MALAYSIA PLASTIC FACTS
More Production, More Pollution

November 2024

PULAU PINANG

IPEN
for a toxics-free future

National Report

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More Production, More Pollution

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Acknowledgements

We take this opportunity to thank all those who were instrumental in compiling and shaping this report. This study was undertaken as part of an IPEN project to compile country facts and data on plastics.

The Consumers' Association of Penang (CAP), based in Malaysia, was founded in 1970. Its primary aim is to ensure a sustainable model of development that meets the basic needs of the poor and is also socially just and sustainable. In the field of environmental protection, CAP is a fearless advocate of the people's right to a healthy and sustainable environment, challenging the unsustainable model of production and wasteful consumption patterns. Through the years, CAP's work has led to the exposing of unethical business behaviour, hazards in products and food, pharmaceuticals, etc. CAP's advocacy has led to improvements in the laws to regulate these practices.

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CONTENTS

STOP TOXIC POISON PLASTICS

“More Plastic Production Means More Plastic Pollution”

1.0 BACKGROUND

The global production of primary plastic forecasted to triple to 1,100 million tonnes by 2050 represents a serious crisis. The industry’s narrative of circularity, recycling, and sustainable plastic is misleading. While these concepts sound promising, they do not align with the reality that most plastic waste is not effectively recycled and continues to pollute the environment.

More plastic production also means a greater output of toxic chemicals, posing significant risks to public health and the environment. It is difficult to counter the narrative that “more production means more pollution” because it is fundamentally true. Claims that plastic production can somehow be sustainable are unrealistic, as increased plastic production will always result in more waste and toxins.

Discussions around the Global Plastic Treaty are stalled when addressing plastic production. This critical issue requires more attention and far greater political will. Without firm action to limit plastic production, the Treaty is unlikely to achieve its objectives, and the global plastic crisis will continue to escalate.

1.1 Stages in plastics production

Figure 1 outlines the greenhouse gas (GHG) emissions across different stages of primary plastic production as of 2019. It breaks down the process into six stages, each contributing a specific percentage of emissions. These emissions contribute to the greenhouse effect, worsening climate change and harming human health. Under a business-as-usual scenario, the plastics lifecycle could be responsible for as much as 19% of global greenhouse emissions by 2040.[1]

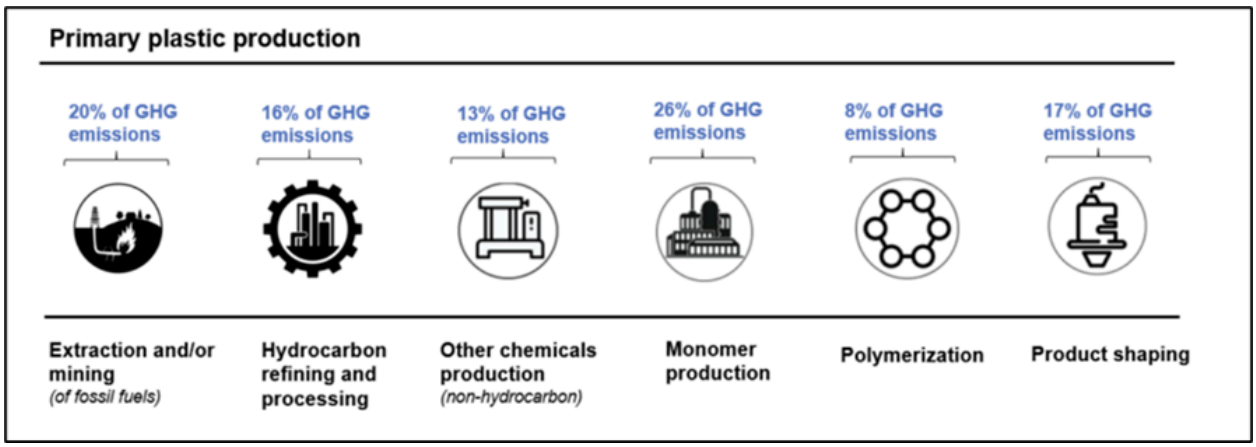

Figure 1. Greenhouse Gas Emissions Shares of Plastic Production Stages in 2019 (Source: Climate Impact of Primary Plastic Production, 2024.)[2]

[1] https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution
[2] Nihan Karali, Nina Khanna, Nihar Shah. 2024. Climate Impact of Primary Plastic Production. https://eta-publications.lbl.gov/sites/default/files/climate_and_plastic_report_final.pdf

COUNTRY REPORT: MALAYSIA

2.0 FOSSIL FUEL EXTRACTION

The plastic industry is heavily tied to fossil fuel extraction. Malaysia, with its abundant fossil fuel reserves, plays a significant role in the global plastics and petrochemical industry.

Currently, Malaysia produces 660,000 barrels of liquids and approximately 7.0 billion cubic feet of gas per day. Malaysia's remaining commercial reserves are estimated at over 17 billion barrels of oil equivalent from more than 400 fields, with gas making up three-fourths of the mix.[3] Figure 2 shows locations of oil and gas extraction areas in Malaysia, whereby most of Malaysia's oil comes from offshore fields in East Malaysia, Sabah, and Sarawak.

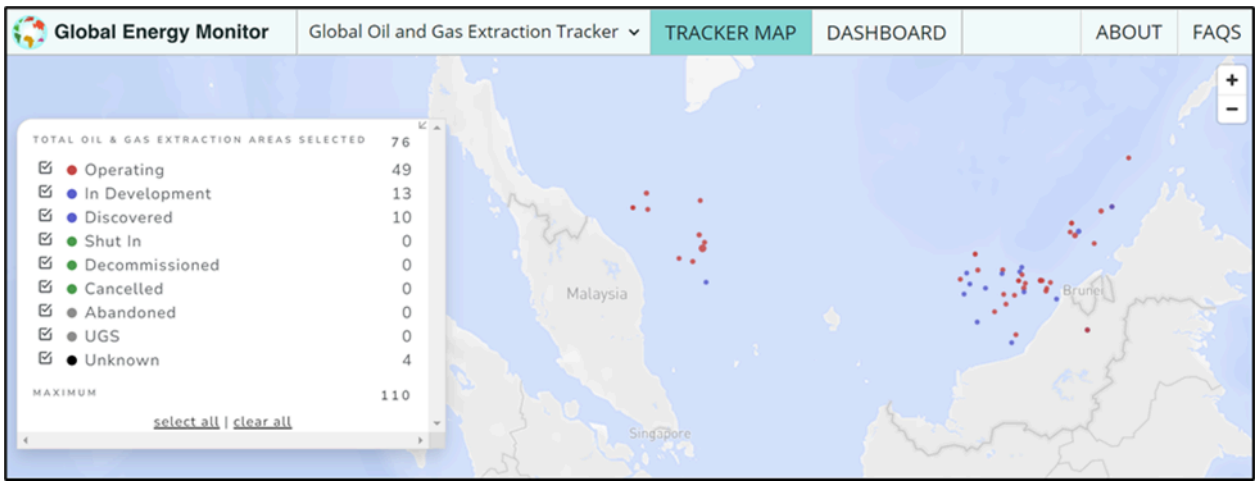

Figure 2. Locations of Oil & Gas Extraction Areas in Malaysia
(Source: Global Energy Monitor)[4]

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[3] Overview of Production in Malaysia. https://www.petronas.com/mpm/malaysia-e-p/production accessed on 26 October 2024
[4] https://globalenergymonitor.org/projects/global-oil-gas-extraction-tracker/tracker-map/

Petroliam Nasional Berhad, commonly known as PETRONAS, is a Malaysian multinational oil and gas company, owned by the Federal Government. The Global Energy Monitor report of 2024 indicates the volume of oil and gas reserves sanctioned in 2022 and 2023 for PETRONAS as 584 million barrels of oil equivalent. In 2022, PETRONAS's operational emissions of greenhouse gas (GHG) in Malaysia were 46.11 million tCO2e, increasing from 44.12 million tCO2e in 2021.[5]

GHG emissions from Malaysia operations had decreased in 2023 to 49.5 million tCO2e. Besides GHG emissions that contribute to global warming and air pollution, the fossil fuel industry also contributes to hazardous waste generation. The total hazardous waste generated in Malaysia by PETRONAS's operations in 2023 was 66,444 tonnes with 52,147 tonnes being reused, recycled or recovered, and 20,023 tonnes sent for final disposal.[6]

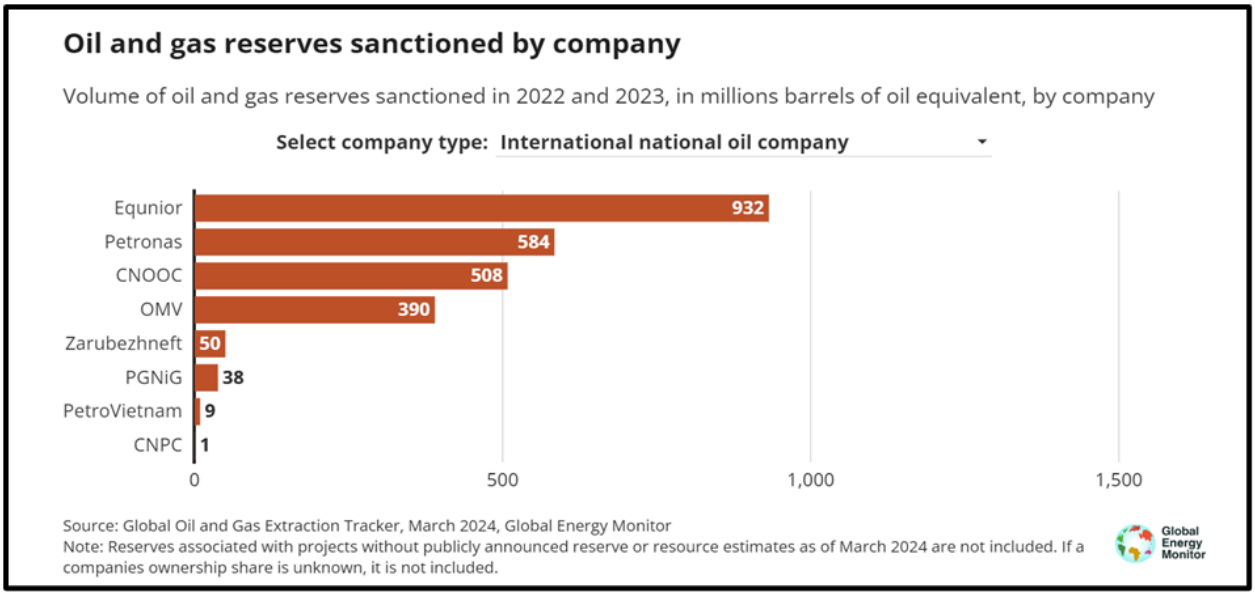

Figure 3. Volume of Oil and Gas Reserves Sanctioned in 2022 and 2023, in Million Barrels of Oil Equivalent, By Company (Source: Global Energy Monitor)[7]

