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What's next for plastic?

Strategies to propel leadership in the
commoditized plastics market

The future of plastics

Plastics touch almost every aspect of our lives, and the demand for polyethylene continues to rise. In North America, the polyethylene market enjoys a plentiful supply of relatively low cost feedstock. Because the market is dominated by a few volume sellers, the business is often considered similar to oil. However, to compete in the commoditized plastics market, companies must refine their strategies. Suppliers will need to focus on better understanding their customers and improving supply-chain agility to meet the needs of more diversified customer end uses. Companies also will have to place a greater emphasis on sustainability.

Standing out in a competitive market

Polyethylene (PE) is the most widely used plastic globally. Overall, the global cross-linked polyethylene market was valued at USD 4.76 billion in 2015 and is projected to reach USD 9.43 billion by 2026. The compound annual growth rate (CAGR) was 6.42 percent from 2016 – 2026, significantly higher than overall GDP growth. That's a lot of plastic.

For the next several years, polyethylene suppliers have the prospect of enjoying unprecedented growth options and higher margins. The low price of oil is making the market attractive for new plastics applications, which is driving innovation in polyethylene products. Competition also may arise from imports and small companies working on environmentally friendly niche substitutes for PEs. The production of PE requires economies of scale with units typically integrated into extensive petrochemical complexes that make feedstock ethylene as well as co-products. As a result, the industry in

the United States is largely composed of integrated global petrochemical giants that have undergone consolidation in recent years.

Because of increased competition, PE providers can no longer rely on price differentials. Given the industry characteristics, the barriers for “digital attackers” are fairly high. But digital technology provides new options for maintaining or capturing clients for the mid-to-large PE producers. As digital options continue to advance, customers expect better service. To set themselves apart in the market, providers will need to embrace new and emerging technologies. They will have to create compelling customer experiences and drive operational efficiencies, new opportunities and disruptive innovations to compete. Shifting towards this type of innovative culture and more participative ecosystems can also foster reliable and collaborative partnerships with both suppliers and customers.

Responding to customer needs

PE companies often suffer from a lack of customer and user insights. Sometimes, they have a limited understanding of how their consumer segmentation is changing or how existing products might be used in new markets. PE sales and marketing functions also suffer from a lack of visibility into pricing, operational execution and competitive logistics, which can result in a disconnect between contracting and the opportunity pipeline. In today's digital environment, the sales force can't just knock on doors. As global and digital footprints expand, opportunity extends beyond local chemical customers. For sustainable growth, leading PE companies must digitally transform the customer experience and take steps to exceed minimum baseline requirements.

Blockchain use in carbon accounting helps reduce greenhouse gases

Historically, the process of measuring greenhouse gas emissions throughout a complex supply chain has been challenging. However, Veridium Labs Ltd. is collaborating with IBM to help transform the carbon credit market using blockchain. Veridium plans to turn carbon credits into a new type of fungible digital asset that can be redeemed and traded with less friction.³ Putting the process of carbon accounting and offsetting in a token on a public, permissioned blockchain network makes it easier to transmit and trade ownership rights. The Veridium-issued token will be a new way to address the challenges of climate change with a simpler and more efficient approach to carbon accounting.

Creating a global supply chain

Currently, many PE companies suffer from a lack of agility in transportation, such as ports and railcars, to handle the additional capacity of polyethylene. Traffic jams, container unavailability and inefficiencies can disrupt the supply chain from production to shipment. Right now, many organizations have limited ability to track and trace across the supply chain. This poor visibility into inventory across the network results in difficulty in rebalancing demand and supply, which can have serious financial implications.

