

Study: Chemical recycling may need decades to be 'low cost'

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Chemical recycling technologies could take until 2050 to have enough scale to achieve a low-cost position in the marketplace, according to an analysis from consulting firm IHS Markit presented at a recent industry conference.

The new study, from the firm's Circular Plastics Service, predicts that the percentage of plastics from recycled sources could grow from 15 percent of total production today to 50 percent by 2050.

It predicts steady, incremental growth in traditional mechanical recycling but estimates that the potential for plastics made from chemical recycling will remain fairly limited until 2030 and could show significant growth after 2040.

The analysis came in comments and presentations from IHS consultants at the online Global Plastics Summit, held Oct. 25-28 and sponsored by the firm.

Vice President Anthony Palmer said the cost structure for chemical recycling, which breaks down the polymer bonds of plastics to recycle them, is currently "unfavorable."

"The cost structure is unfavorable right now," Palmer said. "In fact, our analysis ... had a cost curve view for 2030, and ... in that situation, chemical recycling was still more expensive in most regions than virgin."

But he said that over the next few decades, chemical recycling could follow the pattern of other plastics resin technologies and start to see "significant reductions" in fixed costs.

"The conclusion I would say right now is that yes, chemical [recycling] is more expensive than virgin. Mechanical is lower cost," Palmer said. "But in the long-term view, depending on the

experience curve and how these technologies develop, we could expect to see a more significant improvement when we look out to the 2050 time frame."

A chart in presentations by both Palmer and Jonny Goyal, IHS associate director of technology and infrastructure, said that "chemical recycling at-scale has the potential to move from a high-cost position in 2030 to a low-cost position in 2050."

"Chemical recycling has a capability to achieve a low-cost scenario by year 2050," Goyal said. "By 2030 ... the scale is an issue because the scale of [the] economics are not great."

The study predicts that mechanical recycling capacity could grow from 20 million metric tons globally today to between 112 million and 200 million tonnes by 2050.

While significant, the study said mechanical recycling would plateau at between 14 and 22 percent of total plastics demand by 2050.

That would require chemical recycling technologies to "close the gap," the study said, and hit its target of 50 percent of plastics demand coming from recycled sources.

For chemical recycling, the analysis said it could grow from 1.2 million tonnes today to between 44 million and 190 million metric tons by 2050, depending on various economic and policy scenarios.

Palmer said most chemical recycling will use pyrolysis technology but he said that "we don't expect large increases in pyrolysis capacity" by 2030.

He said the study predicts that chemical recycling "grows dramatically post-2040" as technology and infrastructure develop.

"We could envision costs coming down significantly," Palmer said. "That's an assumption that's built into our aggressive case in which we reach a circular economy by 2050."

The study was released in early October but the presentations included new details around chemical recycling cost positions.

In a panel at the IHS event, Carsten Larsen, chief commercial officer with chemical recycling firm Agilyx Corp., compared his industry to the development of wind power, which initially was much more expensive than other generation technologies.

"[People said] this is never going to be cost-competitive; people were skeptical," he said. "Now, we have countries in the world that have more than 20 percent — 20 percent — of their energy consumption cost-competitively served by wind."

He also said chemical recycling will be crucial to provide recycled content in plastic food packaging.

But one environmental group that's studied chemical recycling said it's "damning" that it will take the technology decades to be low cost.

"If this study, which we have to assume is on the optimistic side, says that chemical recycling can't be cost-competitive until 2050, it's pretty damning," said Neil Tangri, science and policy director for the Global Alliance for Incinerator Alternatives.

He pointed a Pew Charitable Trust study that said that chemical recycling is projected to grow 16 percent a year until 2040 but he said that won't "make more than a dent in the waste problem."

"At current growth rates, plastic production and waste generation will have tripled by then," said Tangri, who was not speaking at the event.

Chemical recycling, or advanced recycling as it's sometimes called, is a significant part of the industry's policy response to plastics waste concerns in the United States and worldwide.

The American Chemistry Council includes favorable regulations and laws for it among its lobbying priorities for plastics in Washington and state capitals, and the role of the technology is becoming a larger part of policy debates.