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[5] PETRONAS Integrated Report 2022. https://www.petronas.com/integrated-report-2022/assets/pdf/appendix/PETRONAS-Integrated-Report-2022-pages-161-173.pdf accessed on 26 October 2024.
[6] PETRONAS Integrated Report 2023.https://www.petronas.com/integrated-report-2023/assets/pdf/PETRONAS-Integrated-Report-2023.pdf#page=117 accessed on 26 October 2024.
[7] https://globalenergymonitor.org/projects/global-oil-gas-extraction-tracker/dashboard/

Transforming fossil fuel into plastic resins and additives releases carcinogenic and other highly toxic substances into the air. Documented effects of exposure to these substances include impairment of the nervous system, reproductive and developmental problems, cancer, leukemia, and genetic impacts like low birth weight. Industry workers and communities neighbouring refining facilities are at greatest risk and face both chronic exposures and acute exposures due to uncontrolled releases during emergencies.[8]

According to the British Plastic Federation (2023), approximately 6% of the total world's oil consumption is used in the production of plastics, highlighting the direct connection between plastic manufacturing and fossil fuel extraction.[9]

In 2023, Malaysia's oil consumption was estimated at 929.56 thousand barrels per day (bbl/d).[10] There is not much information about the annual oil consumption for plastic production in Malaysia. Hence, to calculate the estimated daily oil consumption for plastic production, we can apply 6% of the daily oil consumption in Malaysia. Therefore, approximately 55.77 thousand barrels per day of oil in Malaysia are estimated to be used for plastic production in 2023. The estimated annual oil consumption for plastic production in Malaysia is derived from multiplying the number of days in a year, resulting in approximately 20,357.36 thousand barrels in 2023.

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[8] Plastic & Health: The Hidden Costs of a Plastic Planet. 2019. www.ciel.org/plasticandhealth
[9] Source: British Plastic Federation. (2023). Oil Consumption. https://www.bpf.co.uk/press/Oil_Consumption.aspx#:~:text=Most%20plastics%20are%20made%20from,in%20plastics%20production%20(1).
[10] Malaysia Oil Consumption Yearly Trends: The Energy Institute Statistical Review of World Energy. (2023). YCharts. https://ycharts.com/indicators/malaysia_oil_consumption

3.0 PLASTIC PRODUCTION

The plastics value chain in Malaysia, comprising petrochemical producers, converters, recyclers, and materials/machinery suppliers, employs 175,000 people (not including petrochemicals). These workers are spread across 800 companies. In 2023, plastic resin production was valued at RM22.3 billion, and the manufacturing of plastic products reached RM61.5 billion, with plastic waste recycling contributing RM5.5 billion.[11]

The Malaysia plastics market size is estimated at USD3.89 billion in 2024 and is expected to reach USD4.71 billion by 2029, growing at a Compound Annual Growth Rate (CAGR) of 3.91% during the forecast period (2024-2029). This expansion comes at a cost to the environment, as plastics are a significant source of pollution, both in their production processes and post-consumption.

Established producers of plastic resins in Malaysia include Lotte Chemical Titan, PETRONAS Chemicals Group (PCG), Kaneka, Petrochemicals Malaysia (Idemitsu), Toray and Recron Malaysia (Reliance group). These companies focus largely on commodity plastics such as PP, PE, PS and PET as well as certain niche products within engineering plastics such as ABS and high-performance plastics such as PPS.[12]

In 2022, exports of plastic products from Malaysia rose to RM17.3 billion, an 8.8% increase from 2021's RM15.9 billion. In the coming years, the industry envisions investment prospects in high-end plastic products, engineering plastics and plastic recycling bolstered by advanced waste management infrastructure.[13]

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[11] Plastics Neutrality Masterplan 2024 - 2030. https://mpma.org.my/upload/2024/Plastics_Neutrality_Masterplan_1.pdf
[12] MPA (2023). Malaysia Petrochemical Country Report 2022. (APIC 2023). https://www.mpa.org.my/images/APIC2020/MPA_APIC_2023_Country_Report_FINAL.pdf
[13] Chemicals Advance Materials - Plastic Products. (2023, December 19). | Malaysian Investment Development Authority (MIDA). https://www.mida.gov.my/industries/manufacturing/chemical-advanced-materials/chemicals-advance-materials-plastic-products/

Olefins are used for manufacturing plastics, resins and polymers. Ethylene and propylene are the most commonly used raw materials in plastics and chemical industries. Xylene is a chemical precursor to terephthalic acid and dimethyl terephthalate, which are monomers used to create polymers for plastics. Xylene is used for the production of polyethylene terephthalate (PET). Butadiene is used to create tough thermoplastics like acrylonitrile butadiene styrene (ABS) plastic. Benzene is used as a raw material to make chemicals that are used in the production of plastics, such as polystyrene, ABS, and nylon.

Figure 4 shows the olefins and aromatics market in Malaysia from 2022 to 2024 and includes forecast for 2027 and 2031.

Malaysia Olefins And Aromatics Market, By Product, 2022-2031 (Kilo Tons)

Product	2022	2023	2024	2027	2031	CAGR (2024-2031)
Ethylene	3,211.95	3,300.13	3,403.40	3,757.99	4,356.07	3.59%
Propylene	2,460.63	2,537.12	2,625.81	2,930.90	3,447.91	3.97%
Xylene	812.08	830.56	852.66	928.86	1,057.85	3.13%
Benzene	653.40	666.46	682.34	737.29	830.60	2.85%
Toluene	397.18	408.30	421.31	466.06	541.74	3.66%
Butadiene	328.02	234.87	242.84	270.24	316.65	3.86%
Total	**7,763.26**	**7,977.44**	**8,228.35**	**9,091.34**	**10,550.82**	**3.62%**

Figure 4. Malaysia Olefins and Aromatics Market, By Product, 2022-2032 (Kilo Tons) (Adapted from Global Olefins and Aromatics Market - Industry Trends and Forecast to 2031)

Packaging makes up 45 percent of the plastic market in Malaysia, with 28% used for applications in the electrical and electronics industry. Figure 5 indicates the major market segment of plastic products in Malaysia in 2023 based on statistics by the Malaysian Plastic Manufacturers Association (MPMA).

