Morgan Stanley

INSTITUTE FOR SUSTAINABLE INVESTING

Plastic Waste:

Addressing a Global Economic and Environmental Challenge Through the Power of the Capital Markets

Plastic is a valuable material that has contributed to global economic growth since the 1950s. It has helped transform sectors as wide-ranging as health care, transportation, packaging and electronics. Over the last few years, however, the public has grown increasingly aware of the impact of plastic waste. Changing consumer preferences and increased regulation are driving companies to better measure and manage their plastic footprints. Meanwhile, valuable raw materials worth billions of dollars are discarded each year due to inefficiencies in design, collection and recycling of products containing plastic. While it remains a nascent investment theme, the ubiquity of plastic, and the growing trend to reduce the impact of plastic waste, warrants a closer look from the investment community.

Plastics are durable, malleable, multifunctional materials with low-cost, high-volume production methods. These traits have helped drive a massive increase in plastic use since production began in earnest following World War II. Primary plastic production has increased more than 20-fold since the 1960s,[1] to 407 million metric tons in 2015.[2] Production has grown so quickly, in fact, that virtually half of all plastics ever produced were manufactured within the last 15 years.[3] As populations grow, poverty rates decline and consumption rates increase—particularly in emerging economies—plastic production is forecast to outpace global economic growth by a multiplier of 1.2 to 1.5.[4]

The Scale of Global Plastics Use

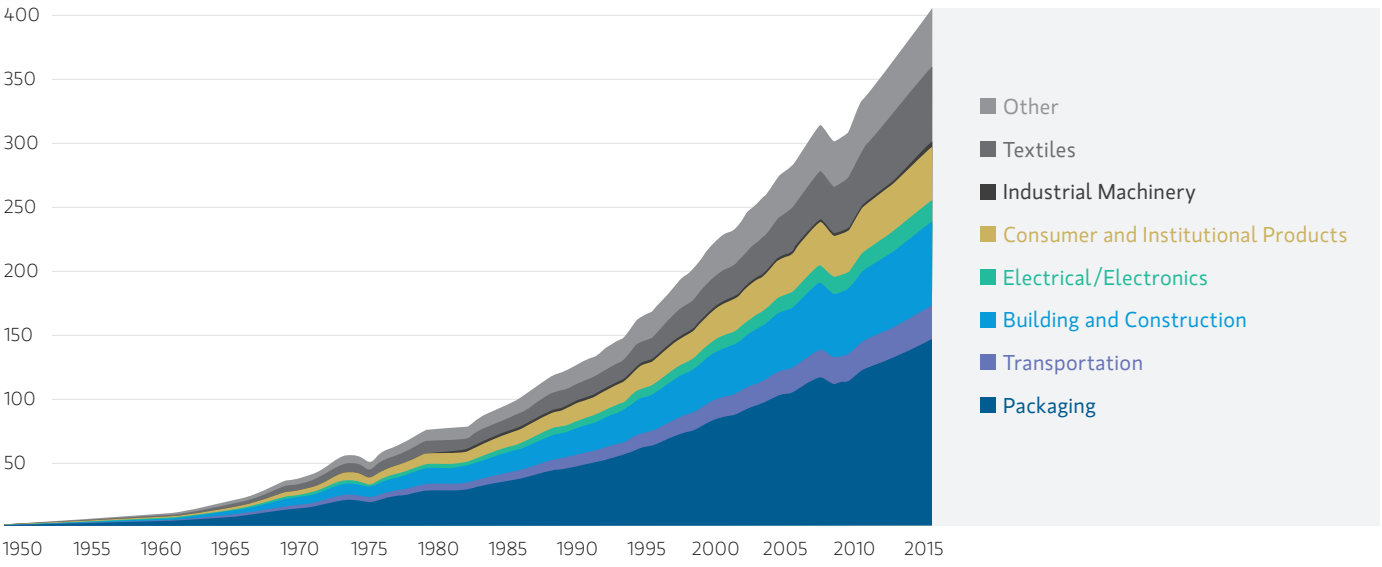
The characteristics that make plastic materials an integral part of modern society and an important contributor to global growth are the very same properties that make them challenging to manage in an environmentally and economically responsible way. They have many uses, are durable and inexpensive to produce.

