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Circular economy: Ensuring the right chemistry

As a manufacturer of packaging materials, family-owned business Südpack believes it has a responsibility to make its contribution to the circular economy. The company is taking its efforts a step further and wants to help achieve a breakthrough with a technology that could revolutionize plastic recycling.

Even if the terminology has changed in recent decades, sustainable ways of doing business, together with environmental and social responsibility, have always been important pillars underpinning the corporate culture at Südpack. As a film manufacturer with an international ambit, it therefore plans for the long term and with a sense of responsibility, emphasises Valeska Haux, Vice President Strategic Marketing. “The defining characteristic of our business is its ‘family firm’ culture,” says Dirk Hardow, who has headed the Functional Films and Compounds (FF&C) Business Unit for the past two years. “That means short decision pathways, a spirit of innovation and rapid implementation.” Hardow’s area of specialization is in films that have a functional component or a technical function in addition to their main packaging role. A qualified industrial engineer, he is familiar with developing new business models in the area of the circular economy. After all, the firm is fully aware that the bulk of its products will be turned into waste after a single use.

For the manufacturer, mechanical recycling plays a vital part in turning all this back into useful raw materials. But that is not enough to ensure the best recycling outcome, either for all the types of plastic involved or for the volume of packaging that builds up, and the recyclates obtained in the process are not always appropriate as a raw material for new, functional film or for film for use in direct contact with foodstuffs. According to the European Commission’s Green Deal, however, all plastic packaging must be recyclable by 2030. That means the materials must be designed to be fed into the relevant recycling flows. “But we have to distinguish between the theoretical recyclability of the materials and the actual available capacities of the recyclable materials industry,” notes Hardow. “This is where there is a major discrepancy.”

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Breaking plastic down into its components

Hardow firmly believes one technology has the potential to resolve the problems of recyclability: chemical recycling. For composite films, in particular, this could be used to create a closed cycle.

The properties of the film, which is made of several layers, make it indispensable in many cases in terms of product protection and hygiene requirements. Reusing this product, however, is beyond the limits of mechanical recycling facilities. As a result, this valuable raw material ends up in an incineration plant. But that's about to change, thanks to chemical recycling.

Südpack has found a partner to put this project into practical application in plant construction firm Recenso. Its Carboliq procedure converts mixed plastic waste – the sort that usually goes into the yellow bin in Germany – into an oil that serves as a raw material for the production of new, high-grade plastics. “The good thing about granulate from chemical recycling is that it is absolutely on a par with the virgin material and can therefore provide the high quality needed for functional films, for example,” comments Hardow. “There is also the possibility of obtaining a granulate that is also permitted for re-use in contact with foodstuffs.”

An industrial-scale pilot plant has already been set up on the site of the Ennigerloh disposal centre. “We signed a cooperation agreement with Recenso in 2020,” says Hardow. “That enabled the company to run and test its system in continuous operation. As far as I know, this is currently the only chemical recycling plant in Europe that operates continuously.” He believes that emphasises the safety of the process. The companies have also been able to confirm the long-term energy efficiency of the process: It can operate at relatively low temperatures in the order of 360°C, which not only saves energy but also avoids the formation of critical substances such as dioxins and furans. The process is also energy-efficient, since it runs at normal pressure. “We ran a trial with a flow of waste,” recounts Hardow. “One half went into the incinerator, and the other into the pyrolysis unit. Based on a direct comparison we achieved a carbon saving of 46 percent with the Carboliq process. Using 100-percent renewable energy for the process, the saving would come to 64 percent.”

Toward the zero-waste company

One of the uses of the plant for Südpack is to press forward with recycling its own material flows, including its production waste. Unlike the situation with many other technologies, polyamides and polystyrene pose no problem. “The pyrolysis oil that is obtained can be fed into cracking systems at petrochemical facilities with no problems and be processed into polymers,” Hardow explains. “That means that the materials we put onto the market can be recycled using chemical recycling processes and serve as the raw material for new film.”

Based on this positive experience, Südpack decided at the beginning of this year to expand its partnership with Recenso and also increase its financial commitment. The partners have also made very good progress with their planning for an industrial facility. “If we want the circular economy to become reality, we know we can’t just rest on our laurels as material manufacturers,” asserts Hardow. “We have to think as part of the value chain instead. That’s why we are constantly engaging in dialogue with various players in the value chain, in the hope of not merely completing the cycle with a pilot facility. It goes without saying that a pilot facility’s capacity would be insufficient to recycle the huge volume of currently unrecycled plastics that is generated in Germany every year.” By including flows of recyclable materials that it was previously impossible to recycle into new film, Südpack hopes in the medium term to develop into a zero-waste company and also help other companies in the same regard.

Valeska Haux hopes that policy-makers will acknowledge chemical recycling in their calculations of the proportions of recyclates in packaging. “That would raise the willingness of the industry to invest in this technology,” she notes. “With this process, Südpack has taken the first step toward showing that this is a robust procedure that can help to resolve many problems.” Now it is up to policy-makers to put the necessary overall conditions in place.

The company would like to meet other supporters – at FACHPACK in Nuremberg, for example. Haux is looking forward to the trade fair this autumn: “I’ve known and appreciated FACHPACK for many years. It’s the leading trade fair for packaging, especially for the German-speaking market and the countries in the eastern part of Europe. We appreciate the format – an in-depth programme packed into three days and covering the full cross-section of the industry.”



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