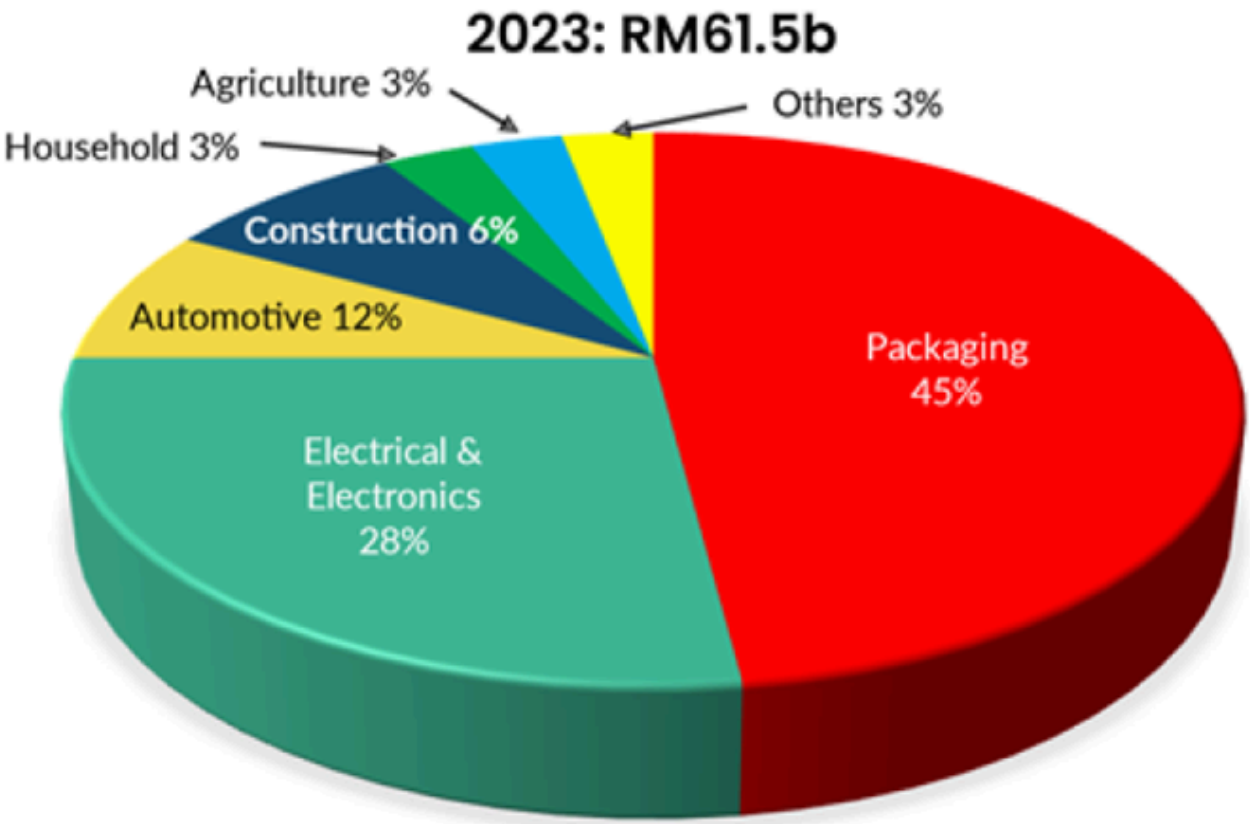
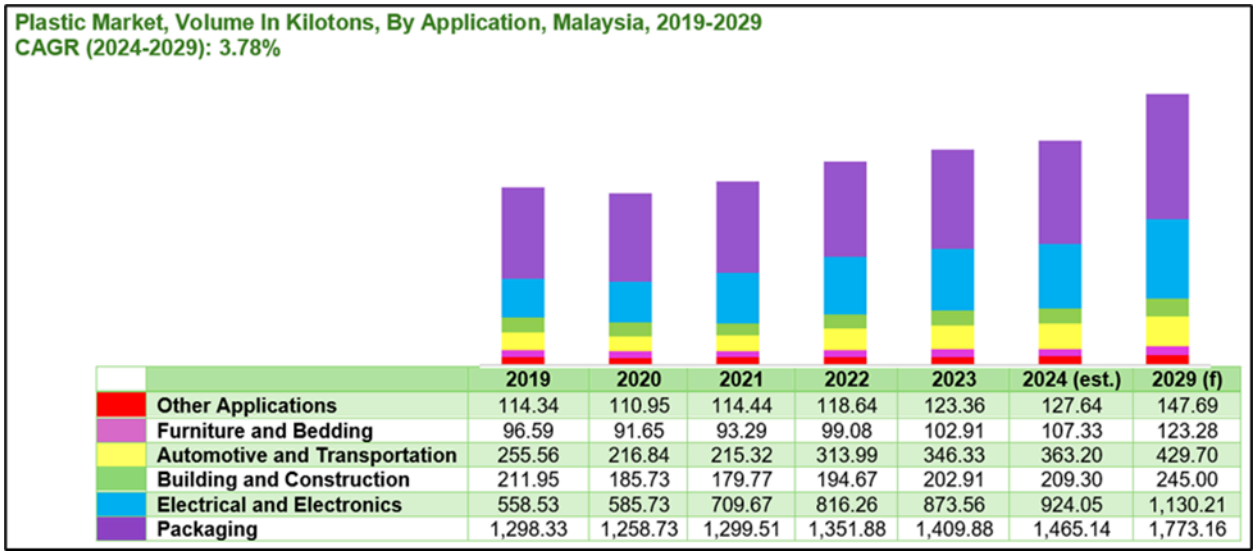


Figure 5. Major Market Segment of Plastic Products in Malaysia in 2023 (Source: Plastics Neutrality Masterplan 2024 - 2030, pg6)

Figure 6 highlights a troubling trend in the projected growth of plastic usage in Malaysia from 2019 to 2029, measured in kilotons and segmented by application. The Compound Annual Growth Rate (CAGR) of 3.78% from 2024 to 2029 indicates a persistent rise in plastic consumption across multiple sectors, underscoring the urgent need to address plastic pollution. Packaging consistently holds the largest share of the plastic market, followed by electrical and electronics, automotive and transportation, building and construction, other applications, and furniture and bedding respectively.

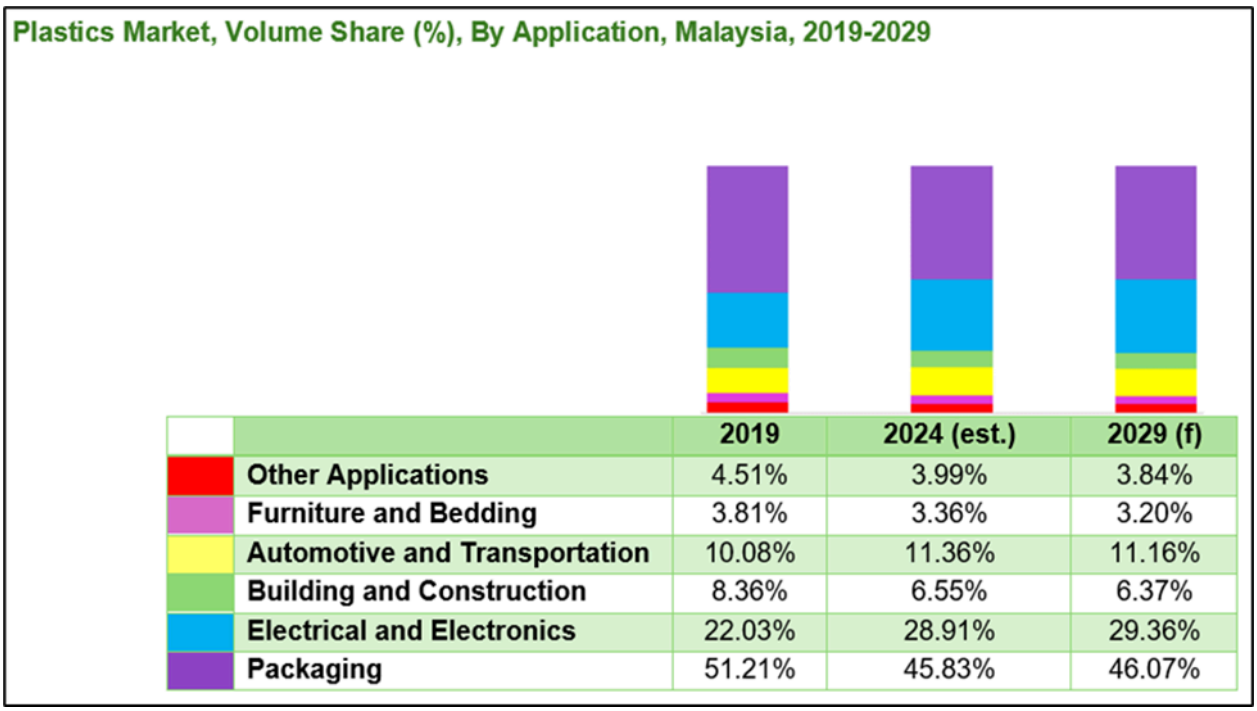


	2019	2020	2021	2022	2023	2024 (est.)	2029 (f)
Other Applications	114.34	110.95	114.44	118.64	123.36	127.64	147.69
Furniture and Bedding	96.59	91.65	93.29	99.08	102.91	107.33	123.28
Automotive and Transportation	255.56	216.84	215.32	313.99	346.33	363.20	429.70
Building and Construction	211.95	185.73	179.77	194.67	202.91	209.30	245.00
Electrical and Electronics	558.53	585.73	709.67	816.26	873.56	924.05	1,130.21
Packaging	1,298.33	1,258.73	1,299.51	1,351.88	1,409.88	1,465.14	1,773.16

Figure 6. Plastic Market Volume in Kilotons, By Application, Malaysia, 2019-2029 (Adapted from Mordor Intelligence, 2023. Indonesia, Malaysia, And Thailand Plastic Market, pg39)

Figure 7 highlights the alarming projected growth in plastic usage across various sectors in Malaysia from 2019 to 2029 measured as a percentage. Packaging holds the largest share of plastic consumption, accounting for over half of the market in 2019 and only slightly decreasing by 2029. This trend indicates a persistent reliance on single-use and disposable plastics, which contribute heavily to pollution and environmental degradation.

The electrical and electronics sector is expected to grow from 22.03% to 29.36%, pointing to an increase in toxic and hazardous plastic waste that will likely end up in landfills and ecosystems. Automotive and transportation also show a slight increase. Sectors like building and construction, furniture and bedding, and other applications maintain smaller shares but collectively add to the plastic pollution crisis.



	2019	2024 (est.)	2029 (f)
Other Applications	4.51%	3.99%	3.84%
Furniture and Bedding	3.81%	3.36%	3.20%
Automotive and Transportation	10.08%	11.36%	11.16%
Building and Construction	8.36%	6.55%	6.37%
Electrical and Electronics	22.03%	28.91%	29.36%
Packaging	51.21%	45.83%	46.07%

Figure 7. Plastic Market, Volume Share (%), By Application, Malaysia, 2019-2029
(Adapted from Mordor Intelligence, 2023. Indonesia, Malaysia, And Thailand Plastic Market, pg39)

In general plastic production in Malaysia covers the following:

- Traditional Plastics: These include common plastics like Polyethylene (PE), Polypropylene (PP), and Polyvinyl Chloride (PVC). They are widely used in packaging, household items, and construction materials.
- Engineering Plastics: These are more advanced plastics such as Polycarbonate (PC), Acrylonitrile Butadiene Styrene (ABS), and Polyamide (PA). They are used in automotive parts, electronic components, and industrial machinery.
- Bioplastics: These are made from renewable biomass sources like corn starch, sugarcane, and vegetable fats and oils. Bioplastics are used in packaging, disposable items, and agricultural products.
- Specialty Plastics: These include plastics with unique properties or applications, such as fluoropolymers, thermoplastic elastomers, and high-performance plastics used in aerospace, medical devices, and advanced engineering applications.