Plastic products can offer both economic and environmental benefits. The European plastic industry alone directly employs more than 1.5 million people and has a multiplier effect of 2.4 in GDP and almost three in jobs.[5] As lightweight alternatives to materials like glass, steel and aluminum, plastics also can help reduce transportation costs and lower greenhouse gas (GHG) emissions from engines that run on fossil fuels,[6] since lighter vehicles burn less fuel. In fact, plastics make up approximately 50% of the volume of a car but only 10–12% of its weight.[7] Plastic materials can also improve food preservation capabilities, elongating shelf lives of certain foods by as much as 4.5 times,[8] and offer more effective insulation materials to help reduce energy consumption in commercial and residential buildings.

Global Primary Plastics Production, 1950–2015

FIGURE 1

Mt (million metric tons)



Source: *Production, use, and fate of all plastics ever made*, Geyer, Jambeck, Law, 2017.

Plastics in The Environment

One of the key challenges plastic presents is how best to dispose of it at the end of its useful life while retaining its economic value. Approximately $100 billion of single-use plastics gets discarded annually.[9]

Of course, the most tangible impact of plastic waste is seen in the environment. Unfortunately, most commonly used plastics are neither biodegradable nor compostable, so they accumulate in the environment.[10] Consumer plastic and packaging causes nearly $140 billion in total environmental damages per year,[11] including $13 billion to the marine environment alone.[12]

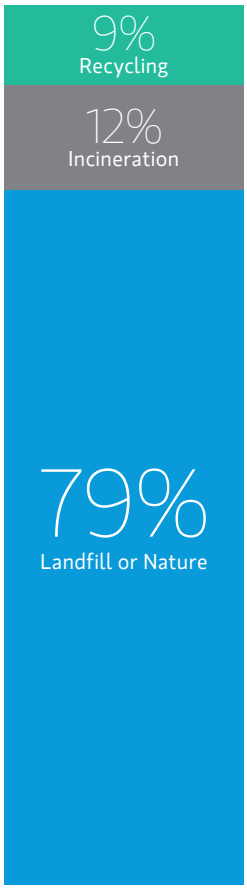
Plastic waste that enters the ocean, an issue that has galvanized many consumers, corporations and policymakers, poses a threat to marine life through entanglement, ingestion and contamination.[13] Moreover, collecting ocean plastic waste can be extraordinarily challenging because it tends to fragment into small particles and spread across the ocean over time.[14] Eight million metric tons of plastic enters the ocean annually.[15] According to the Ellen MacArthur Foundation, this is the equivalent of dumping a garbage truckload of plastic into the ocean every minute.[16] Under current projections, the rate of plastics entering the ocean is expected to increase to two truckloads per minute by 2030 and four per minute by 2050, at which point the ocean would hold more plastic than fish by weight.[17]

Overall waste management efforts have not kept pace with the rapid growth of plastic. Global nonfiber plastic recycling rates have increased to 18% annually in recent years, but the majority of plastic waste continues to end up in incinerators, landfills and nature.[18] Incineration remains a controversial approach for managing plastic waste because of air-quality and public-health concerns, and the generation of GHG emissions and heavy-metal-laden ash. The debate over incineration continues to evolve, however, with the advent of new technologies to address these issues.

Consumers have also focused on the carbon implications of plastics production, most of which are derived from fossil fuels.[19] While there are clear carbon benefits that accrue from using lighter-weight plastic material in transportation, for example, the overall production of plastic is estimated to account for six percent of total oil demand.[20] As of 2012, GHG emissions from plastics production amounted to approximately 390 million metric tons of CO_2e.[21] Plastics also release potent greenhouse gases like methane as they degrade in the environment.[22] Under current forecasts, plastics will represent 15% of the global annual carbon budget associated with limiting global warming to 2° Celsius by 2100 compared with pre-industrial levels.[23]

End-of-Life Pathways for All Plastics Ever Generated as of 2015

FIGURE 2



Source: *Production, use, and fate of all plastics ever made*, Geyer, Jambeck, Law, 2017.

