BCG's Latest Report on Sustainability: "A Circular Solution to Plastic Waste"

September 18, 2019 - Plastics have delivered enormous societal benefits including providing product safety and enabling storage and complex transportation, among others. We produce some 350 million tons of plastics every year. The problem is that we have been unable to manage the waste they create at a sustainable pace. About 250 million end up in landfills or the environment and 10 million in oceans.

A rising awareness to limit plastic waste has risen across regulators, society and companies. Banning single-use plastics, establishing ambitious recycling targets, pushing for minimum recycled content quotas… All these actions have signaled the possibility of a rapid change in the status quo.

However, the current solutions are insufficient and incomplete. There are at least seven major forms of plastics, each with its own chemical composition and purpose. About 50% of all plastic consumption is used for flexible packaging which are poor feedstock for recycling. Current recycling technologies require well-developed waste sorting and collection systems, which are present in only more mature markets. These factors complicate existing mechanical recycling efforts.

Recently, new circular technologies like chemical recycling have emerged as feasible solutions not only to recycling low-value materials, like foils and blends, but also offering a real value proposition in remote areas and decentralized systems.

Chemical recycling can be also be referred as plastics regeneration, and it achieves a particularly circular approach by reversing the chemical composition of these materials, basically turning them back to stable monomers. As output, pyrolysis can yield approximately 70-80% oil and 10-15% gas.

In this report, BCG analyzes the plastic waste hierarchy with special focus on chemical recycling via pyrolysis and its business case. There are mainly 4 factors that determine pyrolysis economics: addressable volume of plastic waste, feedstock acquisition and treatment costs, the capacity and operating expenses of pyrolysis plants, and potential revenues from the sale of pyrolysis gas and liquids.

Nonetheless, the research proves that while the financial and business challenges vary, pyrolysis could be economically viable in a wide range of markets from Indonesia to the US. For instance, it has the potential to treat up to two-thirds of the plastic waste generated in Jakarta. A visualization of BCG's pyrolysis analysis is available here.

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18/09/2019