Group and industry description	Number of persons engaged	Indication	Value of gross output	Value of intermediate input	Salaries & wages
Manufacture of plastic products	156,098	(RM '000)	70,600,963	52,598,169	5,456,043
		(USD '000)	16,278,400	12,125,382	1,257,670
Manufacture of semi-manufactures of plastic	17,306	(RM '000)	11,845,626	9,382,953	665,617
		(USD '000)	2,730,777	2,162,974	153,431
Manufacture of finished plastic products	9,655	(RM '000)	4,903,038	3,640,121	361,819
		(USD '000)	1,130,299	839,127	83,403
Manufacture of plastic articles for the packing of goods	49,195	(RM '000)	22,531,222	16,522,066	1,855,237
		(USD '000)	5,194,091	3,808,694	427,650
Manufacture of builders' plastics ware	3,496	(RM '000)	1,326,031	784,993	109,504
		(USD '000)	305,688	180,958	25,242
Manufacture of plastic tableware, kitchenware and	15,526	(RM '000)	7,770,783	6,142,487	518,074
		(USD '000)	1,791,388	1,415,976	119,413
Manufacture of diverse plastic products n.e.c	60,920	(RM '000)	22,224,263	16,125,550	1,945,792
		(USD '000)	5,123,328	3,717,288	448,494

Figure 8. Principal Statistics of Plastic Products Sub-Sector, 2022
(Source: Department of Statistics, Malaysia. 2024)

The total resin processed in 2023 was 2.7 million metric tonnes.[14] Malaysia is an overall net exporter of key commodity plastics (esp. LDPE and PET), but a net importer of some engineering plastics and high-performance plastics. Malaysia has been a net importer of high-density polyethylene (HDPE) and linear low-density PE (LLDPE), with net combined imports reaching 530,000 tonnes in 2022, primarily from Singapore, Saudi Arabia, Thailand, and Indonesia to meet domestic demand. Within South East Asia, Malaysia holds the third largest position in HDPE with a 15% capacity share (0.6 mtpa) and is expanding significantly.[15]

The start-up of Pengerang Refining and Petrochemical's (PRefChem) PE unit facilities is expected to add 400,000 tonnes/year of HDPE and 350,000 tonnes/year of LLDPE, according to the ICIS Supply & Demand Database. Malaysia's overall imports for LLDPE is expected to fall to 210,000 tonnes/year in 2027 from 340,000 tonnes/year in 2022. HDPE imports are expected to fall to 90,000 tonnes in 2027 from 190,000 tonnes in 2022. As for low-density PE (LDPE), no new capacity additions are expected in the near term and Malaysia is expected to maintain its net export position. Malaysia's imports of LDPE are expected to fall to 120,000 tonnes in 2027 from 190,000 tonnes in 2022.[16]

Malaysia is a notable player in the production of Polyethylene Terephthalate (PET), which is widely used for making beverage bottles, food containers, and packaging materials. Recron Malaysia has an annual capacity of 140,000 metric tons of PET chips. Hiroyuki Industries (M) Sdn Bhd with a production capacity of 30,000 metric tons per annum specializes in manufacturing food-grade R-PET resins, which are made from recycled post-consumer PET bottles.

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[14] Malaysian Plastic Manufacturers Association Annual Report 2024
[15] MPA (2023). Malaysia Petrochemical Country Report 2022. (APIC 2023). https://www.mpa.org.my/images/APIC2020/MPA_APIC_2023_Country_Report_FINAL.pdf
[16] Nurluqman, S. (2024, August 27). Malaysia to remain net importer of HDPE, LDPE, synthetic rubber on strong local demand. ICIS Explore. https://www.icis.com/explore/resources/news/2023/06/06/10893412/malaysia-to-remain-net-importer-of-hdpe-ldpe-synthetic-rubber-on-strong-local-demand/

Malaysia's polypropylene (PP) production is widely used in various industries such as packaging, automotive, and construction. One of the leading producers of PP is Pengerang Petrochemical Company Sdn Bhd, a joint venture between Petronas and Saudi Aramco. This company has a production capacity of 900,000 metric tons of virgin PP per year.[17]

Malaysia's Polyvinyl Chloride (PVC) industry is a significant part of its plastic production sector. PVC is widely used in construction for pipes, fittings, and other building materials. In 2023, Malaysia produced approximately 123 thousand metric tons of PVC pipes, which was an increase from around 98 thousand metric tons in 2022.[18]

Figure 9 summarises the capacity, net exports and demand of HDPE, LLDPE, LDPE and PP for the years 2010, 2022 and forecast for 2027. From the figure, we can forecast that Malaysia will be a major producer and exporter of the four resins, increasing its capacity for the production of HDPE, LLDPE and PP.

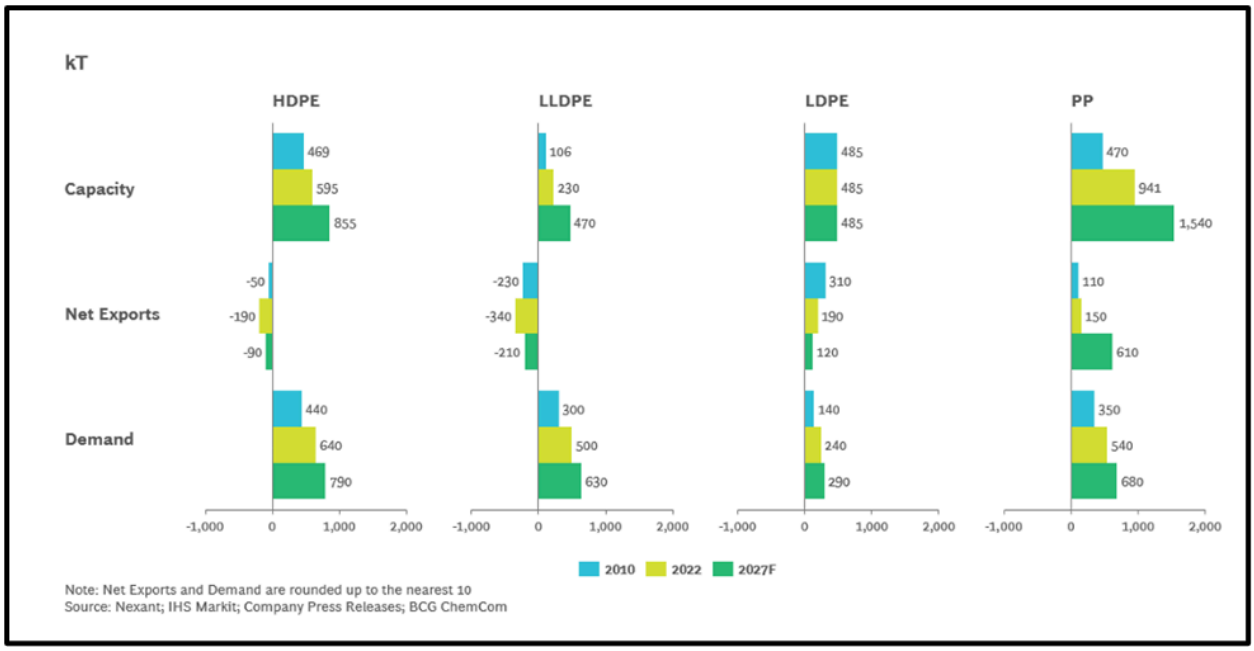

Figure 9. Malaysia Polyolefins Market Dynamics[19]

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[17] Malaysia: PP resin leading private sector producers. (2023). Statista. https://www.statista.com/statistics/1244770/malaysia-leading-private-sector-producers-pp-resin/

[18] Malaysia: PVC pipe production 2023. (2023). Statista. https://www.statista.com/statistics/719172/pvc-pipe-production-malaysia/

[19] MPA (2023). Malaysia Petrochemical Country Report 2022. (APIC 2023).

4.0 PLASTIC WASTE MANAGEMENT

4.1 PLASTIC RECYCLING

Malaysia has a developed recycling industry and is a global hub for plastic waste exports. According to a report published by WWF-Malaysia, post-consumer plastic waste generation in Malaysia is estimated to be more than 1 million tonnes.[20]

Recyclable wastes including plastic waste are either collected by scavengers and waste collectors, or sent to private or charity recycling centres by waste generators before being transported to recycling factories via traders.[21] In 2023, Malaysia achieved a 35.38% recycling rate, with plastic waste contributing 39.85%.[22]

According to the Malaysian Investment Development Authority (MIDA), as of December 2018, a total of 55 plastics recycling projects were in operation with total investments of RM199.5 million, creating 3,341 jobs.[23] In July 2018, the Malaysian Government imposed a temporary ban on plastic waste imports, and also shut down recycling plants that were not adhering to the law. Currently, as reported in a directory of plastic recycling plants, ENF Recycling, there are 60 recycling plants[24] and 48 plastic material recovery facilities[25] in Malaysia.

The Malaysia Plastics Manufacturers Association (MPMA) estimates that the plastics recycling industry produces 1.5 million tonnes of recycled resins a year worth approximately RM4.5 billion in revenue, and exports roughly 70 percent of its production, generating foreign exchange earnings for the country.[26] Despite the increase in plastic recycling, the RM5.5 billion value generated in 2023 is insufficient to counterbalance the harm caused by vast amounts of unrecyclable plastic waste.

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[20] WWF-Malaysia (2020). Study on EPR Scheme Assessment for Packaging Waste in Malaysia
[21] Chen, H.L., Nath, T.K., Chong, S. et al. The plastic waste problem in Malaysia: management, recycling and disposal of local and global plastic waste. SN Appl. Sci. 3, 437 (2021). https://doi.org/10.1007/s42452-021-04234-y
[22] 2024. Blueprint Ekonomi Kitaran bagi Sisa Pepejal di Malaysia 2025 - 2035.
[23] Malaysian Investment Development Authority (MIDA). (2020). Plastic Recycling : Malaysia's Perspective. https://www.mida.gov.my/plastic-recycling-malaysias-perspective/
[24] https://www.enfplastic.com/directory/plant/Malaysia
[25] https://www.enfplastic.com/directory/mrf/Malaysia
[26] MPMA & MPRA. 2019. An Advanced Plastics Recycling Industry for Malaysia https://mpma.org.my/v4/wp-content/uploads/2019/09/White-Paper-FINALR.pdf

Petrochemical companies in Malaysia are venturing into advanced chemical recycling, such as the recovery of oil from plastic waste through pyrolysis instead of conventional recycling of plastic waste to produce recycled resin/plastic. Pyrolysed oil is to be used to produce virgin-quality polymers, and marketed as certified circular polymers.[27]

PETRONAS Chemicals Group Berhad (PCG) is constructing one of Asia's largest chemical recycling plants, with a capacity of 33,000 tonnes per annum. This plant aims to convert end-of-life plastics into pyrolysis oil, which can be used as chemical feedstock for the production of new plastics.[28]

While projections suggest that further investments in advanced technology and infrastructure could increase the industry's economic contributions by three to four times - potentially reaching RM15 billion to RM20 billion annually—this growth must not come at the expense of environmental health. Instead of viewing plastic recycling as a means to boost economic growth, we should focus on reducing plastic production and consumption overall.