Because of the size, scale and tangibility of plastic waste in our everyday lives, this topic has come to the forefront for individuals and governments, with possible wide-ranging implications for consumption, investment and regulation. While end-of-life solutions like recycling have important roles to play in managing plastic waste, addressing the full scope of plastic waste's economic and environmental costs calls for a more comprehensive approach.

Scaling Solutions Across The Plastics Value Chain

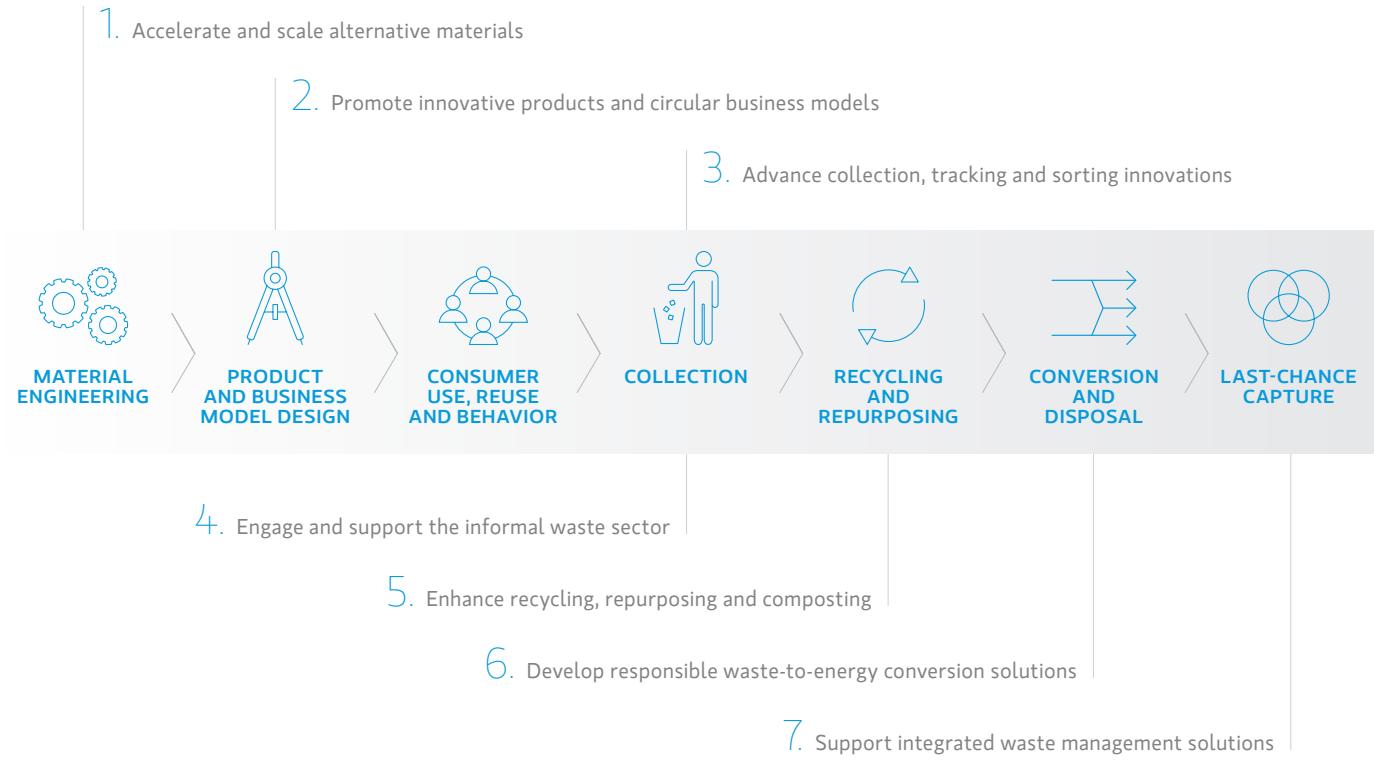
Organizations ranging from private foundations to multilateral public institutions are exploring approaches to mitigate the impact of plastic waste—often through system-wide programs that seek solutions across the entire plastics value chain. From the earliest stages of research and development into materials and products, through waste disposal, collection and reuse, there are multiple innovations and interventions aimed at reducing the environmental, health and economic impacts of plastic waste. The investment strategies summarized in Figure 3 highlight the range of opportunities to reduce the material value of plastic packaging lost to the economy every year after its short first, and often only, use.

