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Increasing landfill fees and restrictions

by MAURA KELLER

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The cost of tipping fees within the waste and recycling industry is steadily increasing, according to the Environmental Research & Education Foundation's (EREF) recent landfill tipping fee report. As J.D. Ambati, founder and chief executive officer of EverestLabs explained, the report investigated the average municipal solid waste (MSW) landfill tipping fee and how it varies across the U.S.; whether tipping fees are increasing or decreasing over time; and how tipping fees are correlated to other MSW management practices.

"The findings of the 2022 report show that the average tipping fees for municipal solid waste landfills in the U.S. have spiked 11 percent from 2021 to 2022. In fact, all regions in the U.S. experienced price increases in 2022," said Ambati, who also pointed out that changes in the rates of tipping fees are based on the landfill's operational expenditures and revenue.

"The EREF explains specific factors that could contribute to changes in tip fees. They include the Consumer Price Index (CPI), motor vehicle repair, vehicle manufacturing and cost of labor," Ambati said. "They also explored the relationship between these four indicators and tipping fees and identified the strongest relationship between increased tipping fees and wages. Labor is one of the major expenses for waste management services and increasing tipping fees is one way that landfills make up for rising labor costs."

In addition to rising labor, the volume of waste generation has been steadily increasing while the increase of landfill space has not.

"In fact, the Solid Waste Environmental Excellence Protocol reports that the U.S. could run out of landfill capacity in 18 years," Ambati said. "At the same time, MSW generation is expected to increase by 50 percent by 2050. This macro trend combined with regulatory pressures on the waste industry is also driving higher costs across the industry."

Anthony "AJ" Diianno, vice president of recycled materials at Waste Harmonics, a national technology-enabled managed waste service provider, has over 10 years of experience in the waste and recycling industry and works with customers to develop comprehensive waste and recycling programs that best fit their needs to improve green initiatives and streamline costs.

According to Diianno, per a recent article published by Wastedive.com, "Ton-weighted average tipping fees for U.S. municipal solid waste landfills increased 11 percent from 2021 to 2022."

"These increases are causing customers to do a deeper dive into their waste



Cost of tipping fees within the waste and recycling industry is steadily increasing.

and recycling programs and look for ways to decrease their overall waste spend," Diianno said. "Industry experts continue to work with their customers on finding ways and helping establish best practices to reduce, reuse and recycle, which will help them with landfill diversion and these rising costs."

Michael McCamley at New West Gypsum Recycling also sees tipping fees increasing as landfill capacity is decreasing and obtaining new permits for landfills is getting harder. "In the case of gypsum waste, some landfill operators have to install equipment to manage hydrogen sulfide gases," McCamley said. "For gypsum recycling it brings more of a competitive advantage to recyclers because the cost of disposal becomes closer to the cost of recycling."

Industry Impacts

So how does the increase in tipping fees affect the waste and recycling industry?

Ambati said that the growth in tipping fees is often a catalyst for change for other businesses in the waste industry. For example, in a material recovery facility (MRF), the non-recyclable materials are sorted out from the recyclables and are sent to landfills for disposal.

"When MRFs drop off this material at a landfill, they have to pay a tipping fee based on the weight of the material they are dumping," Ambati said. As a result, when tipping fees increase, recycling facilities will find other ways to increase material recovery so they pay less when sending material to a landfill. This will result in increased recovery of recyclable materials, which has both economic and environmental benefits."

As MRFs recover more recyclables to avoid tipping fees, Ambati said they are more willing to sell recyclable commodities at lower prices, which will impact the recyclable commodity market.

"We need robust programs that create demand for recyclables by enforcing

packaging manufacturers to use more post-consumer recycled content in order to make recycling more economical," Ambati said. "Such policies are part of extended producer responsibility (EPR) programs that have been signed into law in many states."

In addition, the increase in tipping fees often discourages other MSW companies, including recycling companies, from disposing large amounts of material at a landfill and instead finding more cost effective ways to handle their waste.

According to Ambati, this could include adopting new technologies to facilitate waste reduction by increasing sorting and the recovery of valuable materials. The implementation of AI and robotics at MRFs is one avenue that can help recycling facilities increase material recovery and decrease costs.

"EverestLabs' RecycleOS is an enterprise AI & robotics platform that can recover two to three times more material than the current technology in place, decreasing the amount of recyclables being sent to landfill," Ambati said. "In fact, with our platform, EverestLabs customers are seeing 40 to 70 percent savings in landfilling costs."

As tipping expenses increase, municipalities must evaluate how and how often to pay for these increased expenses. As director of public works for the City of Lakewood, California, Lisa Ann Rapp said that process will result in increased costs to residents of communities in the form of higher service fees.