In Malaysia, most rigid plastics are recycled, especially mono-material plastics. However, multi-material plastics can be a challenge for recycling. For flexible plastics, the most commonly recycled flexible plastic is LDPE. The most commonly recycled plastics in Malaysia are polyethylene terephthalate (PET), Type 1; high-density polyethylene (HDPE), Type 2; and polypropylene (PP), Type 5.[29]

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[27] MPA (2023). Malaysia Petrochemical Country Report 2022. (APIC 2023)
[28] PETRONAS Activity Outlook 2024-2026. https://www.petronas.com/activity-outlook-2024-2026/assets/pdf/PETRONAS-Activity-Outlook-2024-2026-in-the-spotlight.pdf
[29] Hui Ling Chen, Tapan Kumar Nath, Chong, S., Foo, V., Gibbins, C., & Lechner, A. M. (2021). The plastic waste problem in Malaysia: management, recycling and disposal of local and global plastic waste. https://doi.org/10.1007/s42452-021-04234-y

Based on a study by the World Bank on plastic circularity opportunities in Malaysia, it was reported that only 24% of plastics, from four main resins (PET, PP, LDPE/LLDPE and HDPE), introduced to the market in 2019 were recycled.[30] The recycling rates for PP and HDPE are much higher than for LDPE/LLDPE, and PP is estimated to be slightly higher than HDPE, as shown in Figure 10.

Approximately 70% of the recycled resin production is exported. Additionally, the recycling industry supports the RM31 billion local plastics sector, which is a key supply chain for major industries, including electrical and electronics, and automotive manufacturing.[31] However, this economic activity cannot justify the environmental damage caused by plastics.

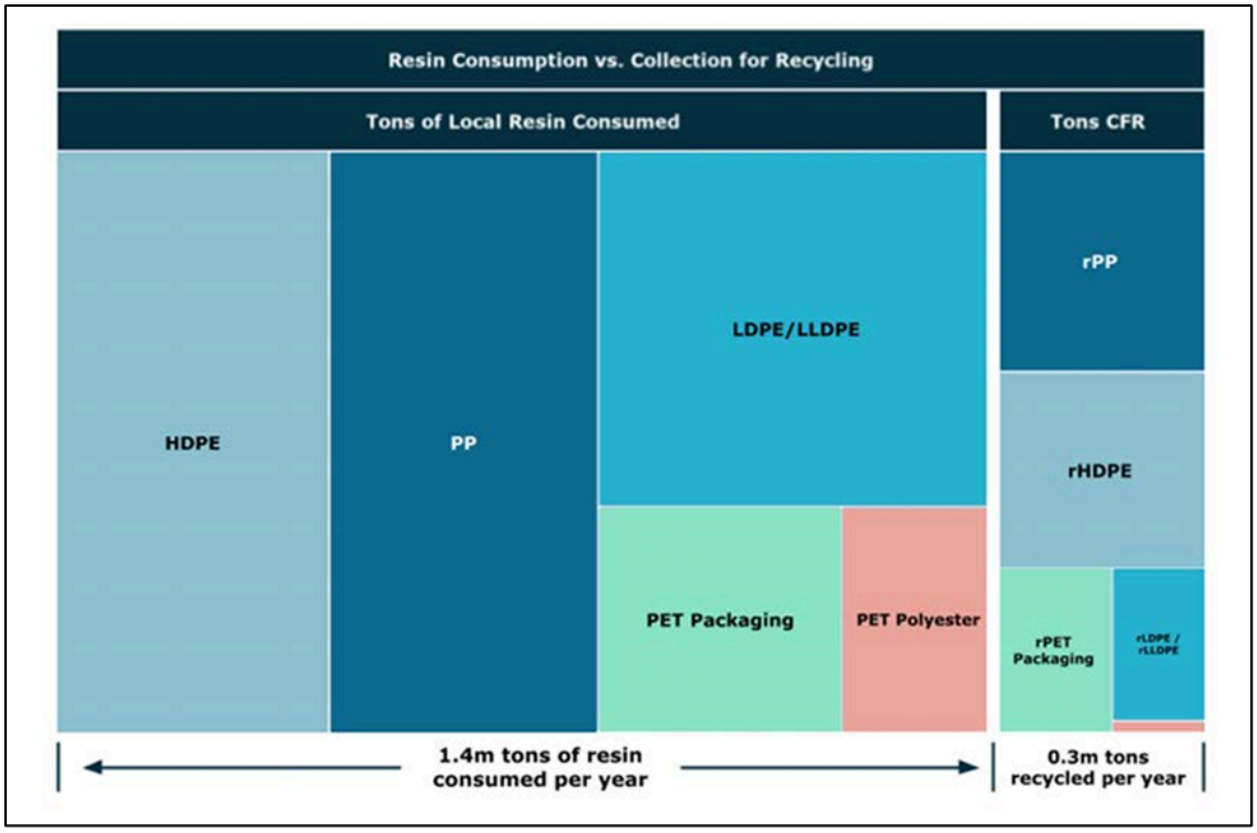

Figure 10. Estimated Total Collected For Recycling Out of Total Consumption for Each Resin[32]

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[30] World Bank Group 2021. Market Study for Malaysia: Plastics Circularity Opportunities and Barriers. Marine Plastics Series, East Asia and Pacific Region. Washington DC.
[31] An Advanced Plastics Recycling Industry For Malaysia. (2019). https://mpma.org.my/v4/wp-content/uploads/2019/09/White-Paper-FINALR.pdf
[32] World Bank Group 2021. Market Study for Malaysia: Plastics Circularity Opportunities and Barriers. Marine Plastics Series, East Asia and Pacific Region. Washington DC.

4.1.1 Impacts of Plastic Recycling

From early 2018 after China closed its doors to waste imports under its Operation National Sword, we have witnessed firsthand illegal recycling plants popping up in Malaysia, mostly by investors from China. These pop-ups operated without permits, using low-end technology and environmentally harmful methods of disposal. Residual wastes that could not be recycled were either dumped or burned. Plastic burning, whether by open burning or controlled burning in incinerators, cement kilns, or pyrolysis, and even in state-of-the-art facilities, generates significant toxic and carbon emissions as well as hazardous ashes laden with microplastics.

Recycling and waste management infrastructure simply cannot deal with the amount of plastic being disposed of locally and waste that were being imported on the pretext of recycling. Furthermore, plastic recycling does not address the health threats from chemicals in plastics. Recycling can spread these toxic chemicals even further. Recycled plastic pellets collected from two recycling companies in Penang, Malaysia which were sent for analysis detected a total of 123 chemicals in the two samples.

The testing was conducted by a group of scientists in Sweden, Germany and Denmark and the data was_published in December 2023[33]. In the first sample of the recycled HDPE pellets from Malaysia, a total of 107 chemicals were detected whilst in the second sample a total of 111 chemicals were detected. 95 of these chemicals were present in both samples. Out of the 30 chemicals detected at the highest concentration, it is noted that half were traces from various stages of the production of different types of plastics. These 30 chemicals also included several bioactive substances, including pesticides such as chlorpyrifos, and pharmaceuticals. In addition, they included three Polycyclic Aromatic Hydrocarbons (PAHs).

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[33] Eric Carmona, Elisa Rojo-Nieto, Christoph D. Rummel, Martin Krauss, Kristian Syberg, Tiffany M Ramos, Sara Brosche, Thomas Backhaus, Bethanie Carney Almroth. A dataset of organic pollutants identified and quantified in recycled polyethylene pellets. Data in Brief, Volume 51, 2023, 109740, ISSN 2352-3409, (https://www.sciencedirect.com/science/article/pii/S2352340923008090)

At the Global Plastics Treaty talks, some countries favour approaches that would rely on plastic recycling as a significant tool for resolving the plastics crisis. But the new data adds to the increasing evidence that plastic recycling is a vector for the spread of toxic chemicals and therefore should not be considered a useful tool in the struggle to end the health and environmental threats from plastics. Chemicals found in recycled plastics may already be making us more susceptible to cancer, heart disease, reproductive disorders, diabetes, obesity, and other serious health conditions.

Plastics are made with toxic chemicals, so when plastic is recycled these chemicals end up in the recycled material. An effective Plastics Treaty needs to address the health and environmental threats from plastic chemicals and include approaches to control plastic production because we cannot recycle our way out of the toxic plastic problem.

In addition, the process of plastic recycling can create new toxic substances, adding even more chemicals to recycled plastic. This means that workers in plastic recycling facilities, consumers who use recycled plastic products, waste workers who handle recycled plastics, and communities near recycling and waste operations are all at risk from exposure to a stew of toxic chemicals.

Currently, there are no international requirements to monitor chemicals in recycled plastics or make the chemical content of plastic materials and products publicly available and accessible. This means that the spread of chemicals from recycled plastics is currently untraceable and uncontrollable. International controls are needed due to the extensive international trade in chemicals, plastics, and plastic waste.

4.1.2 Proposed Waste-to-Energy Incineration

Malaysia's current waste management system is inadequate for dealing with the amount of plastic waste generated domestically, besides the residual waste from plastic recycling plants that are processing both local and imported wastes. These wastes mostly end up in landfills, open dumped or burned, impacting public health and the environment. Over the years, the Malaysian government has explored the possibility of incineration and turning plastic trash into an alternative fuel.