One approach to lifecycle solutions garnering attention from industry stakeholders involves the adoption of circular economic principles. The Ellen MacArthur Foundation, one of the leading voices for this approach, explains the circular economy as "one that is restorative and regenerative by design and aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles."[24] Focusing on circular economy principles for plastic specifically, the Ellen MacArthur Foundation's New Plastics Economy Global Commitment calls for eliminating unnecessary plastic items, driving innovation so all necessary plastics are designed to be safely reused, recycled or composted, and circulating plastic to keep it in the economy and out of the environment.[25]

The potential for large-scale systemic change in the plastics economy can obviously present risks and opportunities across the investment spectrum. Thus, capital markets institutions have a critical role to play in the development of new approaches to this challenge. As capital allocators and facilitators of capital on behalf of clients, such firms can help bring innovations to market and scale solutions that aim to recapture the value of plastic waste as a resource and reduce economic and environmental risks. In one estimate, as of 2015, only five percent of the material value of plastic packaging—approximately $4 billion to $6 billion—is retained for future use each year.[26] This represents a large, untapped opportunity-set for investors.

Investment Strategies Across the Plastics Value Chain

FIGURE 3



Source: *Sea of Opportunity: Supply Chain Investment Opportunities to Address Marine Plastic Pollution*, Encourage Capital, 2017.

Why Investors Should Pay Attention

Plastic materials add value for countless industries across the global economy. They provide a range of benefits over alternative materials, many of which include their net environmental benefits.[27] But elevated public awareness of the impacts of plastic waste is driving an evolution in consumer preferences. Faced with this, and with increased regulatory pressure around plastic waste, many corporations are acting to mitigate their plastic footprints. Capital markets can serve as levers for system-wide change and can enable solutions through capital allocation. In our view, investors should consider how these realities will impact the industries they are exposed to and where opportunities exist to generate economic value from otherwise wasted resources. Investors concerned about plastic waste should also realize that they can affect change and address these issues through their investment decisions.

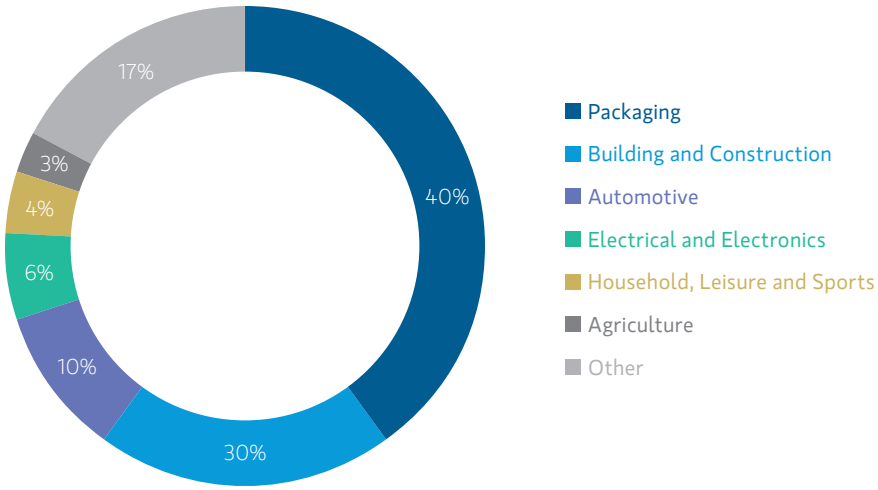
The Ubiquity of Plastics

In the span of only a few generations, plastics have transitioned from specialized materials to those that consumers interact with on a daily basis. They can be found in everything from water bottles to prosthetics, cars to computers, and countless products in between.