"Alternatively, some communities reduce or alter services in other areas to address such rising costs," said Rapp, who also serves as a board member from the solid waste management committee for the American Public Works Association. "Each community evaluates and makes decisions based upon what is in the best interest of their residents."

See INCREASING LANDFILL FEES, Page A4

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Casella recognizes 2023 sustainability leaders



Casella Waste Systems, Inc. recently honored six of its customers for their leadership in sustainability as part of Casella's annual Sustainability Leadership Awards.

The Casella Sustainability Leadership Awards represent innovation and commitment to creating a better tomorrow by showcasing each recipients' sustainable material management practices. Recipients were selected from a range of segments, including municipalities, colleges and universities, industrial manufacturers, food and beverage producers, and more.

"We are thrilled to acknowledge and celebrate the sustainability achievements of these organizations with our 2023 Sustainability Leadership Awards," said John W. Casella, Chairman and chief executive officer of Casella. "This year's recipients represent innovation and leadership in the sustainability space, and we are honored to work alongside them providing services to help advance their materials management initiatives."

"As our own sustainability journey evolves and continues forward, we are grateful to all our customers, who inspire us to continuously improve each day, and we look forward to honoring them in this manner each year," said Casella.

2023 Casella Sustainability Leadership Award Winners

- Boston University has entrusted Casella to help implement one of the country's leading campus resource management and zero-waste strategies. Since launch, Casella has supported many of the campus' initiatives including compost pilot programs, zero-waste events, a lab plastics recycling pilot program, a sustainability intern program, waste audits, and more, as well as worked to right-size service and improve efficiencies across campus using innovative technology.
- The City of Worcester, Massachusetts is one of Casella's largest municipal partners across the company's operating footprint. The city has been

dedicated to improving recycling quality by reducing contamination and, together with Casella, deployed dozens of measures to improve recycling habits, including the incorporation of new bins, educational materials, curbside audits, bin tagging, and community events, resulting in an almost 50 percent reduction in contamination. Their efforts are setting the standard for other municipalities in Central Massachusetts and beyond.

- Coca-Cola Beverages Northeast is one of the nation's largest Coca-Cola bottlers. Since 2016, the partnership between Coca-Cola Northeast and Casella has grown to encompass 26 branches, 46 vendors, and 36 managed waste and recycling streams. Today, Coca-Cola Northeast locations have collectively contributed to an impressive diversion rate of 93.7 percent, a testament to their devotion of time, effort, and resources to creating a more sustainable future for generations to come.
- Nestlé Purina's manufacturing facility in Allentown, Pennsylvania produces quality food for pets while implementing sustainable business practices. In collaboration with Casella, Nestlé has prioritized the recovery of organics, cardboard, LDPE film, and pallets, in addition to helping redirect an additional 2,300 tons per year of unsellable pet food away from incineration.
- Wake Robin, a continuing care retirement community in Shelburne, Vermont, has made the responsible stewardship of resources part of its core mission. The community has fully implemented Casella's Zero-Sort Recycling, compost, and municipal solid waste services, in addition to establishing their own initiatives, such as the Wake Robin Green Committee and Climate Action Taskforce, to further explore and expand on-site sustainability programs with the support of residents, staff, and administration.
- The WooSox, Triple-A affiliate of the Boston Red Sox, in Worcester, Massachusetts took the field at Polar Park for its first home game in May 2021, marking the redevelopment of a 12 acre parking lot brownfield into a valued community resource. As the stadium's preferred waste and recycling provider, Casella has proudly supported the WooSox's commitment to environmental stewardship with waste, recycling, and organics services while providing educational resources for the Worcester community.

Anaergia affiliate Kent County Bioenergy Facility awarded \$5M grant

Kent County Bioenergy Facility, LLC, a subsidiary of Anaergia Inc., has been awarded a \$5 million grant from the Michigan Public Service Commission in support of developing the Kent County Bioenergy Facility, a project in partnership with the Kent County Department of Public Works (DPW). The project is designed to increase recycling, reduce Kent County's dependence on landfills, create jobs, reduce greenhouse gas emissions, and produce carbon-negative renewable fuel.

The total cost to implement the overall project is currently estimated to be approximately \$380 million. The grant from the State of Michigan is an important step in advancing this significant potential project.

Michigan's Low Carbon Energy Infrastructure Enhancement and Development grants are given to projects that develop low carbon energy infrastructure and help move the state toward carbon neutrality.