Malaysia's Housing and Local Government Ministry announced plans to establish 18 waste-to-energy (WTE) plants by 2040. The Minister of Housing and Local Government informed the Dewan Rakyat (House of Representatives, Malaysian Parliament) -in July 2024 that the WTE plants can generate up to 600 megawatts of renewable energy, aiming to achieve the targeted 70 per cent renewable energy capacity and reduce carbon emissions by 45 per cent, as outlined in the National Energy Transition Roadmap 2050.[34]

All incinerators pose considerable risks to the health and environment of neighbouring communities and the general population. From the broader perspective of sustainability, which the government expounds, incinerators are a losing proposition and are fundamentally incompatible with a closed-loop and circular economy. Incinerators are essentially destroyers of discarded products and materials, and concentrators of toxicity.

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[34] Naz, H. 2024, July. Govt to set up 18 Waste-to-Energy plants by 2040, says Nga. New Straits Times. https://www.nst.com.my/news/nation/2024/07/1070781/govt-set-18-waste-energy-plants-2040-says-nga

5.0 PLASTIC PRODUCTS AND WASTES TRADE

5.1 Import and Export of Plastic Products

Malaysia is a key exporter and importer of plastic products, reflecting the country's deep involvement in the global plastics trade. In 2023, Malaysia imported USD 8.479 billion worth of plastics, with China being the top supplier accounting for 25.81% of imports. Malaysia exported USD 9.032 billion worth of plastics to China, Singapore, and Indonesia, with nearly 24% of these exports going to China alone.[35]

The largest exports of plastic products are film and sheets, driven by Malaysia's position as the largest producer of stretch films in Asia. The country's output makes up approximately 9% of the global stretch film production.[36]

Malaysia's plastic industry is expected to grow steadily, with imports projected to reach USD 9.84 billion by 2033, driven by demand for high-end plastic products and investments.[37]

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[35] Malaysia Plastic Industry Research Report 2024-2033: Analysis of Major Brands, Development Environment, Imports and Exports, Supply and Demand, Outlook. 2024. https://finance.yahoo.com/news/malaysia-plastic-industry-research-report-111200454.html
[36] Malaysia Plastics Industry https://www.trade.gov/market-intelligence/malaysia-plastics-industry
[37] China Research and Intelligence. (2024, July 10). Malaysia Plastic Industry Research Report 2024-2033. https://www.giiresearch.com/report/cri1511532-malaysia-plastic-industry-research-report.html

5.2 Import and Export of Plastic Wastes

Plastic wastes as well as their trade and management threaten workers, communities, ecosystems, and planetary boundaries, particularly in Global South countries such as Malaysia. Malaysia was one of the largest importers of plastic waste in 2023, receiving shipments of more than 405 thousand metric tons from around the world. The United States was by far the largest exporter of plastic waste to Malaysia in 2023, with shipments amounting to over 100,000 metric tons. Germany was ranked second that year, having exported around 50,000 metric tons of plastic waste. Such large volumes of waste create numerous problems for Malaysia's waste management system.[38]

The following is a compilation of UN Comtrade data for the tariff code HS3915 (waste, parings and scrap, of plastics). However, HS3915 may represent only about half of the total plastic waste traded because hidden plastic such as synthetic textiles, rubber-like material, and refuse-derived fuel are not accounted for under-traded plastic waste.[39]

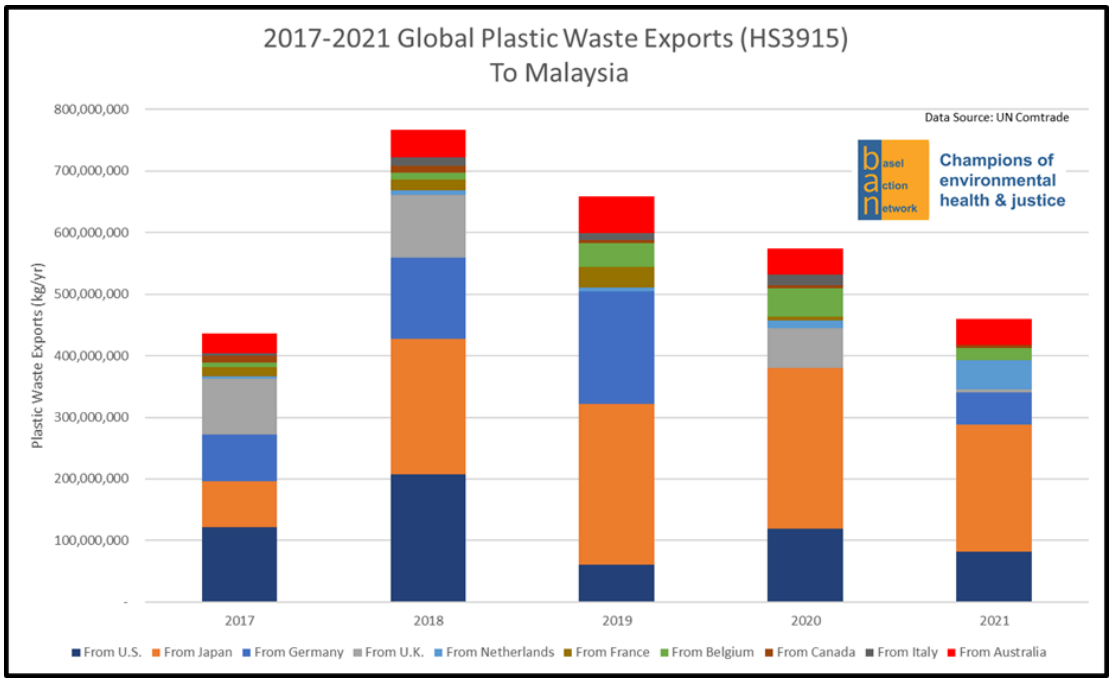

Figure 11. Global Plastic Waste Exports (HS3915: Waste, Parings and Scrap, of Plastics) To Malaysia from 2017-2021 (Source: Basel Action Network)

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[38] Malaysia: plastic waste imports by country. (2024). Statista. https://www.statista.com/statistics/1357943/plastic-waste-import-volume-malaysia-origin/

[39] Karlsson, T, Dell, J, Gündoğdu, S, and Carney Almroth, B. Plastic Waste Trade: The Hidden Numbers. International Pollutants Elimination Network (IPEN), March 2023

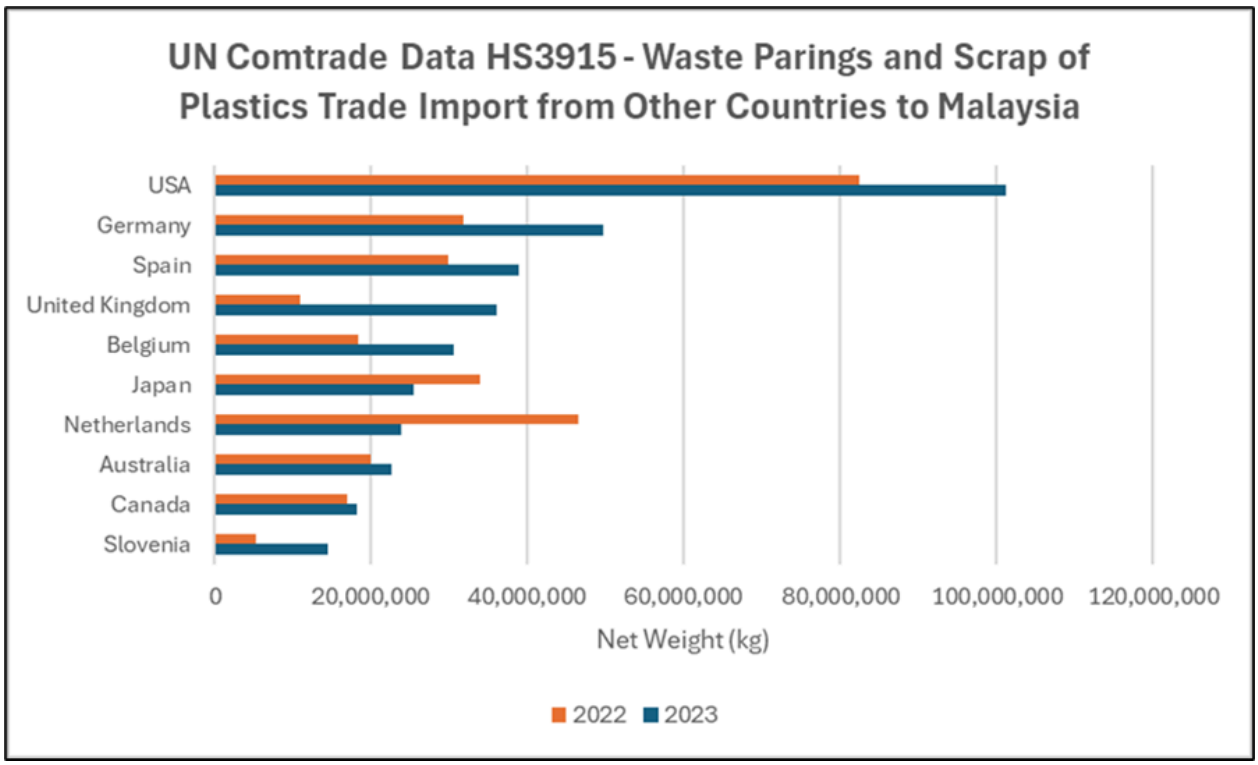

Figure 12. UN Comtrade Data HS3915 - Waste Parings and Scrap of Plastic Trade Import from Other Countries to Malaysia from 2022-2023 (Data Source: UN Comtrade Database)

