

TIRE RETREADING & REPAIR



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Photo above: As many as 50% of the OTR tires intended for repairing or retreading may be scrapped.

CONVERTING WHOLE OTR SCRAP TIRES TO ENERGY

by Marvin Bozarth
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The disposal of scrap tires and unretreadable casings has always been a problem for tire dealers and retreaders. For many years, scrap tires were buried in landfills, caves, mines, and deep ravines. In many cases, these tires – which had air trapped inside them – were then covered with dirt, eventually working their way to the surface. This inevitably led to various regulations dealing with the disposal of scrap tires.

Some states required tires to be cut into several pieces to keep them from trapping air and working their way to the surface, and other states forbid tires from being placed in landfills. These restrictions, along with some very creative individuals, have brought about a host of products that are made from scrap tires. Although most people refuse to call it "recycling," one of the most popular products that has surfaced is energy.

Today's scrap tires are ground up and burned in boilers and other types of equipment, as well as in some steam generating plants and cement kilns (where passenger and truck tires are burned whole). Until recently, large earthmover tires had to be cut into small pieces before they could be burned to create energy.



Hitec displays one of their smaller systems.



The larger Hitec waste-to-energy unit is displayed at their research center.

Hitec, LLC, owned by Harvey Buhr of Bonnots Mills, Missouri, has developed a system that not only allows whole off-the-road, giant tires, and shredded tires to be converted into energy as oil and high-BTU gas; it also recovers the steel and carbon. Buhr, who has been involved in industrial construction for most of his career, was always interested in researching alternative sources of energy and has always felt we should be able to use the scrap we generate.

Buhr has worked for several years in developing systems for several industries to recycle waste into energy. The successful completion in 2009 of two years of research and development for the Army Research Laboratory (ARL), under applied research grants from the Leonard Wood Institute (LWI), has led Hitec to find the bridge from research and development into commercialization.

In the research for the ARL, it was found that gas generated by the system could be used in boilers and



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Three 235R25 scrap tires being loaded into the Hitec unit.



Three 235R25 scrap tires after processing.

heaters in the same way as natural gas or propane could. It was also found that the fuel oil generated (which is similar to #2 diesel) could be used in Army generators in combat locations. With a small amount of refining, the fuel oil could be used in heavy equipment and motor vehicles on U.S. highways. More and more markets for the by-products of steel and carbon are being identified and developed. All of these recovered products lead to a greener economy and a smaller carbon footprint.

The Hitec system operates by placing whole tires in a large chamber and heating them under a vacuum. After an initial startup using natural gas or propane, the chamber is heated, and the gases or oil from the tires are used to complete the conversion process. This consumes only 25% of the energy produced.

Buhr's research has proven that his system is scalable. The size of the whole tires that can be processed in this system is limited only by the size of chamber that holds the tire. The system can be used to convert any biomass into energy; but it is especially designed to convert large, whole tires into energy. It would be possible for a large OTR retread plant to generate enough energy with this system to produce the steam and electricity to run their plant. As a result, the plant would be able to dispose of their waste tires and sell the steel and carbon by-product.

Hitec recently signed a Letter of Intent with State Fair Community College (SFCC) in Missouri, establishing them as the first incubator tenant for their newly developed Missouri Center for Waste to Energy Project. SFCC, along with the University of Central Missouri, the University of Missouri, Crowder College, Waste Corporation of Missouri, Pro Energy, and Kansas City Power and Light will combine their efforts to expand students' and faculties'

understanding of the ever-changing landscape we call "alternative energy." These institutions and businesses (and, hopefully the tire industry) will assist in providing research, development, and hands-on training opportunities for the students. In addition, new curriculum, focused on alternative energy, will be written to provide Missouri students with the knowledge needed to become leaders in the expanding alternative energy field. In addition, the gas produced from the Hitec process will be combined with landfill gas at this site to produce electricity.

In October of this year, the first Hitec waste-to-energy unit in the retread industry is scheduled to be installed at the RDH off-the-road retread plant in Cleveland, North Carolina. This unit will be used to establish markets for the recovered products and train employees in how to operate the system. This processor will be used to convert whole OTR tires, tire buffings, and other biomass into energy. RDH will use the gas they will be producing to fuel the processor burners and other heating applications. The fuel oil will be sold to local industries for use in their burner applications; the carbon will be recycled back into new rubber and other products; and the steel will be sold to steel mills for incorporation into new steel.

This eco-friendly process uses very little electrical energy, in addition to saving the energy that it takes to cut up or shred these tires. It will also reduce the carbon footprint normally associated with disposing used tires.

With the tremendous cost involved in transporting and cutting up the many thousands of giant tires that are generated annually, there is a continuing need for technologies to convert all tires to new products and low-cost energy. And, it is far more preferable to seeing scrap tires just lying around or covered in landfills.