"Kent County has a real opportunity to create a better world for future generations by building the Kent County Bioenergy Facility and Sustainable Business Park," said Dar Baas, director at the Kent County Department of Public Works. "Thank you to the Michigan Public Service Commission for recognizing the importance of this project in helping achieve Kent County's landfill diversion goals."

Kent County Bioenergy Facility, planned as the anchor tenant at the greater Sustainable Business Park, is designed to help Kent County reach the

ambitious goal of diverting 90 percent of trash from the local landfill by 2030. The facility is expected to initially divert over 50 percent of municipal solid waste while reducing methane emissions by recovering organic material in the waste and converting it into renewable natural gas and fertilizer. Non-degradable recyclable materials otherwise destined for a landfill would also be reclaimed.

"Over 40 percent of what is landfilled in the U.S. creates methane, a potent greenhouse gas that is responsible for at least 30 percent of global warming to date – so projects like the one being developed by Kent County Bioenergy Facility will do no less than help save the planet," said Brett Hodson, chief executive officer of Anaergia.

This innovative facility is designed to help reduce Kent County's dependence on landfills and put West Michigan on the map as a national leader in recycling, reducing waste and curbing greenhouse gas emissions from landfills. The project is also expected to create jobs and attract investment from companies that can join the Sustainable Business Park and convert waste into usable products.

The Kent County DPW anticipates requesting approval from the Kent County Board of Public Works to move forward with the Kent County Bioenergy Facility project in July. The project would then go to the full Kent County Board of Commissioners for review and approval. If approved, the Kent County Bioenergy Facility project could be fully operational by early 2027.

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Increasing landfill fees

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Another area cities must monitor is the practice of illegal dumping. According to Rapp, as tipping fees increase it is important to ensure companies do not choose to unlawfully dump material in the community to avoid paying those fees.

“A further complication is that prices change for tipping fees and costs continue to increase for contracted services, or even municipal services, or public agencies that are dependent on user fees,” Rapp said. “Those usually are only able to implement user fee rate increases once per year, putting them in danger of running their budgets in the red.”

With landfill capacity decreasing and operational costs increasing, Ambati said there is no end in sight for increasing tipping fees. Therefore, it is going to be important for the rest of the waste industry to find new ways to innovate and adapt to these increasing fees.

“Improving the recovery of valuable materials in other sectors of the waste industry, including organics and recycling, is a key way to avoid large tipping fee costs,” Ambati said. “Adopting new technologies, like AI and robotics for

sorting facilities, can help achieve higher recovery rates and help facilities save money.”

C&D Recycling Constraints

In addition to increased tipping fees, the waste and recycling industry is also facing an increase in construction and demolition (C&D) materials no longer being accepted at landfills. Because of this, companies are finding alternative ways of dealing with the debris.

“Babcock & Wilcox has supplied waste-to-energy combustion technologies to many customers that use some types of unrecyclable construction and demolition waste as fuel, including wood, unrecyclable plastics and other petroleum-based materials,” said Brandy Johnson, chief strategy and technology officer at Babcock & Wilcox. “Turning this waste into fuel to make power can be part of the solution to high tipping fees or landfill prohibitions on some types of construction waste, while being fully complementary to community recycling programs. This can also be done in an environmentally sound way, as modern waste-to-energy plants are equipped with state-of-the-art emissions control technologies.”

Diienzo noted that the number of landfills around the U.S. that will accept C&D waste also continues to decrease. “For example, there use to be close to a dozen landfills located in the Mid-Atlantic region you could send C&D waste

to that have now been reduced to only a handful – less than five that are able to accept C&D waste,” Diienzo said.

How to navigate the challenges with C&D waste starts with helping the customer put together a program which starts early in the planning/procurement process of sourcing sustainable material to ensure landfill diversion. “The second part is proper planning of the right amount of material to try and minimize waste generated from projects. Lastly, proper planning for equipment is needed and training to ensure material separation of the different waste streams being generated. This helps ensure end markets for recycling versus having material go to the landfill,” Diienzo said.

Of course, the level of C&D debris not being accepted at landfills depends on the landfill location. As McCamley explained, nearly all C&D waste can be recycled when handled and treated in the right way.

“Some areas have both MSW and C&D landfills. When one landfill closes, waste is sent to another landfill,” McCamley commented. “For example, a C&D landfill in North Carolina closed and now C&D waste is being sent to a MSW landfill. Recycling has a higher cost over landfilling, but with increasing landfill rates, the gap is closing with an increase in recycling rates. As recyclers, we believe only non-recyclable waste should end up in the landfill.”