The number of businesses that rely on plastics has increased in parallel with their uses and applications. While levels of dependency vary across industries, the ubiquity of plastic calls for investors to develop a clearer understanding of their exposure to changes in the plastics landscape. For instance, recent slowdowns in plastic recycling in China due to stricter standards for imported waste (see Regulatory and Policy Risk) could benefit plastic producers in the near term as demand for virgin plastics increases to fill the gap.[28] At the same time, many consumer goods companies see reducing plastics packaging as a strategic focus. Plastic materials like PET, LDPE and HDPE can represent a significant expense. Morgan Stanley Research estimates that the cost of these materials as a percentage of sales can be 1.5–13.9% for these companies. Reducing these expenses could benefit the bottom line, though much depends on the solutions employed and their respective net costs.[29]

European Plastic Demand by Sector, 2017

FIGURE 4



Source: PlasticsEurope Market Research Group (PEMRG) and Conversion Market & Strategy GmbH, 2018.

Public Awareness, Consumer Preference and Corporate Action

In the last few years, public awareness and concern about plastic's impact on the environment have surged. It is difficult to identify the exact cause for this change, but the working theory voiced by scientists and campaigners ultimately suggests that the nature of how society thinks about plastic waste has evolved. What was formerly considered merely a nuisance is now understood as a widespread, pervasive risk.[30]

The change in awareness and heightened level of concern is also driving changes in consumer preferences. A 2018 survey by Morgan Stanley Research suggests that the majority of consumers in the U.K. consider single-use plastic when making their purchasing decisions and that a company's approach to single-use plastic could impact demand for their products.[31]

Increased public awareness also helps explain the recent rise in campaigns and grassroots activism to reduce single-use plastics and increase pressure on companies to address their plastic footprints. How companies respond to this mounting pressure can pose significant reputational risks. Companies in the consumer-facing restaurant, leisure and retail industries could also face higher levels of reputational risk due to consumers' increasing association of brands with plastic waste's appearance in the environment.

Corporate action to reduce plastic waste often varies based on where a particular company sits in the plastics value chain. For instance, some companies that produce plastics are committing to more robust research and development of bioplastics and compostable plastics.[32] The Alliance to End Plastic Waste, a nonprofit, industry-led group launched in early 2019, is focused on keeping plastic waste out of the environment through investments and innovation in recycling infrastructure. The companies supporting the Alliance have committed over $1 billion to develop new technologies and deploy recycling infrastructure in locations across Southeast Asia where much of the plastic entering the environment originates.[33]

Suppliers of products that use plastic are establishing more ambitious plastic waste reduction goals, launching products with alternative materials and eliminating others altogether.[34] Industry leaders across the food service and hospitality industries, for instance, are working together via the NextGen Consortium to minimize environmental impacts of single-use food packaging through the development and commercialization of new cup solutions.[35]

Regulatory and Policy Risk

Regulators are also driving plastic waste reduction efforts. Restrictions on single-use plastics such as straws, cutlery and shopping bags have been in place in many countries for years,[36] and are gaining ground in jurisdictions across the United States.[37] The European Commission has been particularly active on this front, announcing its first strategy on plastics in January 2018, which aims to ensure "that all plastic packaging is reusable or recyclable in a cost-effective manner by 2030."[38] In October 2018, the U.K. government announced its intention to introduce a new tax on all plastic packaging that does not include at least 30% recycled content.[39]

Interest in these policy options, in addition to deposit-refund schemes and other types of plastics levies, is on the rise following China's 2017 National Sword Policy (NSP). The NSP established stricter contamination rate thresholds on imported scrap, effectively banning a wide variety of waste imports. Many developed countries that export their plastic waste have been forced to find new markets for their scrap. Import rates surged in Thailand, Vietnam, the Philippines and Pakistan as a result.[40]

Respondents Indicated That Their Purchasing Decisions Are Influenced by Single-Use Plastic

FIGURE 5

Percentage of respondents

Source: "*Single-Use Plastic: What do Consumers Think?*", Morgan Stanley Research, 2018.

