showed a preliminary value of plastic debris accumulation in beaches at 113.58 ± 83.88 g/m^2 monthly or equivalent to 0.40 Mt/year by assuming plastic debris is the most pervasive within 3 meters from Indonesia's 99,093 km-long coastlines.[6] It is important to recognize that although river monitoring data informs land-based releases of plastic waste, beach debris represents a small fraction of waste that is not present in the water column and bottom sediments. Moving forward, monitoring initiatives to mitigate marine debris should utilize national city-level model estimates, such as the National Plastic Action Partnership's source to leak route framework.[7]

The Government of Indonesia established the National Coordination Team of Marine Debris Management, which is tasked to draft policies and carry out coordination, control, and evaluation related to marine plastic debris pollution. The law enforcement in marine plastic

[1] The International Union for Conservation of Nature, "Marine Plastic Pollution," Issues Brief November, 2021.
[2] Ina Tessnow-von Wysocki and Philippe Le Billon, "Plastics at Sea: Treaty Design for a Global Solution to Marine Plastic Pollution," *Environmental Science & Policy* 100 (2019): 94–104, https://doi.org/https://doi.org/10.1016/j.envsci.2019.06.005.
[3] The ASEAN Post Team, "Indonesia's Plastic Waste Problem," 6 July 2018, https://theaseanpost.com/article/indonesias-plastic-waste-problem.
[4] Kementerian Lingkungan Hidup dan Kehutanan, "Sistem Informasi Pengelolaan Sampah Nasional (SIPSN)," 2023.
[5] World Economcy Forum, "Insight Report: Global Plastic Action Partnership in Indonesia National Plastic Action Partnership (NPAP)" (Switzerland, 2020).
[6] Intan Suci Nurhati and Muhammad Reza Cordova, "Marine Plastic Debris in Indonesia: Baseline Estimates (2010-2019) and Monitoring Strategy (2021-2025)," *Marine Research in Indonesia* 45, no. 2 (2020): 97-102, https://doi.org/https://doi.org/10.1098%2Frstb.2008.0207.
[7] Peter G. Ryan, et.al., "Monitoring the Abundance of Plastic Debris in the Marine Environment," *Philos Trans R Soc Lond B Biol Sci* 364, no. 1526 (2019): 1999–2012, https://doi.org/https://doi.org/10.1098%2Frstb.2008.0207.

debris pollution is known as the legal system, which comprises the substance of the law, facilities, society and culture, and the officers enforcing the law. The effectiveness of law enforcement refers to the ideal combination of these aforementioned elements.[8]

Marine plastic debris litter is one of the major problems that undermine the Indonesian Government's vision for making the sea the future of Indonesia. Marine areas of Indonesia are endangered by the massive plastic pollution, which is causing serious marine environmental problems. Indonesia is referred to as the biggest source of plastic waste in Southeast Asia and the second biggest in the world. Indonesia's government through Presidential Decree No. 7/2017 has established a National Plan of Action (NPOA) on Marine Plastic Debris Management to strengthen the Indonesian commitment to reducing marine plastic litter. Furthermore, the Indonesian government also enacted Presidential Regulation No. 83/2018 on Handling Marine Litter.[9]

Thus, the present study argues that it is of paramount necessity to assess the impact of the legal framework regulating marine plastic litter in Indonesia to identify the lacuna in the existing legislative and policy framework for dealing with marine environmental pollution caused by marine plastic litter. The research conducted did not differentiate its implementation in big or small cities. This research will analyze the implementation to mitigate marine plastic debris mostly located in Indonesia and the ASEAN framework.

B. METHOD

This paper is based on primary and secondary materials of statutory sources, supported by a comparative approach comparing Indonesia and ASEAN framework rules.[10] Articles, research papers, books, and internet materials were also used. Law No.18 of 2008 concerning Indonesian Waste Management and the ASEAN framework is considered very important for this research.