Transforming textile recycling: Avery Dennison and TEXAID unveil innovative collaboration

Avery Dennison, a materials science and digital identification solutions company, announced it has joined forces with TEXAID, a European company specializing in the collection, sorting, repair, reselling and recycling of used textiles. The partnership aims to address the challenges of textile waste management ahead of incoming regulatory changes in the EU.

A key aspect of this collaboration is the integration of cutting-edge technologies. As a provider of market-leading digital identification solutions for the apparel industry, Avery Dennison will work with TEXAID to explore how technology can enable traceability of garments through the sorting and recycling process. Digital identifiers, tracked via Avery Dennison’s atma.io connected product cloud platform, carrying vital fiber information, will aid TEXAID to process apparel into relevant resale or recycling streams.

Europe generates a staggering seven million tons of textile waste each year, yet only 35 percent of this waste is separately collected, and less than 1 percent is recycled into new materials. Recognizing the urgent need for change, the European Union (EU) is aiming for a complete overhaul of the industry by 2030 under

the Strategy for Sustainable Textiles. New design requirements will ensure fashion items are longer-lasting, easier to repair and recycle, and free of hazardous substances.

An important aspect is the mandatory minimums for recycled content and the planned introduction of Digital Product Passports containing information about an item’s sustainability credentials. These will help EU regulators impose disclosure requirements and more accountability for what happens to clothes that can’t be sold or are no longer wanted.

Michael Colarossi, vice president, innovation, product line management, and sustainability, Apparel for Avery Dennison, said: “How do we turn textile waste into value at scale? The fashion industry needs answers and it needs action. This technology-driven approach will enable textile recycling, while also reducing processing time, driving down costs, and increasing capacity.”

Martin Bösch, chief executive officer of TEXAID, said: “Existing textile recycling facilities will be woefully inadequate if they remain small scale. We are showing today how technology can scale up processing so that we can generate the volumes of high-quality feedstock the industry is going to need.”

SWACO honors waste and recycling workers

The Solid Waste Authority of Central Ohio (SWACO) honored waste and recycling workers.

“While collecting and disposing of garbage and recycling is a dirty and, at times, dangerous job, it’s an absolutely essential function for maintaining safe and clean neighborhoods and communities,” said Joe Lombardi, SWACO’s executive director. “We ask you to join us in recognizing and thanking waste and recycling workers for the vital role they play in keeping our communities safe and clean.”

In central Ohio, SWACO serves 41 communities, and an estimated 5,000 tons of waste material and more than 700 truckloads – is delivered to the Franklin County Sanitary Landfill every day. SWACO’s recycling truck drivers manage to service more than 70 recycling drop off locations, diverting an estimated million pounds of material from the landfill every month.

SWACO’s Franklin County Sanitary Landfill and Transfer Stations are some of the largest in the state,” said Adam Burleson, SWACO’s operations manager. “Our dedicated workforce receives comprehensive training, equipping them with knowledge and skills necessary for safe landfill and transfer operations. The training ensures an efficient and committed workforce to impact our community by managing the waste stream every day.”

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ISRI launches web version of specifications guide for recycled material

ISRI has launched a digital version of the ISRI Specifications Guide at ISRI-Specs.org, providing an online framework for buyers and sellers of recycled materials and products across the globe. For more than 100 years, the ISRI specifications have helped promote consistency and quality in the trade of recycled materials in the U.S. and around the world. Thanks to a grant from the U.S. Department of Commerce's International Trade Administration this invaluable resource is now accessible online to anyone at any time.

"For over a century, recyclers from around the world have relied on ISRI specifications to provide the most comprehensive set of guidelines when buying or selling recycled materials. As the international trade and regulatory landscape evolves, it was time to update the specifications – our universal language – to

better allow all those entities along the manufacturing supply chain for recycled materials to better communicate with each other – regardless of their geographical location or language," said Robin Wiener, ISRI president. "Thanks to the support of the International Trade Administration, this website reflects the changing international landscape and the essential role of ISRI's specifications in the global trade of recycled materials."

Specifications are reviewed on an ongoing basis to ensure they meet the demands of the domestic and global marketplace. Any individual, organization, or company can file a request for additions, changes, or deletions to the specifications. ISRI will continue to update the specifications as the flow of recycled materials evolves with the introduction of new products into the supply chain.

Cook County expands foam recycling access to lower-income communities

South Suburban College in partnership with Cook County Government, received a \$50,000 grant from the Food-service Packaging Institute's Foam Recycling Coalition (FRC) that enables the Illinois county residents to recycle materials, such as foam polystyrene cups, plates, bowls, clamshells, egg cartons and meat trays, as well as block packaging foam, at its local drop-off center.