Forward-thinking organizations need to examine demand patterns and explore options when plants aren't close to raw materials. In the United States, the highest areas of PE demand are in the east north central and mid-Atlantic states. Creating an agile, resilient and seamless supply chain can help proactively address changes in market dynamics, optimize costs and increase speed to market. Digitizing the supply chain makes it possible to gain near real-time information on all supply chain assets, including in-transit inventory. Systems can then deliver contextualized information through mobile

devices with role-based access. With this new access to data, key performance indicators can be established as well as associated performance management processes. Incorporating analytics makes it possible to share insights and collaborate using tools across formerly isolated areas of the organization and across the entire supply chain. Analytics can quickly deliver insight at the point of consumption, and predictive analytics and augmented intelligence can help improve decision making in areas such as inventory management, supply and demand forecasting, distribution costs and manufacturing.

Companies that enhance their digital operations and embrace technological innovation can improve conversion and delivery in addition to digital automation of specific processes. For example, dynamic scheduling can connect real-time customer orders with production data to improve the order-scheduling process and increase customer fulfillment. Operations can be optimized through improved cost metrics and easy-to-configure logic that automates the mathematical complexity.

Embracing sustainability

Many ecological concerns surround plastics, and pressure is mounting globally to address issues related to plastic waste in the environment. Approximately 8 billion tons of plastic have been produced since the first plastic was created in 1907. And around 5 billion tons still exist in the environment.⁴ Almost two-thirds of plastic products are discarded, which results in plastic waste in landfills where waste-management services are mature. It also results in leakage into land and marine environments where services are lacking.⁵

The lifecycle of plastics is complex and fragmented, and the PE industry is subject to an array of environmental rules. The industry must follow laws and regulations related to the use, storage, handling, generation, transportation, emission, discharge, disposal and remediation of, and exposure to, hazardous and non-hazardous substances and wastes. Polyethylene manufacturing facilities are also subject to national, state or provincial and local standards that regulate air, water and land quality effects from manufacturing operations. Market

pressures may lead to further regulations, which might increase cost of feedstocks and fuel. For example, bans on micro bead PE, plastic films and plastic bags have already been implemented in some areas.

In the United States, 8.8 percent of plastic solid waste is recovered, although not necessarily recycled.⁶ In Europe, the number is 30 percent.⁷ Mechanical recycling rates are highest for rigid bottles, but other forms of reuse and recycling are needed for other packaging formats and to produce recycled content that more closely resembles virgin material. Producing PE from bio-based sources, such as sugar cane or beets, may also help with sustainability.

With 18 billion pounds of plastic waste flowing into the oceans, it's clear current recycling efforts must improve.⁸ Responsible material suppliers need to consider ways to better address sustainability issues. Creating this type of circular economy can lead to innovation, new business channels, optimized processes and less waste.⁹ Choosing the right resin for customers and working to improve sustainability is cost-effective for everyone.

Chemical plastic recycling

The limitations of typical mechanical recycling methods lead most plastics to end up in landfills where they take hundreds of years to decompose. However, the development of cost-efficient chemical recycling methods has great potential. Chemical polymer recycling relies on the design of depolymerization catalysts and the development of recyclable polymers for targeted applications. Concurrent with the development of depolymerization catalysts and new recyclable materials, mechanical sorting methods in recycling plants and decontamination processes must continue to be improved. Then, chemical depolymerization processes can be applied to pure starting materials, and precious monomers can be recovered.¹⁰

Increasing investments

The investment in chemical plants has surged in recent years, surpassing the USD 180 billion mark since 2010.¹¹ In the last year, several PE manufacturing facilities started production and US global market share is increasing. As competition and price pressures increase in the commoditized PE marketplace, the need for efficiency and innovation rises. Digital technologies, new strategies, business models and experiences will be keys to success in this complex environment. Organizations that focus on customer needs, sustainability and supply-chain capabilities will be able to innovate, compete and succeed in a digital business future.

As you look at new opportunities, consider these questions:

- Where are the biggest threats coming from?
- What are the biggest concerns about operations, production and the supply chain?
- How are customer profiles changing and what are their demands?
- How are employee profiles changing and what are their expectations from a workplace perspective?
- How do operating expenses map against product yields, volumes and profitability?

Notes and sources

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