C. RESULTS AND DISCUSSIONS

1. The Scope of Marine Plastic Debris

The seven most common types of waste are: (1) liquid or solid household waste including kitchen scraps, packaging, cleaning waste and liquids such as cooking fats, wastewater, cleaning liquids or grease, (2) hazardous waste, containing mercury, solvents, some paints, aerosol cans, pool chemicals, batteries, gasoline, fuel and others classified as hazardous waste, (3) Medical or clinical Waste including bandages, needles, single-use medical, devices, packaging, samples, PPE such as gloves, gowns and masks, (4) electrical waste, a wide range of electrical devices including computers and computer parts, printers, DVD, music players,

[8] Sutikno Zhen Jing, "Legal Issues on Indonesian Marine Plastic Debris Pollution," *Indonesia Law Review* 10, no. 1 (2019): 167–88, https://doi.org/https://doi.org/10.15294/jils.v4i2.34757.
[9] Maruf, "Indonesia Response and Recent Development of Law and Policy in Addressing Marine Plastic Litter," *Journal of Indonesian Legal Studies* 4, no. 2 (2019): 167–88, https://doi.org/https://doi.org/10.15294/jils.v4i2.34757.
[10] Tunggul Ansari and Setia Negara, "Normative Legal Research in Indonesia: Its Originis and Approaches," *Audito Comparative Law Journal (ACLJ)* 4, no. 1 (February 2, 2023): 1–9, https://doi.org/10.22219/ACLJ.V4I1.24855; Putri Nur Hidayah, "Comparative Study of Legal Protection for Migrant Workers In Participation Of Social Security Programs In Indonesia And Singapore," *Legality : Jurnal Ilmiah Hukum* 28, no. 1 (April 10, 2020): 47–59, https://doi.org/10.22219/ljih.v28i1.11786.

TVs, telephones, vacuum cleaners, (5) recyclable waste, including paper, cardboard, beverage and food containers, to ensure waste is being reused and environmental impact is minimized (Steve's rubbish removals, online). (6) Construction and demolition debris may include material such as ceiling tiles, bathroom tiles, plumbing fixtures, carpeting, insulation, timber frames, gyprock or plaster, concrete, bricks, skirting, rocks and fill dirt, (7) green waste including grass, weed clippings, tree limbs, branches, waste from vegetable produce, bread and grains, as well as paper products.[11]

The review of related literature in this research was a comparative approach, analysing the National practices with respect to standards in waste management. Based on Law No. 18 of 2008 concerning Waste Management, waste is the residue of human daily activities and/or natural processes in solid form. The waste that they produce is usually disposed of in the trash and then they take it to the Temporary Shelter—a place before waste is transported to a place for recycling, processing and/or an integrated waste processing site. From the Temporary Shelter, the waste will be collected and brought by the Environmental Service using a garbage truck to the Final Processing Site to process and return waste to environmental media in a way for humans and the environment safely.[12]

Waste that is managed includes household waste (derived from daily activities in the household, excluding faeces and specific waste), household-type waste (derived from commercial areas, industrial areas, special areas, social facilities, public facilities, and other facilities), and specific waste (waste containing hazardous and toxic materials, waste arising from disasters, demolition of buildings).[13] Some regulations of marine plastic debris involve the following:

1. Law No.18 of 2008 concerning Waste Management;
2. Government Regulation No. 81 of 2012 concerning The Management Of Domestic Waste And Domestic Waste Equivalents;
3. Government Regulation No.101 of 2014 concerning Hazardous Waste Management;
4. Government Regulation No. 27 of 2020 concerning Specific Waste Management;
5. Presidential Decree No. 97 of 2017 concerning National Policy & Strategy On Management of Household Waste And Household-Like Waste;
6. Presidential Decree No. 83 of 2018 concerning Marine Debris Management;
7. The Regulation of the Minister of Home Affairs No 33 of 2010 concerning the Guidelines of Waste Management;
8. The Regulation of the Minister of Public Works No. 3 of 2013 concerning the Implementation of Infrastructure and Facilities in Handling Household Waste and other type of Household Waste;