The FRC grant assisted with funding the purchase and installation of a foam densifier at the newly opened Center for Hard to Recycle Materials (CHaRM) Center in South Holland on the South Suburban College campus. Densifiers are used to compact foam products into foam blocks or ingots. Cook County sells the foam ingots to end markets to be manufactured into architectural moldings and picture frames, as well as thermal insulation panels for foundations, walls and roofs.

The CHaRM Center is centrally located near 53 communities with over 268,000 households in Cook County that have the lowest recycling and diversion rates, including 37 municipalities below the median income and 33 municipalities that are designated Environmental Justice areas.

The County will inform residents about the addition of foam polystyrene recycling via communications including mailers, flyers, community events, social media and on its website.

The grant is made possible through contributions to FRC, which focuses exclusively on increased recycling of post-consumer foam polystyrene. Its members include Americas Styrenics; Chick-fil-A; CKF Inc.; Dart Container Corp.; Dyne-A-Pak; Genpak; INEOS Styrolution America LLC; Lifoam Industries, LLC; Pactiv Evergreen; and Republic Plastics.

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AUTO

New Jersey files landmark advanced clean car proposal

New Jersey Governor Phil Murphy announced the filing of the Advanced Clean Cars II (ACCII) proposal with the Office of Administrative Law. ACCII requires vehicle manufacturers to make zero emission vehicles (ZEVs) an increasing percentage of their new light-duty vehicle sales, ramping up to 100 percent ZEVs by 2035. The rule does not impose any obligations on consumers or car dealers, and provides compliance flexibilities for manufacturers, including a credit trading mechanism. During his 2023 Climate Address in February, Governor Murphy directed the Department of Environmental Protection (DEP) to begin stakeholdering on ACCII in order to propose the rule this year. The Office of Administrative Law is expected to publish the proposal in the August 21 New Jersey Register, starting a public comment period that will run through October 20, 2023.

Additionally, Murphy announced that New Jersey has signed on to the Accelerating to Zero Coalition's Zero Emission Vehicle (ZEV) Declaration, a landmark global agreement launched by the UK at the 26th UN Climate Change Conference of the Parties (COP26) in November 2021 and signed by 41 national governments and 74 cities, states, and regional governments so far. New Jersey has signed on

to Section 2C of the Declaration, which commits the state to a zero emission vehicle future in alignment with the Paris Agreement goals.

"By filing the ACCII proposal, we build upon our nation-leading record of bold climate action while delivering on our promise to utilize every tool at our disposal to combat the intensifying climate crisis," said Murphy. "Our commitment to bringing the ACCII proposal to fruition is a commitment to every New Jersey family and the air they breathe, air that will be cleaner and healthier tomorrow thanks to the steps we're taking to reduce emissions today. That commitment is underscored by our signing of the ZEV Declaration, which recognizes that New Jersey is just one crucial piece of our global response to climate change."

The Administration's recently adopted budget includes a new \$10 million appropriation to support the increasing number of electric vehicles on the road. The DEP will use these funds to meet demand for installation of charging stations at businesses, multi-unit residential buildings, and public locations. The FY24 budget appropriation is only a portion of the \$75 million investment in EVs and charging stations from the Murphy Administration.

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PLASTICS

DePoly receives funding to scale its recycling technology for plastics

Over 400 million tons of plastic are produced every year, but less than 10 percent are recycled, with the majority entering incineration centers or landfills around the world. Addressing this pressing crisis, deep tech company DePoly announced a seed funding round to scale the solution the global consumer packaging and textile world has been longing for decades – its universal chemical recycling process converting plastics into raw materials without affecting their quality.

The oversubscribed funding round was co-led by BASF Venture Capital and Wingman Ventures, with the participation of Beiersdorf, Infinity Recycling, CIECH Ventures, Zürcher Kantonalbank, Angel Invest, ACE & Company, and others.

Plastics like polyethylene terephthalate (PET) can be found in many of our daily items, such as clothing, packaging, and outdoor equipment. Unfortunately, the high costs and difficulty required for sorting, separating, and cleaning these complex plastic streams, coupled with a lack of globally scaled solutions mean that only so-called perfect (clean, simple composition without other materials mixed) plastics get recycled. DePoly aims to tackle the entire waste plastic problem with its chemical recycling technology. Currently, it converts all PET plastics and polyester textiles – originally sourced from fossil fuels – back into their main raw chemical components. Those components are then sold back to the industry to make new virgin-quality plastic items, creating a truly sustainable circular plastic economy.