PLASTIC AND THE U.N. SUSTAINABLE DEVELOPMENT GOALS (SDGs)

SDG-Aligned Investing Offers Opportunities to Reduce Plastic Waste

The U.N. SDGs seek to establish a blueprint to achieve peace and prosperity for people and the planet, now and in the future. Private capital has a pivotal role to play in achieving these goals. Investors are moving quickly to develop strategies and products that align with the SDGs, some of which call for sharp reductions in plastic waste and a transition to a circular economy, including:

6 CLEAN WATER AND SANITATION

6.3—By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

9.4—By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

12.5—By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

14 LIFE BELOW WATER

14.1—By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.

Source: *2030 Agenda for Sustainable Development*, United Nations, 2015.

Vietnam has since imposed its own waste import restrictions, and if more countries follow in its footsteps, waste exporters may soon have to reevaluate their entire waste management strategies.[41]

Plastic producers in the petrochemicals industry are benefitting in the near term from these policy-induced reductions in Chinese recycled plastic. But if momentum behind policies banning plastics grows across Asia, petrochemicals companies could face significant long-term demand risks.[42] Spencer Dale, BP's chief economist, suggests that environmental concerns over plastic could reduce oil consumption by 2 million barrels per day by 2040.[43]

Climate change mitigation policies like carbon taxes and emissions-trading schemes can also pose risks to companies across the plastics value chain. While these policies would impose a more direct financial burden on plastics producers due to their relative carbon intensity, how they choose to handle these additional costs could have cascading effects across the entire plastics value chain.

The Role of Capital Markets and Investors

As the dialogue on solutions to reduce plastic waste continues to evolve, capital market institutions can act as levers for systemic change through their expertise, influence and scale. They can help bring to market innovations across the plastics value chain by connecting capital with companies, products and solutions primed to succeed in an evolving plastics landscape.

Investors are signaling greater awareness and interest in plastic waste management as an investment consideration. The number of earnings calls that included mention of "plastic waste" increased 340% year-over-year in 2018.[45] Investors should also continue to consider the effect on valuations as companies work to manage their plastic footprints. Over time, this could help investors identify where opportunities exist to generate economic value from otherwise wasted resources by allocating capital to innovative businesses, products and solutions.

Investment Opportunities and Implications

The current discussion around plastic waste may have implications for companies potentially facing related reputational and regulatory risks. Capturing the economic and material value of plastic waste, rather than allowing it to enter the environment, requires a system-wide approach that leverages opportunities across the entire plastics value chain. Effective solutions could provide a broad set of investment opportunities with varying degrees of risk, reward and impact. Today, however, investment products that directly address the impact of plastics are limited. Nonetheless, demand from retail and institutional investors will likely lead to the development of new plastic-focused investment products and solutions in the years ahead.

Upstream interventions in materials engineering, product and business-model design, and consumer engagement, for example, can have longer time horizons than their downstream counterparts, but they can also drive more systemic impact since they decrease plastic production and reduce plastic waste before it enters the natural environment. These technological and business-model innovations tend to target developed markets.[46] Downstream interventions focus on improving and expanding waste collection and management. Investment opportunities in collection, recycling and repurposing, and conversion and disposal are generally weighted toward developing and emerging markets.[47] Recent resistance from emerging markets to accepting plastic waste imports could create downstream waste management opportunities in developed markets.[48]

Public equities could provide one of the most accessible options for integrating plastics-related considerations into investment portfolios. Corporate sustainability and environmental, social and governance (ESG) disclosures provide useful data for evaluating corporate commitments to sustainable product development and waste reduction initiatives and progress. Increased client demand is helping to drive the investment community to develop new investment products and solutions that address plastic waste. Separately managed accounts and SDG-aligned funds may provide investors with interim investment solutions while more plastics-focused investment products are brought to market.