[11] A1 Steve's Rubbish Removal, "7 Different Types of Rubbish You Need to Dispose Of," 2019.
[12] Laura Astrid Hasianna Purba and Anna Erliyana, "Legal Framework of Waste Management in Indonesia," in *1st International Conference on Law, Governance and Islamic Society (ICOLGIS 2019)* (Atlantis Press, 2020), 104–8, https://doi.org/http://dx.doi.org/10.2991/assehr.k.200306.191.
[13] Agus Brotosusilo and Ari Naldi, "Policy on Optimization of Household Waste and Hazardous Waste Management Based on Community Empowerment at the Local Level," in *IOP Conference Series: Earth and Environmental Science*, Vol. 716, 2021, 1–5, https://iopscience.iop.org/article/10.1088/1755-1315/716/1/012085 .

9. The Regulation of the Minister of Energy and Mineral Resources No. 44 of 2015 concerning the Purchase of Electricity by PT Perusahaan Listrik Negara (Persero) from City Waste-Based Power Plants;
10. The Regulation of Minister of Environment and Forestry Regulation No.14 of 2021 concerning Waste Management in Waste Bank;
11. The Regulation of the Minister of Environment and Forestry No. 75 of 2019 concerning Roadmap to Waste Reduction by Producers;
12. The Regulation of the Minister of Health No. 18 of 2020 concerning Medical Waste Management;
13. The Regulation of the Minister of Home Affairs No. 7 of 2021 concerning Procedures for Calculating of Retribution Rates in the Implementation of Waste Handling;
14. The Regulation of the Minister of Environment and Forestry No.6 of 2022 concerning the National Waste Management Information System;
15. ASEAN Regional Action Plan for Combating Marine Debris in The ASEAN Member States (2021-2025)
16. ASEAN Framework of Action on Marine Debris 2019

Given the important role of the producers as part of waste management, it is essential to encourage manufacturers to reduce waste by achieving a target of 30 % compared to the prediction of waste generation in 2029.[14] Besides, it also requires Community-based waste management by synergizing with the waste management system at the landfills (Ministry of Environment and Forestry No.6 of 2022). A waste management model of this kind requires growing awareness and active participation of residents in managing waste in their environment. In Indonesia, there are four ministries involved in waste handling: the Ministry of Environment and Forestry, Ministry of Public Works, Ministry of Home Affairs and Ministry of Health.[15]

2. The Overview of Marine Plastic Debris in ASEAN

Marine debris is a transboundary issue which requires integrated regional cooperation. In addition to robust national actions to address marine debris strategies for strong collaboration are particularly crucial for the ASEAN region. Without immediate action, marine debris pollution may negatively impact marine biodiversity, environment, health, society and economy. ASEAN Member States recognize the urgent need to take action and have made notable progress in combating marine debris. The ASEAN Framework of Action on Marine Debris was developed to act on the recommendations from the ASEAN Conference on Reducing Marine Debris in the ASEAN Region in Phuket in November 2017, taking into account the East Asia Summit (EAS) Conference on Combating Marine Plastic Debris in Bali in September 2017. The Framework of Action on Marine Debris was welcomed by the Ministers and representatives responsible for natural resources, environment and marine affairs

[14] Aulia Ulfah Farahdiba, et.al., "The Present and Proposed Sustainable Food Waste Treatment Technology in Indonesia: A Review," *Environmental Technology & Innovation* 32 (2023): 103256, https://doi.org/https://doi.org/10.1016/j.eti.2023.103256.
[15] Ilham Dwi Rafiqi, "Legal Ideals Pancasila in the Development of a National Environmental Legal System," *Audito Comparative Law Journal (ACLJ)* 4, no. 3 (2023): 134–46, https://doi.org/https://doi.org/10.22219/aclj.v4i3.28017.