The globally unique chemical recycling technology developed by DePoly operates at room temperature and

standard pressure and does not require any pre-washing, pre-sorting, pre-melting, or separating out other plastics or materials, unlike most of the technologies out there. Ultimately, it can uniquely deal with PET and polyester streams typically turned down by the conventional recycling system, such as those containing mixed plastics, mixed colors, dirty plastic waste streams, as well as fabrics and fibers. The technology is energy efficient, can be implemented quickly, and is easy to tailor to a customer's specific needs.

DePoly has built and operates a pilot plant that processes a capacity of 50 tonnes per year of these complex PET or polyester plastic streams, showcasing the scope and flexibility of how the technology works for various industries ranging from post-consumer packaging to textiles, fashion, and post-industrial streams. Currently, the company is working on building a new showcase plant with a capacity of 500 tonnes per year to demonstrate the technology at a commercial scale.

DePoly was launched in 2020, in Sion, by three co-founders – Samantha Anderson, Bardiya Valizadeh, and Christopher Ireland. Driven by their collective expertise supported by PhDs diplomas in chemistry and engineering, they developed this unique chemical recycling process to address the pressing issue of plastic pollution, launching their pilot plant for PET plastics the same year. Today, the team counts 13 people with substantial industry experience, ready to scale DePoly's technology and make the company a leader of a global plastic recycling revolution by pushing the boundaries of innovation—establishing new plants around the world while expanding the portfolio of plastics.

INEOS Styrolution partners with EGN and TOMRA to recycle post-consumer polystyrene waste

INEOS Styrolution, a leader in styrenics; TOMRA, a leader in waste transformation; and EGN Entsorgungsgesellschaft Niederrhein, a recycling company, announced a project to convert post-consumer polystyrene (PS) waste into recycled polystyrene for food packaging applications.

EGN, a subsidiary of the SWK AG, will build a green field state-of-the-art advanced mechanical recycling facility processing with a capacity to process 40kt of post-consumer polystyrene (PS) waste per year. EGN will manage sorting and washing, while INEOS Styrolution will be responsible for the “super-cleaning” purification process to comply with the European Food Safety Authority (EFSA) requirements for food contact applications.

The new facility will be located in Krefeld, Germany. It is expected to start up in mid-2025, allowing INEOS Styrolution to start serving customers.

An agreement with TOMRA to provide sorting technology and feedstock completes the project. TOMRA feedstock will collect post-consumer polystyrene waste from food packaging waste, and deliver it to Krefeld, Germany.

PS is proven to be one of the best sortable plastics in the waste stream and is one of only two polymers that can achieve food-contact qualities with mechanical recycling. It is expected that a significant percentage of recycled food packaging material will be realized in a very short timeframe.

GLASS

MRF glass used as alternative daily cover

The Northeast Recycling Council (NERC) has released a report that reveals data about post-consumer recycled glass containers being used at landfills in the Northeast states (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont) and Quebec.

NERC's glass committee compiled the Recycled Glass Used as Alternative Daily Cover in the Northeast U.S. and Quebec Report to get a better understanding of the volume of recycled glass containers coming out of material recycling facilities (MRFs) that never reach manufacturers for making new products, but are instead used as alternative daily cover (ADC) – cover material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day.

“The report provides great insight into MRF glass that is not reaching manufacturers for making new products and is instead being used at landfills – the lowest value end use with the least environmental benefits,” said Mary Ann Remolador, assistant director of NERC and glass committee staff lead.

One of the key findings is that 75 percent of the states/province reported that post-consumer glass collected for recycling is being used as ADC. These states include Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Quebec. The glass being used for ADC includes crushed recycled glass that is broken into pieces too small for manufacturers to use in their processing, non-bottle bill glass, and glass meeting the state's specifications for ADC. The states not using glass for ADC are Delaware, Maryland, and Vermont.

One of the contributing factors for glass being used as ADC is the poor quality of glass coming from MRFs. It is oftentimes considered too dirty or contaminated for use in manufacturing. The contamination is due to the glass being mixed with other recyclables at the MRFs. In addition, many Northeast U.S. MRFs aren't equipped with the necessary systems for removing glass at the beginning of the sorting line. This contamination adds weight to the glass, which

makes the cost of shipping long distances impractical.

The Northeast U.S. also lacks enough beneficiation facilities that accept MRF glass to serve the entire region. Beneficiators clean and process glass, making it into a feedstock for manufacturers. Without these facilities, the region's contaminated MRF glass has no viable market within a practical shipping range. As a result, many MRFs are sending their separated glass to landfills for ADC.

Another key finding from the report is that only 58 percent of the states/province have data about the tonnage of MRF glass used as ADC. These include Delaware, Maryland, Massachusetts, New York, Rhode Island, Vermont, and Quebec.

