

Recycled Carbon Black: A Ripe Market Set to Explode

📅 3 May 2023 👤 [Krystyna Lagowski](#)

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A processing tunnel for carbon black recycling at Environmental Waste International. Photo Environmental Waste International

Carbon black recycling is vital to sustainability.

As major tire companies commit to their products containing up to 50 percent sustainable products by 2030, the market is ripe for recycled carbon black.

Recycled carbon black, sometimes referred to as “rCB,” is derived from end-of-life tires through various processes. “The recycled carbon black market is expected to explode in the next two years,” says Steve Kantor, chief technology officer at Environmental Waste International (EWI), an organization that designs and develops eco-friendly systems for the breakdown of organic materials. He estimates the demand for recycled carbon black will increase up to 100 million tons over the next 10 to 20 years.

There are different ways of producing carbon black. Many companies use a technique called pyrolysis, but according to Kantor, this doesn’t necessarily result in a consistent quality of product. In most pyrolytic work, rubber is brought down to a crumb rubber, put into a produce vessel which is sealed off, and heated up externally. The recycled carbon black left inside the vessel is left to cool off and then removed.

Some are done in a batch process and others in a continuous feed. Kantor explains that at EWI, tire shred is continuously fed, which does not consume as much energy. “We take tire shred, feed it through continuously, heat it with external heat similar to pyrolysis, but also use microwave energy,” he says. As a result, there’s not only less energy consumption but a more consistent quality to the product. Plus, microwave technology is powered by electricity, which is a clean energy source, particularly in Ontario.



Steve Kantor, Chief Technology Officer at Environmental Waste International. Photo Environmental Waste International

10 years to meet goals

Currently, tires can take anywhere from 10 to 20 percent recycled carbon black. But in the future, that will change. Kantor believes it will take about 10 years to meet the goals that are being outlined.

At the University of British Columbia, Dr. Lukas Bichler is a professor at the School of Engineering and works in the area of materials and manufacturing. In 2016, he was

approached by KalTire Mining Tire Group (KT-MTG) to help them repurpose carbon black material originating from their recycling operations. KT-MTG has developed a unique technology to recycle off-the-road (OTR) mining tires.

“Each mining tire is about 2,000 pounds, and the tires are designed and manufactured to be very long-lasting,” describes Dr. Bichler. “It doesn’t break down or degrade on its own.” This is where KT-MTG’s technology comes in, since their tire recycling process is able to break down OTR tires, and one of the outcomes is carbon black. “In a typical mining tire, about 30 percent of its mass after the recycling process can be converted to carbon black. So the amount of carbon black that you can recover is quite substantial.”

The plan with KalTire was to figure out how to upgrade the recycled carbon black so that it would perform as well as virgin carbon black. “The economical and environmental aspects of working with recovered carbon black make it very attractive in comparison to virgin carbon black,” notes Dr. Bichler.

Enhancing purity

Dr. Bichler and his students have been working to enhance the purity of carbon black by removing contaminants and by-products. To date, the team has achieved more than 99 percent purity of carbon.

Another area that Dr. Bichler and his students are exploring is using recycled carbon black in batteries for electric vehicles. “We’re trying to take the carbon black, clean it up, optimize it and then add the carbon black to lithium-ion battery electrodes instead of currently used graphite or petrochemically derived carbons,” he reports. This has shown great promise and “... opens up a whole set of opportunities.”

The federal government has said that carbon or graphite is becoming a critical mineral, so having a Canadian supply chain is becoming very important for the Canadian economy.

Circular economy



Dr. Lukas Bichler, Professor,
University of British
Columbia. Photo University
of British Columbia

At Ecolomondo, a \$45 million plant has just been completed in Hawkesbury dedicated to a thermal decomposition process, a proprietary recycling technology. “Recycling and waste is the holy grail of sustainability,” says Eliot Sorella, CEO at Ecolomondo. He believes that recovered carbon black is in high demand today because the production of virgin carbon black has plateaued. “Many governments restrain product of virgin carbon black because it creates a lot of emissions.”

Often, recycled carbon black can be blended with virgin carbon black at a 50 or 60-percent blend. “You’re taking one pound of carbon black and making two pounds of carbon black if you buy recovered product,” Sorella explains. Right now, rubber crumb is being sold at anywhere from \$500 to \$700 a ton. “We get double that just from the recovered carbon black.”

Sorella notes that recycled carbon black brings a lot of economic value to Canada, and to the global circular economy. “The circular economy and future sustainability depend on companies like Ecolomondo,” he stresses. “Otherwise, there’s no way that the planet will be able to sustain and produce what we need for our expanded manufacturing sector.”

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