from all ASEAN Member States at the Special ASEAN Ministerial Meeting on Marine Debris on 5 March 2019 in Bangkok, Thailand. The Framework comprises four (4) priority areas namely: (i) Policy Support and Planning; (ii) Research, Innovation, and Capacity Building; (iii) Public Awareness, Education, and Outreach; and (iv) Private Sector Engagement. Each priority area consists of actions and suggested activities for further collaboration in the ASEAN region and among ASEAN and its partners in combating marine debris.[16]

Various Rules are notified to govern areas like waste prevention, minimization, reuse and recycling of municipal solid waste, industrial, agricultural and hazardous waste. The kind of waste are; (1) Hazardous Waste with physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive nature, causing danger or is likely to cause danger to health or environment; (2) Bio-Medical Waste resulting from the diagnosis, treatment or immunisation of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps' (3) Solid Waste includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities; (4) Plastic Waste includes discarded plastics after use or after their intended use is over; (5) Extended Producer's Responsibility means the responsibility of a producer for the environmentally sound management of the product until the end of its life; (6) E-Waste includes electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes; (7) Construction and Demolition Waste comprises of building materials, debris and rubble resulting from construction, re-modelling, repair and demolition of any civil structure. (8) Battery waste includes lead acid battery which is a source of electrical energy and contains lead metal.

Figure 1: ASEAN Framework of Action on Marine Plastic Debris

Framework / Actions	Suggested Activities*
Framework I: Policy Support and Planning	
A. Promoting regional policy dialogue on prevention and reduction of marine debris from land- and sea-based activities by highlighting the issue, sharing information and knowledge, and strengthening regional coordination.	1. Organizing regular regional policy dialogue/discussion on combating marine debris issues.
B. Mainstreaming multi-sectoral policy measures to address marine debris in national and	1. Developing and implementing long-term and robust strategies to combat marine debris, including having comprehensive waste

[16] Arfin Sudirman, et.al., "The Impact of Weak Marine Debris Governance on the Increased Environmental Insecurity in Southeast Asia," *Politika: Jurnal Ilmu Politik* 14, no. 1 (2023): 141–59, https://doi.org/https://doi.org/10.14710/politika.14.1.2023.141-159.

ASEAN's development agenda and priorities.	management systems to prevent pollution and circular economy approaches. 2. Developing and implementing extended producer responsibility (EPR) policies and schemes including design for environment, deposit refund, and take-back for reusing and recycling. 3. Encouraging national authorities in collaboration with businesses to develop and promote product sustainability and circularity criteria to stimulate the market for sustainable products and secondary raw materials while concurrently addressing the unsustainable use and disposal of single-use plastic products. 4. Developing/strengthening upstream policies for land-based leakage (including single-use plastics), and sea-based leakage (e.g. ghost nets, and waste from fishing vessels, maritime transport and marine tourism). 5. Welcoming inter-sectoral initiatives and collaboration to effectively address marine debris through various relevant ASEAN-led mechanisms. 6. Encouraging national and local governments to incorporate marine debris issues in their priorities
C. Encouraging ASEAN Member States to implement relevant international laws and agreements related to waste management- such as MARPOL Annex V ship-generated waste, Basel Convention, and UN Environment Assembly resolutions 3/7 on Marine Litter and Microplastics.	1. Incorporating international laws and agreements related to waste management into regional platforms. 2. Providing support for enabling conditions for the implementation of international laws and agreements. 3. Conducting regular dialogue through webinars; and/or through the Basel Convention Regional Centre for South-East Asia (BCRC-SEA).
D. Developing a regional action plan on combating marine debris in the ASEAN Region by applying integrated land-to-sea policy approaches.	1. Establishing a task force on the development of the ASEAN regional action plan on combating marine debris as a means to: 1.1. exchanging information on existing national policy instruments to combat marine debris. 1.2. developing elements for a regional action plan. 1.3. compiling the regional action plan in accordance with the national and regional context. 2. Reviewing and analyzing best practices of Regional Seas Programs to combat marine debris. 3. Conducting feasibility study/consultative meeting on the development of an ASEAN agreement on the management of marine debris pollution. 4. Conducting feasibility study/consultative meeting on the establishment of an ASEAN Centre on Combating Marine Debris. 5. Contributing to EAS efforts to develop the regional plan of action on combating marine plastic debris.
Framework II: Research, Innovation and Capacity Building	