Additionally, 76 percent do not recognize post-consumer glass used for ADC as recycling (Connecticut, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Quebec), and 83 percent require post-consumer glass to be recycled. Maryland and New Hampshire do not require it. Also, Massachusetts, Pennsylvania and Vermont (25 percent) are the only states/province that have post-consumer glass disposal bans.

The report also shows that transparency with the public about what happens with post-consumer glass could be improved in most states. While some states take a proactive approach to ensuring end uses for recycled material are publicly available, others do not readily share this information.

After a thorough analysis of the compiled information, NERC and its Glass Committee drew the following conclusions:

- Until more investment is made in the glass recycling infrastructure, MRF glass will continue be used as ADC.
- Without having consistent outgoing materials reporting requirements for MRFs, it's impossible to generate data about the total tonnage of recycled glass diverted for use as ADC in the Northeast region.
- More beneficiation facilities capable of cleaning MRF glass are needed throughout the region to make the glass economical for use as a manufacturing feedstock.

ERI publishes 2022 Data Security Report

ERI, the nation's largest fully integrated IT and electronics asset disposition provider and cybersecurity-focused hardware destruction company, announced today the release of its third annual Environmental, Social and Governance (ESG) & Data Security Report for Fiscal Year 2022, which can be accessed on the company's website at ERIdirect.com.

The report summarizes ERI's ESG-related achievements, innovations and

highlights from the previous year and demonstrates the company's dedication to exceed its ESG goals and benchmarks. The document also highlights ERI's unique culture and how the team demonstrated creativity and resilience while navigating through unprecedented challenges to make 2022 a record year for gross revenues and profits, while furthering its mission to protect “people, the planet and privacy.”

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| | |
|--------------|------------|
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ELECTRONICS

Aqua Metals advances lithium battery recycling operations

Aqua Metals, Inc., a pioneer in sustainable lithium-ion battery recycling, has completed its groundbreaking Li AquaRefining™ recycling pilot, transition to 24/5 operations and production of high-purity, saleable quantities of sustainably recycled battery materials.

The company completed the pilot facility commissioning with the recovery of both cobalt and manganese dioxide, completing the suite of valuable metals (including high-purity lithium hydroxide, nickel, and copper) the company reclaims from spent lithium batteries using its patented AquaRefining technology. Aqua Metals believes this advance makes it the first fully operational lithium battery recycler using advanced electro-hydrometallurgy – replacing polluting furnaces and intensive chemicals typical of recycling with electricity to separate the critical metals from spent lithium batteries.

“Completing commissioning and moving into 24/5 operations at our Li AquaRefining Pilot is a tremendous milestone for Aqua Metals and represents the future of sustainable lithium battery recycling in the US and beyond,” said Ben Taecker, chief engineering & operations officer at Aqua Metals. “Not only are we demonstrating the scalability of our solution, but also our significant advantages in recovery rates, emissions reductions, and worker safety.”

The company has completed the pilot and is scaling the pilot facility to a capacity of 75 tons per annum (tpa) of processed black mass input. Based on the success of the pilot, the company also continues the simultaneous phased development and commissioning of its first commercial-scale facility. The first phase of Aqua Metals’ recycling campus will be designed to process 3,000tpa

black mass, for which the company has secured both sufficient supply of black mass to reach scale and is in the process of finalizing off-take agreements for the recycled materials. The company expects that at current metals prices and projected processing costs at scale, its Phase 1 recycling facility should generate positive cash flow.

Aqua Metals intends to sell the high-purity and battery-grade materials produced at the pilot to metals buyers and start generating initial revenue from recycled metals in the third quarter.

“As previously guided, the successful execution of our rapid scaling strategy is a testament to the innovation and adaptability of our entire engineering and operations team,” said Steve Cotton, president and chief executive officer of Aqua Metals. “The lessons learned from our pilot and improvements in our modular solution reaffirm our confidence in our commercialization strategy. We have secured more than 3,000 tons of black mass to fuel our operations, enough supply to reach commercial scale in 2024. Aqua Metals intends to capitalize on its first-mover advantage, driving U.S. leadership in sustainable battery recycling, and building a robust domestic supply chain for the critical minerals that cleanly power an electrified future.”

Aqua Metals’ regenerative electro-hydrometallurgical recycling method offers a substantial improvement over traditional pyrometallurgical and hydrometallurgical recycling techniques, which produce much higher emissions, lower recovery rates, and significant landfill waste. The AquaRefining process vastly reduces the environmental impact of recycling lithium batteries as compared to other processes.

