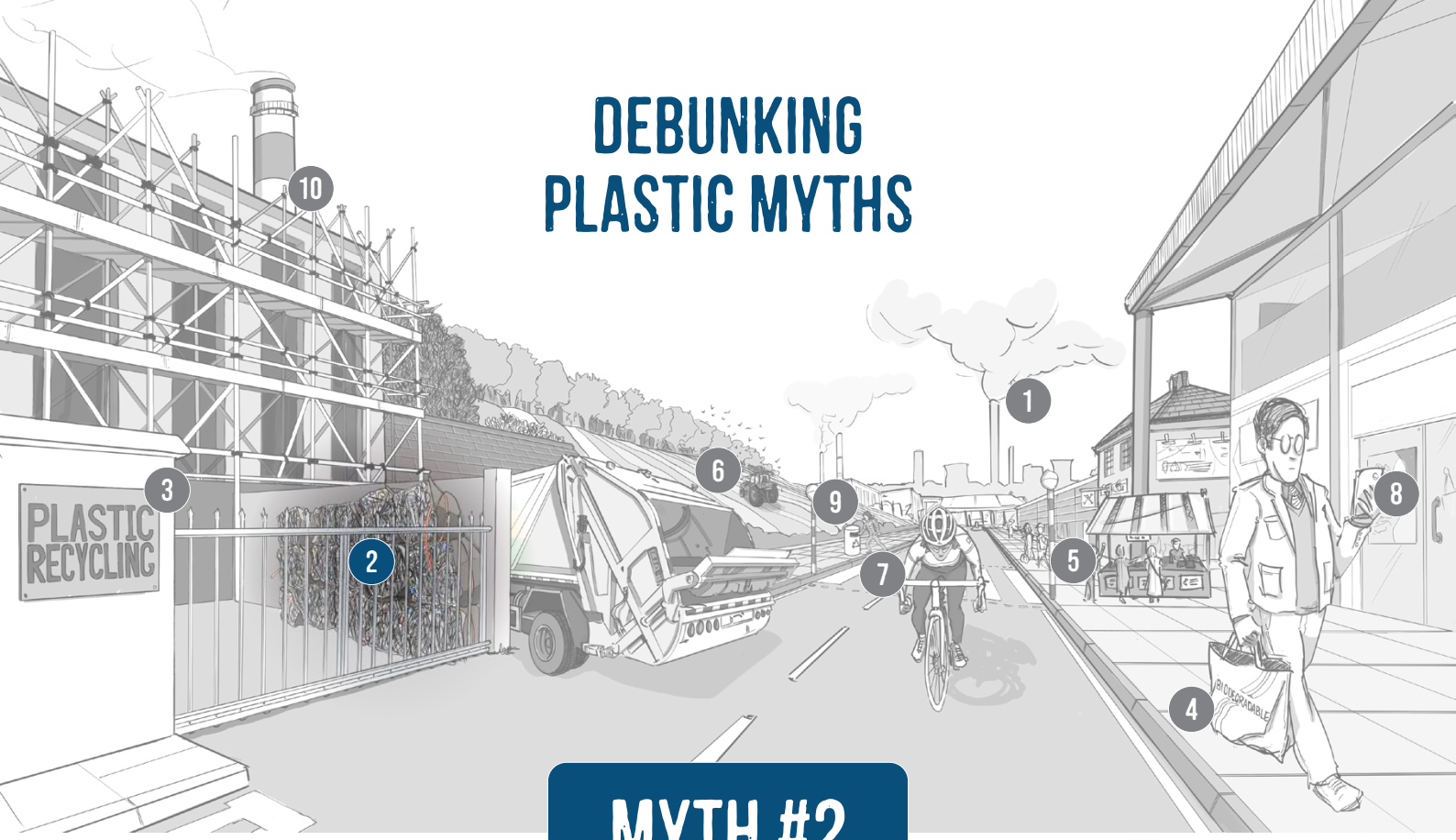
DEBUNKING PLASTIC MYTHS



MYTH #2

THE MARKET FOR RECYCLED PLASTIC IS ROBUST

The complexity of plastic recycling brings high costs associated with infrastructure and processing. In addition, plastic degrades during recycling and may contain contaminants that can compromise the integrity and safety of recycled products. Therefore, rather than recycled plastic, the most reliable choice is virgin plastic, which product manufacturers prefer because it is superior in performance and reliability and, in most cases, cheaper. In the absence of interventions, the market for recycled plastic is unlikely to become robust.