A. Compiling regional baseline on the status and impacts of marine debris in the ASEAN Region	1. Reviewing and analyzing information and data on the status and impacts of marine debris in the ASEAN region, and developing a regional baseline report. 2. Assessing information and data gaps, and identifying possible approaches to bridge the gaps
B. Strengthening regional, national and local capacities to develop and implement national action plans/initiatives.	1. Exploring standardization of methods for the measurement and monitoring of marine debris based on existing/established protocols. 2. Conducting capacity assessment on addressing marine debris issues where appropriate and when requested to assess the existing capacity need of the ASEAN Member States to address marine debris issues. 3. Providing training on combating marine debris among ASEAN Member States as well as with support from external parties including monitoring and management of marine debris
C. Enhancing scientific knowledge, transferring marine technology and promoting innovative solutions to combat marine debris.	1. Supporting research and sharing of scientific knowledge, technology and innovation development among ASEAN Member States, by engaging research institutions, public and private sectors, international partners, and other relevant stakeholders. 2. Promoting cooperation and partnership across research institutions to collect and exchange data and information and developing collaboration on combating marine debris through national and international events/meetings, and exchanged visits. 3. Promoting efforts to identify and replicate innovative solutions implemented by cities for combating marine debris. 4. Enhancing research/study on marine debris, including plastics and microplastics. 5. Exploring the possible development of a network for sharing marine debris data and information. 6. Promoting efforts on research and development cooperation on the development of environmentally-friendly alternatives in combating marine debris.
D. Promoting integration and application of scientific knowledge to enhance science-based decisions and policies on marine debris prevention and management.	Promoting science-policy interface to enhance interaction between scientists and policy makers, and accessibility to scientific information. 2. Disseminating scientific knowledge through various communication channels such as peer-reviewed publications, conferences/ meetings and mass media. 3. Encouraging participation of scientists in the policy-making process, when appropriate, to provide evidence-based inputs to the policy. 4. Encouraging scientists to incorporate multiple points of view, especially from policymakers, into study design, delivery and communication
Framework III: Public Awareness, Education and Outreach	
Promoting public awareness of the status and impacts of marine debris and microplastics	Developing communication materials on the status and impacts of marine debris by incorporating science-based information. 2. Disseminating the information/materials to the general public via

	advanced communication platforms, mass media and public events.
Accelerating advocacy strategy/ program to promote behaviour change to combat marine debris, and to incorporate marine debris issues into ASEAN's Culture of Prevention Initiative.	Developing a communication plan to promote public awareness and behaviour change 2. Adapting and applying best practices and campaigns which successfully change behaviour. 3. Sharing alternative solutions and practices to prevent and reduce land- and sea-based debris. 4. Integrating scientific findings on the status and impacts of marine debris in advocacy strategy/ program. 5. Engaging multi-stakeholders including youth, public and private sectors, and government agencies in advocacy programs and outreach activities on combating marine debris
. Promoting platforms for knowledge sharing, innovative solutions and best practices to combat marine debris.	Organizing expert exchange platforms and/or study-trip programs. 2. Establishing an ASEAN information platform to exchange information and share innovative solutions and best practices.
Framework IV: Private Sector Engagement	
Promoting collaborative actions with private sector and industry associations to implement measures to address marine debris issues.	. Supporting private sectors to implement measures to address marine debris issues.
Encouraging private sector investment in and contribution to combat marine debris.	. Engaging private sectors in campaigns such as programs and campaigns on circular economy, product life-cycle management, sustainable consumption and production and "3R" approaches. 2. Mainstreaming private sector support to develop research and innovation such as through project funding, and prioritising CSR activities on combating marine debris. 3. Promoting private sector investment in redesigning products/packaging and alternative materials. 4. Engaging value chain stakeholders to establish enabling mechanisms /infrastructure to increase waste recovery and recycling rates