Corporate debt issuers in the waste collection industry and municipal debt offerings that support recycling, industrial composting and anaerobic digestion infrastructure offer fixed-income investors the opportunity to invest directly in projects that increase plastic waste management capacity and help drive positive environmental impact. Corporate green and sustainability bonds earmarked for decreasing unnecessary plastic use through business and product innovation or for enhancing recycling initiatives could also help to reduce plastic waste.

Alternative investment opportunities like waste-to-value or recycling infrastructure can also provide investors with direct exposure to real assets that help reduce plastic waste. Private equity and venture capital investments focused on commercializing alternative materials or funding new business models for reducing, replacing or eliminating packaging offer investors an additional alternatives strategy for gaining exposure to upstream plastic solutions.

Conclusion

Plastics have contributed to global economic growth for decades, but increasing public awareness of plastic waste's economic and environmental impacts is driving a potential change in the plastics landscape.

Morgan Stanley believes capital markets institutions are essential to realizing a system-wide approach for reducing plastic waste by bringing innovations to market and by scaling solutions across the plastics value chain. Investors looking to support plastic solutions or concerned with the risks of a changing plastic landscape can use this brief to help integrate plastic considerations into their investment decision-making processes.

Changes in consumer preferences and increased regulation pose risks to companies across the plastics value chain. Companies are responding to the mounting pressure by developing strategies to better measure and manage their plastic footprints. These changes also offer opportunities to generate economic value from otherwise wasted resources.

A Spectrum of Investment Approaches Across Asset Classes

FIGURE 6

MINIMIZE NEGATIVE IMPACT → **TARGET IMPACT**

RESTRICTION SCREENING

As plastics data availability improves, opportunities for investors to develop restriction screens will increase. Investors might consider limiting exposure to companies that have significant reputational, revenue or cost risks due to intensive plastics usage or reliance on plastic products or packaging. This approach can help minimize exposure to long-term risks and align investments with an investor's core values or environmental goals, but can limit one's investable universe and may not be appropriate for investors interested in more proactive plastic waste solutions.

ESG INTEGRATION

Improved data availability will also increase plastics-focused ESG integration opportunities. Investors may be interested in using environmental metrics to identify companies with strong plastic waste reduction efforts. Key indicators for leadership on reducing plastic waste can include:

- Product innovation and impact minimization scores
- Resource use scores
- Strong take-back and recycling initiatives
- Percentage of raw materials used from recycled sources
- Packaging waste management scores

THEMATIC AND IMPACT INVESTING

Investors interested in taking a more proactive approach to reducing plastic waste can explore specific themes or solutions at different stages of the plastics value chain:

- Infrastructure funds targeting such themes as recycling, industrial digesters and composting, and waste-to-energy solutions can address downstream plastic waste reduction opportunities.
- Private equity and venture capital investments can offer opportunities to bring new materials to market or fund new business models focused on reducing, replacing or eliminating packaging to drive upstream plastic solutions.
- Private market investments in informal collection and recycling communities in emerging markets can help drive greater social impact alongside environmental impact.

PUBLIC MARKETS → **PRIVATE MARKETS**

SHAREHOLDER ENGAGEMENT

Some investors use shareholder engagement opportunities to take positions on issues they care about. Shareholder engagement can provide investors the opportunity to discuss and influence corporate strategies to manage plastic footprints. Active dialogue with management can help companies develop plastic waste reduction goals, increase recycled content in packaging and drive product and business-model innovations. Investors can also affect corporate action on plastic waste though proxy voting and filing resolutions.

Notes

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Disclosures

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