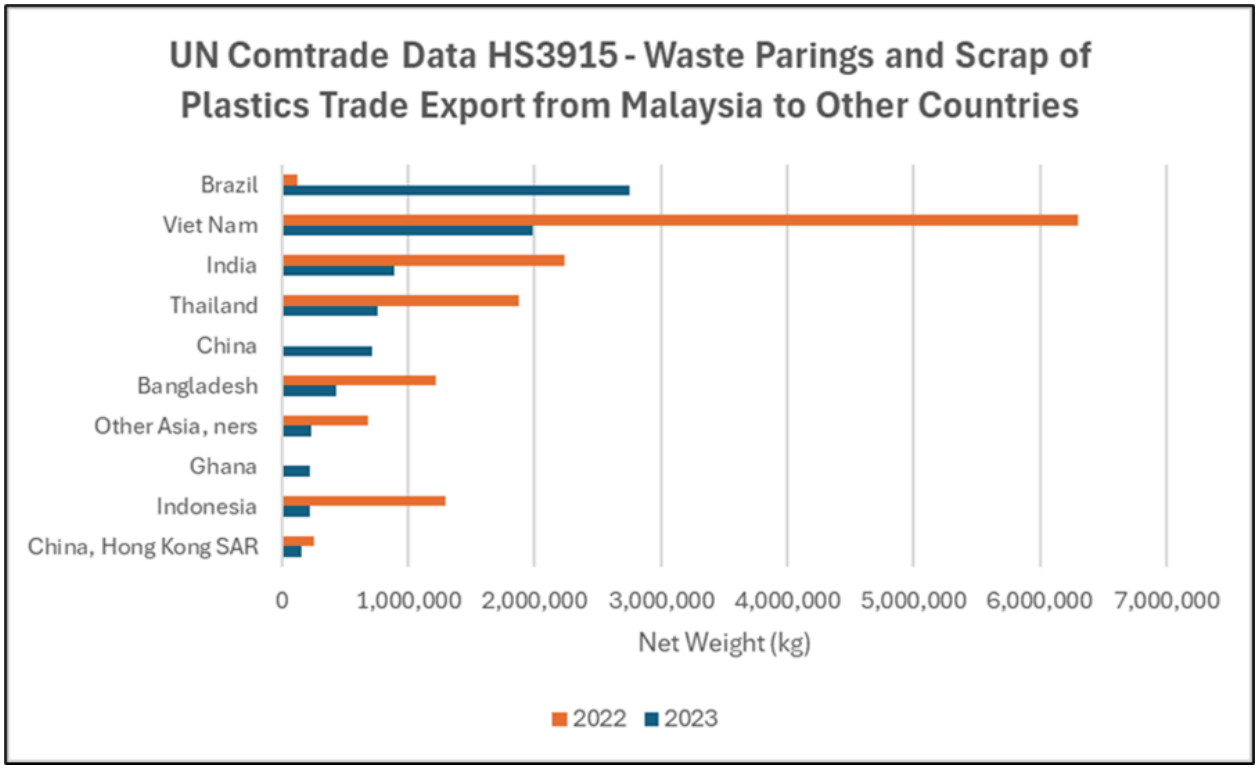

Figure 13. UN Comtrade Data HS3915 - Waste Parings and Scrap of Plastic Trade Export from Malaysia to Other Countries from 2022-2023 (Data Source: UN Comtrade Database)

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal has provisions on waste generation and minimization. However, these provisions are all voluntary guidance that has failed to curb the plastic pollution crisis. The emphasis remains on recycling (often downcycling) rather than upstream action with waste prevention at source, such as stricter standards on the extraction of natural resources and redesigning products using sustainable materials and practices.

The Basel Convention with stronger governance and implementation powers is required to curb the toxic plastic waste trade. The Global Plastics Treaty, currently in the throes of international negotiations ahead of its finalization in 2025, has the potential to be a legally binding instrument to address plastic pollution in many ways, including international rules for plastic design, production and disposal to protect the health, human rights and the environment.

Figure 14: Malaysian Activists Calling for an End to Waste Colonialism

6.0 PLASTIC POLICIES

Malaysia has a number of roadmaps and policy in relation to plastics with the aim of reducing plastic waste and pollution. The plastics industry has developed a masterplan, essentially to keep plastics in the loop.

6.1 Malaysia Roadmap Towards Zero Single Use Plastics 2018 - 2030

The Malaysia Roadmap Towards Zero Single-Use Plastics 2018-2030[40] was approved by the Cabinet in 2018 and aims to reduce single-use plastic pollution through a holistic approach. The vision of this Roadmap is to take a phased, evidence-based and holistic approach by involving all stakeholders in jointly addressing single-use plastics (SUPs) pollution in Malaysia.

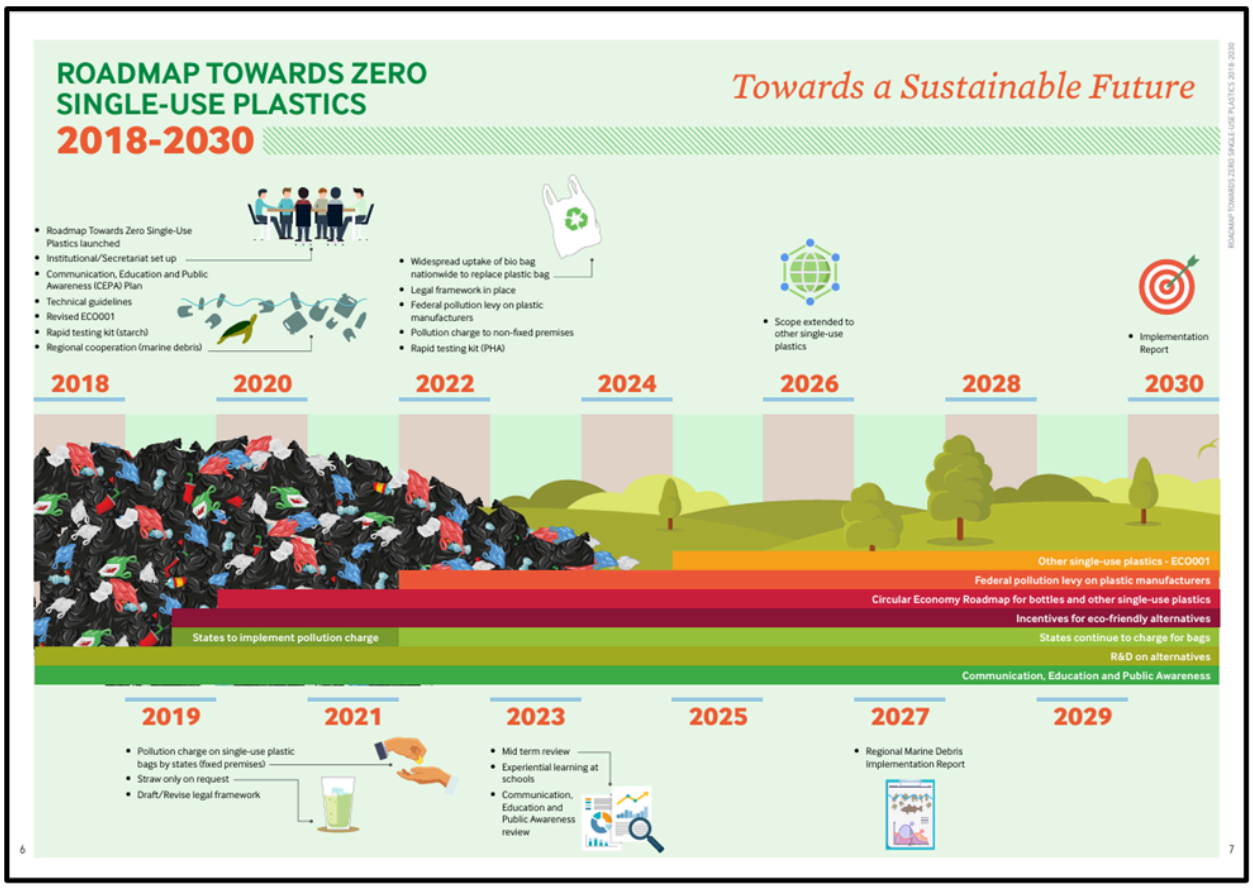

Figure 15. Malaysia Roadmap Towards Zero Single-Use Plastics 2018-2030

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[40] 2018. Malaysia Roadmap Towards Zero Single-Use Plastics 2018-2030 https://www.pmo.gov.my/ms/2019/07/pelan-hala-tuju-malaysia-ke-arah-sifar-penggunaan-plastik-sekali-guna-2018-2030/

One of the suggested interventions in the roadmap is to replace conventional SUPs with other eco-friendly alternatives, leaning towards the use of bioplastics as an alternative to plastics. However, bioplastics are a false solution as they are single-use and are limited in options for composting, and degrade into microplastics under normal environmental conditions. Further, despite the “no straw by default” policy introduced in 2019, many food outlets were still providing straws together with drinks, even without customers requesting them.

The Natural Resources and Environmental Sustainability Minister, in an interview on the New Straits Times' Beyond the Headlines, said it is impossible for Malaysia to eliminate single-use plastics by 2025 as the country is facing significant challenges stemming from implementation at local levels.[41]

Figure 16: CAP Officers with Their Reusable Items

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[41] New Straits Times. May 19, 2024. Environment Minister: Single-use plastic ban by 2025 impossible https://www.nst.com.my/news/nation/2024/05/1052426/environment-minister-single-use-plastic-ban-2025-impossible

6.2 National Marine Litter Policy and Action Plan 2021-2030

Malaysia's Marine Litter Policy and Action Plan is a 10-year national framework designed to steer efforts in combating marine litter pollution. This pollution, as defined by UNEP, encompasses any enduring solid material of human origin, particularly plastic, that is discarded, abandoned, or disposed of in marine and coastal environments.[42]

The primary objective of this Policy is to diminish marine plastic pollution in Malaysia by implementing a series of strategic measures throughout the plastic lifecycle. To achieve the objective, the document focuses on two core themes. The first is to strengthen the evidence base for informed decision-making to address marine litter by building national capacities to monitor the plastic value chain and assessing waste leakage hotspots in line with global best practices. The second is to deploy practical actions in phases to tackle sources of marine litter pollution in Malaysia in line with the latest global innovations, further developed over time through enhanced evidence-based strategies.