Source: The description processed from the ASEAN Framework for Action on Marine Debris

3. Comparison of Marine Plastic Debris Management between Indonesia and ASEAN

The Indonesian government then enacted the National Action Plan for Combating Marine Litter 2018-2025, which was regulated under Presidential Regulation No. 83/2018. The target is to reduce marine litter by 70% in 2025 by implementing five strategies including (1) a National movement to increase stakeholder awareness; (2) Land-based waste management; (3) Waste management on the coast and sea; (4) Funding mechanisms, institutional strengthening, supervision, and law enforcement; and (5) Research and development.[17]

These strategies are then broken down into more actionable national programs, such as improving behavioural changes through formal and informal education, improving the capacity

[17] Nuzulia Fajriningrum, "Regulatory Initiatives to Restrain Marine Plastic Pollution," CarbonEthics, June 30, 2021, https://www.carbonethics.co/post/regulatory-initiatives-to-restrain-marine-plastic-pollution.

of waste management through financial schemes, promoting waste-to-energy projects, and implementing strict monitoring, surveillance, and law enforcement on ocean littering.

Indonesia's movements in restraining their marine plastic litter also started to gain tremendous support from many leaders through various international fora. One of the vital initiatives was the G20 Action Plan on Marine Litter, which was established at the Hamburg Summit in July 2017. This framework was then followed up by the G20 Implementation Framework for Actions on Marine Plastic Litter in June 2019 and later endorsed by leaders from 19 countries, including Indonesia, at the Osaka Summit through "Osaka Blue Ocean Vision" which aimed at reducing marine plastic litter to zero by 2050. Under the initiative, the Japan Ministry of Environment created a portal site and a report that was meant to facilitate the implementation of the action plan from each country while promoting collaborative actions and outreach outside the G20 Summit (JMOE, 2019). Indonesia has recently released its Extended Producer Responsibility (EPR) implementation roadmap. The Ministry of National Development Planning is developing a national circular economy roadmap, with a focus on plastic packaging.

Of all the countries in the ASEAN region, Singapore has the best marine waste management. Singapore is one of the few countries that has achieved a high level of efficiency in waste management.[18] Singapore has found a solution or innovation to its waste problem as its neighbours in Southeast Asia continue to struggle with piles of rubbish in the ocean. One of the innovations is the method applied, namely the controlled process of burning non-organic waste to produce electrical energy. This system is known as the "Waste to Energy" (WTE) system or what we usually know as "Energy from Waste" (EFW).[19] Meanwhile, in managing organic waste, it can be used as compost and fertilizer which can be useful for the fertility of the country's soil and can be imported to neighbouring countries in order to improve the country's economy.

Institutionally, the WTE process is carried out by waste processing factories which are also called waste-to-energy plants. The factory will definitely produce exhaust gas which will certainly cause new problems that are dangerous for the environment and the health of the surrounding community. However, they can overcome the burning of smoke by implementing sophisticated smoke filtering technology coupled with strict monitoring. The government closely monitors factory operations to ensure compliance with established environmental standards.[20]

Not only that, Singapore even has its own island formed from piles of rubbish, known as the Semakau Landfill. The landfill was designed, built and managed by Singapore's National Environment Agency (NEA). To prevent pollution in the sea, they have anticipated leaks of dangerous substances that could damage the water. To prevent infiltration of leachate water into

[18] See the World Bank in the report "What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. The United Nations Environment Program (UNEP) has also recognized Singapore as a country that has a holistic approach to waste processing, and the Institute of Scrap Recycling Industries (ISRI) has awarded Singapore as a country that is successful in waste management in the world.

[19] Helena Varkkey, "The Singapor The Singapore Transboundar Ansboundary Haze Pollution Bill in the Context of Ollution Bill in the Context of ASEAN Regionalism and Cooperation," *Indonesian Journal of International Law* 15, no. 4 (2018): 553–79, https://doi.org/http://dx.doi.org/10.17304/ijil.vol15.4.739.