Limitations and complications

The non-homogeneous nature of plastic waste carries significant implications for the recycling industry (Eriksen et al., 2018). Some products are made using more than one type of plastic, and so the different materials may have different processing temperatures and melting points making the process of separating the materials more difficult and expensive (Hahladakis & Iacovidou, 2018). In addition, the recycling process degrades plastic (ibid; Ragaert et al., 2017). The forces of heating and mechanical shear cause small changes to the molecular structure of the resin. Each successive reprocessing degrades the material further from its original characteristics, and results in material to some degree inferior to the original polymer. This is an example of downcycling (La Mantia, 2004), and works against the development of a circular economy for plastics.

Other complications that impede reprocessing include the contamination of plastic waste by food and beverage residues and other contaminates usually: labels; adhesives; inks; and other impurities. An enormous amount of contaminated waste comes from the plastic packaging used in ready-made and fast food. The process of separating contaminated plastics requires special equipment, and is particularly costly, but the failure to remove contamination can undermine an entire batch (Eriksen et al., 2018). Additives that are used to meet regulatory and manufacturer requirements – flame retardants and antistatic agents,

antioxidants, colorants, fillers, and reinforcements – also complicate the recycling process. Additives mixed at the molecular level cannot be removed, and the reprocessed plastics containing such additives are degraded to inferior material (Hahladakis & Iacovidou, 2018; Hahladakis et al., 2018).

The markets for plastics

Global production of plastic has expanded from 200 million tonnes in 2002 to the current level of roughly 348 million tonnes, no more than 10 per cent of which has been recycled to date (Geyer, 2020).

Polyethylene terephthalate (PET) and high-density polyethylene (HDPE) plastic are two of the most widely available plastics, and are the most widely recycled (ibid.). Blue Weave Consulting, 2021 reports that, "According to PET Resin Association, the PET recycling rate is 31 per cent in the United States and 52 per cent in Europe." This level of success is attributable to the relatively low temperatures at which the polymer chains break down (Thomas, 2012), and – in an exception to the general rule – to the lower selling price of the recycled material over the past couple of years.

Producers generally prefer virgin plastics to their metal, glass, and ceramic counterparts due to their cheaper market price, which is attributable in part to the large subsidies for the fossil fuel industry (Dalberg Advisors & WWF, 2021). The market price of plastics is linked to current fossil fuel prices, which can be influenced by demand, commodity trading, global crises, natural disasters and other market conditions that make the price of plastics subject to volatility (Ebner & Iacovidou 2021). Plastic manufacturers purchase long-term contracts for fixed amounts of fossil materials at a discount (Daniel, 2020), and can purchase at lower costs by exploiting economies of scale wherein they receive substantial discounts in unit prices in exchange for large purchase quantities. The large competitive market for plastics ensures that buyers can discriminate on the basis of price.

In contrast, the plastic recycling sector is considerably smaller, more fragmented and geographicaly dispersed than the primary production sector (OECD, 2018). The smaller and more widely scattered companies working in this sector spend a considerable amount of time and effort in finding and establishing business relationships with buyers and sellers. Recycled plastic cannot compete with virgin material on the basis of price or quality, giving rise to important economic risks that have inhibited investment in the recycling industry (Iacovidou et al., 2021). The costs of recycling include collection, sorting, transportation, treatment, and reprocessing, and these costs are reflected in the market price for recycled plastic – making them more expensive that their virgin counterparts (Ebner & Iacovidou, 2021).

In the current market, any expectation that producers will increase the recycled plastic content in their products is misplaced. Support for the plastic recycling effort comes from eco-marketing campaigns that raise awareness of the plastic waste problem and from foundation and government grants, but this support is insufficient to sustain a market for recycled plastic. Government regulation of single-use plastic products helps reduce plastic pollution, litter, and waste, and supports recycling efforts through reducing contamination and promoting reuse and recycled content (Washington Department of Ecology, 2021a), but these outcomes, while beneficial, have little effect on the market for recycled plastic.