The National Marine Litter Policy and Action Plan 2021-2030 was to be implemented alongside the National Roadmap Towards Zero Single-Use Plastics 2018-2030 and the Plastic Sustainability Roadmap 2021-2030.

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[42] 2021. National Marine Litter Policy and Action Plan 2021 - 2030.https://faolex.fao.org/docs/pdf/mal220729E.pdf

Figure 17. Illustration of the Source-to-Sea Framework for Marine Litter Prevention and Mitigation.
(Extracted from the National Marine Litter Policy and Action Plan 2021-2030)

6.3 Malaysia Plastics Sustainability Roadmap 2021 - 2030

The Malaysia Plastics Sustainability Roadmap, 2021-2030 is a nationwide sectoral document.[43] The Roadmap's scope covers four types of resin: PP, PET, HDPE, and LDPE/LLDPE. These resins are the most highly produced and disposed of in Malaysia, commonly used for single-use packaging with a shorter application lifetime.[44]

Malaysia aims to achieve plastic sustainability by adopting the following five strategies

- materials are kept in circulation for as long as possible (in its highest possible value), can easily be recovered and recycled, and effectively reused through product design stage, as well as during the collection and sorting of plastic waste. Malaysia will also take necessary action in phasing out the most problematic single-use plastics based on an application's necessity, recyclability, toxicity, disruption to recycling process, and probability of being mismanaged.
- reuse, focusing on reusing packaging, rather than discarding after one use, for example refill at home, refill on the go, return at home, and return on the go;
- material circulation, possible only if plastic waste has been properly collected, sorted, treated, and processed into recycled resin. Malaysia will introduce and implement initiatives such as Reverse Vending Machine (RVM) and Deposit Return Scheme (DRS).
- building capacity for reprocessing and manufacturing of recycled product nationally. Malaysia is looking into advanced recycling technology and expresses the need for innovative processes to remove colour, odour and plastic waste contaminants into the "virgin-like" resin that is the basis for plastic products.
- harmonising standards to create conditions for a truly circular economy by filling in regulatory gaps on issues like material efficiency, durability, repairability, reusability, and recyclability.

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[43] 2021. Malaysia Plastics Sustainability Roadmap 2021-2030 https://faolex.fao.org/docs/pdf/mal220769E.pdf
[44] https://www.fao.org/faolex/results/details/en/c/LEX-FAOC220769

The national targets are:

- phasing out problematic SUPs;
- 25% post-consumer plastic packaging to be recycled by 2025;
- 100% recyclability of plastic packaging by 2030;
- 15% average recycled content by 2030;
- 76% average collected-for-recycling (CFR) rate by 2030.

Extended Producer Responsibility (EPR) is a policy instrument under the circular economy approach that the government views can effectively push for plastic sustainability. Before moving into a mandatory EPR scheme in 2026, adoption of voluntary EPR phase will be implemented nationwide from 2023 to 2025. The government expects that industry will participate in the voluntary EPR phase.[45]

Malaysia's National Circular Economy Council, which is chaired by the Housing and Local Government Ministry and comprises relevant federal ministries, state authorities, industry players and civil society stakeholders, stated that it would take a phased approach to mandatory EPR implementation in its National Circular Economy Blueprint, launched on 6 August, 2024.[46] The Council will also be conducting a study ahead of drafting a circular economy bill that can be adopted by all states.

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[45] 2021. Malaysia Plastics Sustainability Roadmap 2021-2030 https://faolex.fao.org/docs/pdf/mal220769E.pdf

[46] Samantha Ho. The case for mandatory extended producer responsibility in Malaysia. Eco-Business. August 20, 2024. https://www.eco-business.com/news/the-case-for-mandatory-extended-producer-responsibility-in-malaysia/

Figure 18. Cover Page of Malaysia Plastics Sustainability Roadmap 2021-2030

In an interview with ESG, The Edge, the Natural Resources and Environmental Sustainability Minister said that the Ministry will focus on phasing out problematic single-use plastics, like plastic bags and polystyrene, by replacing with a sustainable and environmentally friendly alternative, such as biodegradable plastic. The list will be prioritised based on consumption, impacts and available alternatives. The Ministry is collaborating with SIRIM Bhd to develop a new standard as an alternative product to single-use plastics. [47]

The policies, although aim to address plastic waste and reduce plastic pollution, however promote bioplastics. Bioplastic which is being promoted as “biodegradable” or “compostable” is a false solution as it only degrades in a controlled environment of high temperature and sufficient oxygen and cannot be composted at home. Compounding the situation is the inability of our waste management infrastructure to deal with these plastics.

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[47] Vanessa Gomes & Tan Zhai Yun. 2024. Cover Story: Can Malaysia really be free of plastic bags by 2025? The Edge Malaysia Weekly. February 19 - 25, 2024. https://theedgemalaysia.com/node/701090

6.4 Malaysia Plastic Manufacturers Association (MPMA) Plastic Neutrality Masterplan: Zero Plastics to Landfill (2024-2030)

Malaysia's plastics industry submitted its vision for the role of plastics in the circular economy. aiming to achieve zero plastics in landfills.The Masterplan states that plastics neutrality is achieved when plastics is being kept in the loop to achieve plastics net-zero in the environment, and this can be done through the practice of redesign, reuse, repurpose, recycle and recovery.[48] Among the drawbacks of this Masterplan is the promotion of chemical recycling and waste-to-energy plants.

Figure 19: Overview of Plastics Industry in Malaysia 2023
(Source: Plastic Neutrality Masterplan: Zero Plastics to Landfill 2024-2030)

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[48] Malaysia Plastic Manufacturers Association. 2024. Plastics Neutrality Masterplan 2024 - 2030. https://mpma.org.my/upload/2024/Plastics_Neutrality_Masterplan_1.pdf

7.0 RECOMMENDATIONS

Plastic production, use, and end-of-life management threaten the environment and human health with toxic chemicals exposures. Protecting women, children, and communities in low- and middle-income countries that are particularly vulnerable to the impacts of plastics is a priority.

The key solution to address the impact of plastics is to scale down production and prohibit the use and addition of hazardous chemicals. To curb the negative health and environmental impacts of plastics, essential uses should be identified, and non-essential uses should be eliminated. The remaining plastics should be free of hazardous chemicals and designed for durability and reuse.

To ensure transparency, data on chemicals used and added to plastics should be publicly available throughout their life cycle, including through labeling, materials safety data sheets, and databases. Quantities of plastics produced, imported, exported, and disposed of should be monitored and the data publicly available to all.

The management of current stockpiles of plastics must not release toxic chemicals, or plastic litter or contribute to climate change. Only plastics that do not contain toxic chemicals should be recycled. Non-circular plastics (those containing toxic additives) should be identified, segregated, and safely disposed of. The export of plastic waste for disposal purposes should be prohibited and effective national collection and safe recycling systems should be ensured. Burning plastic waste or associated derived fuels for energy in cement kilns, incinerators, or other combustion technologies is not circular, renewable, or sustainable and should be prohibited.[49]

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[49] 2021. IPEN Views on Global Controls on Plastic. https://ipen.org/documents/global-controls-plastic

7.1 Demands for INC-5 of the Global Plastics Treaty

In finalizing the negotiations for the future Plastics Treaty, the Intergovernmental Negotiating Committee (INC) should ensure that the health-protective objectives of the Treaty are supported by meaningful global controls and that the INC fulfills the UNEA mandate 5/14 by addressing the full life cycle of plastics.[50] To do so, the Malaysian government must ensure that the INC will include the following:

- Control measures are global and not based on individual national commitments. We are facing a global plastics crisis, so the solution needs to be global. An approach based on national rules would make the Treaty largely ineffective and create major trade hurdles, while global measures would create a level playing field for all economic actors.
- The Treaty is guided by the precautionary principle when dealing with scientific uncertainty. Regulating groups of chemicals expedites protective measures and reduces risks of hazardous (so-called regrettable) substitutions.
- The Treaty includes global mechanisms to reduce the production of plastics.
- Plastic chemicals are regulated throughout their full life cycles and across sectors. Regulating chemicals only in products would severely limit the protection of workers and vulnerable populations.
- There is sufficient and predictable funding. The creation of a financial mechanism that also includes a dedicated multilateral fund that allows for additional, sufficient, and predictable funding and includes mechanisms that apply the polluter pays principle will be critical for the effective implementation of control measures.

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[50] 2024. IPEN Quick Views on the Fifth Session of the Intergovernmental Negotiating Committee to Develop an International Legally Binding Instrument on Plastic Pollution. https://ipen.org/documents/text-ipen-quick-views-inc-5

- The Treaty includes strong monitoring and reporting provisions. Reporting is an important measure for effectiveness evaluation and it is necessary to have a clear understanding of plastic pollution trends that include indicators of human health protection, such as biomonitoring of plastic chemicals, microplastics, and nanoplastics.
- The Treaty text should also ensure that the future COP can make decisions through majority voting when consensus cannot be reached. Without this option, the COP could fall back to the least ambitious approach or decisions could be blocked by a small group of countries. There have previously been similar situations that have severely hampered the effectiveness of, for example, the Rotterdam Convention and the United Nations Framework Convention on Climate Change.

8.0 CONCLUSION

Without regulatory interventions, plastic production is projected to increase dramatically, resulting in increasing climate, pollution, and health problems. More production means more pollution. To protect human health and the environment, the Plastics Treaty should include mechanisms to limit or reduce the production of plastics. Without a mechanism to reduce overall plastic production, any other provisions of the Treaty would become significantly more expensive to implement and less effective.[51]

[51] 2024. IPEN Quick Views on the Fifth Session of the Intergovernmental Negotiating Committee to Develop an International Legally Binding Instrument on Plastic Pollution.

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