[20] The National Environment Agency, "Waste-To-Energy Incineration Plants," 2023.

the surrounding sea waters, the base of the embankment and the bottom of the landfill are coated with an impermeable membrane and a layer of clay, so that environmental pollution can be prevented. Next, the leachate originating from the landfill is pumped and stored in the liquid waste processing unit located within the landfill area itself.[21]

Singapore's success in waste management cannot be separated from holistic policies in dealing with pollution and waste. In efforts to mitigate waste in the Sea, Singapore has several policies such as the Prevention of Pollution of the Sea Act (PPSA). This law aims to prevent marine pollution, both from land and from ships. The law also gives the Maritime & Port Authority of Singapore (MPA) the authority to take preventive action to prevent pollution, including refusing entry to or detaining vessels.[22]

To achieve management standards similar to Singapore, Indonesia needs to pay attention and take the right steps. Starting from tightening policies regarding preventing marine waste pollution, taking firm action against illegal waste dumping, to implementing an effective tax and fine system for business actors who do not comply with the marine waste management system. In terms of policy, Indonesia has many regulations aimed at overcoming the problem of marine debris. Indonesia has also initiated many international agreements regarding the prevention of marine debris. Currently, there is a National Coordination Team for Handling Marine Waste. The problem experienced is that the ocean area in Indonesia is quite extensive. Indonesia's geographical condition as an archipelagic country is a particular obstacle.[23]

When compared with Singapore, innovations such as creating a special island for landfills are less relevant due to remarkably different geographical conditions. Innovations that can be imitated include the WTE system at Integrated Waste Disposal Sites (TPST) in each region in Indonesia. This innovation has been accommodated in Presidential Regulation No. 83/2018; however, of the 12 selected cities, only 2 cities have waste energy power plants, namely the cities of Surabaya and Solo.[24]

Waste reduction is the main and most efficient solution to implement. If we refer to the Waste Management hierarchy according to Vergara and Tchobanoglous, which consists of reduction (stage 1), reuse (stage 2), recycling (stage 3), recovery (stage 4), and disposal (stage 5), the main thing that can be done in managing marine waste is reduction.[25] Waste reduction can be done from sources of waste-producing activities, such as households and non-households. This is the "golden standard" in waste management. Meanwhile, WTE is the 4th stage in the waste management hierarchy, namely the recovery stage. At this stage, what is usually defined as an activity of extracting material from waste to be used as another form of

[21] Hsien H. Khoo, Lester L.Z. Tan, Reginald B.H. Tan, "Projecting the Environmental Profile of Singapore's Landfill Activities: Comparisons of Present and Future Scenarios Based on LCA," *Waste Management* 32, no. 5 (2012): 890–900, https://doi.org/https://doi.org/10.1016/j.wasman.2011.12.010.
[22] Charles Lim Aeng Cheng, "Environmental Protection of the Seas In Singapore," *Singapore Journal of Legal Studies*, 1994, 52–90.
[23] Indah Dwi Qurbani and Ilham Dwi Rafiqi, "Prospective Green Constitution in New and Renewable Energy Regulation," *Legality : Jurnal Ilmiah Hukum* 30, no. 1 (2022): 68–87, https://doi.org/https://doi.org/10.22219/ljih.v30i1.18289.
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alternative energy source should be carried out. Therefore, the Indonesian government in mitigating marine waste should be more oriented towards reducing waste.

D. CONCLUSION

Marine debris is defined as any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned in the marine environment. Marine debris is inevitable and no seas in the world are absolutely free from marine debris. Indonesia is a country with the 4th largest population in the world, consisting of 264 million people. The population affects the amount of waste produced. From lessons learned from the ASEAN Role, Indonesia can apply two actions to mitigate marine plastic debris. Marine plastic debris management may be different among States, depending on the following four elements: area, population, mastery of technology and state budget. In efforts to mitigate marine litter, the main step that the Indonesian government can take is to reduce marine litter because reduction is the initial and efficient stage in the waste management hierarchy, while waste reduction is the gold standard.

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