Some producers voluntarily use recycled plastic to signal their environmental concerns to consumers or in anticipation of governmental regulations, and an increasing number of brands have committed to using 25 per cent recycled plastic in their packaging (Shiran & Kremer, 2021). These developments create demand for recycled plastic, but are thus far insufficient to sustain a market.

The role of government

The production and consumption subsidies that governments provide to the fossil fuel industry globally come up to US $500 billion annually, and have distorted the recycling markets and led to adverse environmental effects (Geddes et al., 2020). More than 99 per cent of all plastics are manufactured from fossil fuels (CIEL, 2017), so the production of virgin plastic is directly subsidized. When governments pay for plastic waste collection, sorting, treatment, and transportation and provide grants to agencies providing those services, they are really paying for the market externalities of plastic production. These costs are imposed on society by the negative effects of production and are not reflected in the prices charged for the goods. So, by subsidizing fossil fuels and then paying the costs associated with the externalities of plastic production, governments are distorting the plastics markets from two directions.

One approach that governments are taking to reverse the subsidization of the externalities of plastic production is Extended Producer Responsibility (EPR), a policy tool that helps facilitate recycling and promotes environmentally friendly product design (Pouikli, 2020; Walker et al., 2021). EPR is intended

to hold manufacturers responsible for the post-consumer treatment or disposal of their products. In practice, EPR can result in design changes that enable the effective and efficient recycling of product waste. In some cases, producers pay a fee for the management of their products' waste.

Another regulatory approach – mandates for recycled content in plastic products – requires producers to use recycled material regardless of price. This mechanism increases both the demand for recycled material and the price of the new products (Felton, 2020). On the face of it, this approach would appear to correct some of the market failures by making producers use some of the waste they generate, but the recycling system is complicated. Problems with collection and sorting compromise the recycled material and decrease its value, and requiring producers to use a certain percentage of recycled material in their products does not necessarily make the problems with collection and sorting go away.

What can we do?

In the absence of a natural market, policymakers need to take further steps to create and sustain a viable market for recycled plastic. The solutions may include the realignment of subsidies, the adoption of Extended Producer Responsibility schemes, the adoption of policies that promote a mandatory recycled content, and innovations in recycling systems. All of these strategies may make the recycled plastics sector more attractive to investors and together may encourage more robust collection and treatment.

1. Realign subsidies to support markets for recycled plastic

The recent environmental challenges call for new subsidy schemes, and the elimination of fossil fuel subsidies is long overdue, but the barriers to removal of these subsidies are substantial – the political power of the industry, the fear of job losses, and the fear that higher energy prices might hinder growth or trigger inflation (Urpelainen & George, 2021). The removal of subsidies would, however, increase the price of virgin plastic by raising the price producers pay for fossil fuels, and would thus improve the competitive position of recycled plastic at least in terms of price.

2. Adopt public policies on Extended Producer Responsibility

Plastic materials brought to the market should be designed in accordance with circular economy principles, and EPR is a step in that direction. EPR also shifts some of the burden of collection, sorting, treatment, and transportation from government and the public to the producers. To the extent that these externalities become part of the pricing of virgin plastic products, recycled material becomes more competitive.

3. Adopt public policies on mandatory recycled content

Governments can and do require minimum amounts of recycled content in certain products, and can support this strategy by their own purchases. The idea is to support markets for recycled materials while reducing dependence on virgin plastics (Washington Department of Ecology, 2021b). Legislation that focuses on improving the quantity and quality of the supply of recyclable materials has no effect on end markets for these materials, but minimum requirements for recycled content actually help create the end markets that a circular economy needs (ibid.).

4. Apply innovative approaches to improving the recycling system

The whole recycling system needs to be redesigned (Iacovidou et al., 2021). Innovations could include systems based on advanced robots, machine learning, artificial intelligence, digital markers for traceability and polymer and product identification, and advanced spectroscopy for the detection and removal of unwanted materials (Shiran & Kremer, 2021). Improvements in sorting and recycling processes are necessary, as are investments in new plastic waste recycling technologies (Fråne et al, 2014; Shiran and Kremer, 2021).

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