Oregon E-Cycles program modernized

Oregon Governor Kotek signed into law House Bill 3220. This bill modernizes the Oregon E-Cycles Program, which requires electronics manufacturers to offer Oregon households responsible and free recycling of computers, monitors, TVs, printers, keyboards and mice. The new law makes changes to the program –including expanding the types of electronics the program accepts; ensuring robust, stable, and equitable program services; and requiring the program to allow for reuse – to ensure Oregon E-Cycles’ continued success.

Created in 2007 by Oregon’s Electronics Recycling Law and overseen by DEQ, Oregon E-Cycles is one of the nation’s oldest state producer responsibility programs for electronic waste and a successful example of producer

responsibility, a waste management strategy Launched in 2009, Oregon E-Cycles significantly expanded opportunities for Oregon residents to recycle electronic waste. In 2022, the program collected 12.4 million pounds of electronic devices for recycling and 39,131 devices for reuse.

Despite the program’s achievements, structural changes became apparent after the network of sites providing collection services faced instability in 2022. HB 3220 arose through a series of public workshops DEQ convened between July 2022 and January 2023 to discuss options for these structural changes, as well as other changes to modernize and sustain the success of Oregon E-Cycles. The bill was passed unanimously by the members of the Oregon House of Representatives and 23-1 by the Oregon State Senate.

METALS

Steel imports down 2.6 percent

Based on preliminary Census Bureau data, the American Iron and Steel Institute (AISI) reported that the U.S. imported a total of 2,318,000 net tons (NT) of steel in May 2023, including 1,869,000 net tons (NT) of finished steel (down 2.6 percent and 3.3 percent, respectively, vs. April 2023). Total and finished steel imports are down 12.5 percent and 15.7 percent, respectively, year-to-date vs. 2022. Over the 12-month period June 2022 to May 2023, total and finished steel imports are down 13.5 percent and 9.7 percent, respectively, vs. the prior 12-month period.

Finished steel import market share was an estimated 21 percent in May and is estimated at 22 percent over the first five months of 2023.

Key steel products with a significant import increase in May compared to April are cold rolled sheets (up 63 percent), cut length plates (up 59 percent), sheet and strip hot dipped galvanized (up

30 percent), tin plate (up 22 percent) and hot rolled sheets (up 19 percent). Products with a significant increase in imports over the 12-month period June 2022 to May 2023 compared to the previous 12-month period include line pipe (up 36 percent), oil country goods (up 35 percent), heavy structural shapes (up 14 percent) and standard pipe (up 13 percent).

In May, the largest suppliers were Canada (628,000 NT, up 6 percent vs. April), Mexico (282,000 NT, down 20 percent), Brazil (239,000 NT, up 12 percent), South Korea (219,000 NT, up 30 percent) and Germany (103,000 NT, down 4 percent). Over the 12-month period June 2022 to May 2023, the largest suppliers were Canada (6,929,000 NT, down 1 percent compared to the previous 12-months), Mexico (4,777,000 NT, down 13 percent), Brazil (2,871,000 NT, down 18 percent), South Korea (2,574,000 NT, down 10 percent) and Japan (1,294,000 NT, up 11 percent).

U.S. Imports of Steel Mill Products by Country of Origin
(thousands of net tons)

| COUNTRY | MAY 2023 PRELIM | APR. 2023 FINAL | % VAR. MAY. VS. APR. | YTD 2023 (5 MON.) | YTD 2022 (5 MON.) | % VAR. 2023 VS. 2022 | JUNE 2022 TO MAY 2023 | JUNE 2021 TO MAY 2022 | % VAR. |
|--------------|-----------------|-----------------|----------------------|-------------------|-------------------|----------------------|-----------------------|-----------------------|---------------|
| Canada | 628 | 594 | 5.6% | 3,013 | 2,943 | 2.4% | 6,929 | 6,986 | -0.9% |
| Mexico | 282 | 352 | -19.7% | 1,908 | 2,433 | -21.6% | 4,777 | 5,513 | -13.3% |
| Brazil | 239 | 214 | 12.0% | 1,658 | 1,355 | 22.4% | 2,871 | 3,485 | -17.6% |
| South Korea | 219 | 168 | 30.4% | 938 | 1,181 | -20.6% | 2,574 | 2,872 | -10.4% |
| Japan | 88 | 130 | -31.8% | 525 | 491 | 6.9% | 1,294 | 1,171 | 10.5% |
| Germany | 103 | 107 | -4.2% | 477 | 457 | 4.2% | 1,146 | 1,323 | -13.4% |
| Taiwan | 42 | 72 | -42.2% | 327 | 485 | -32.6% | 880 | 1,100 | -20.1% |
| Turkey | 27 | 22 | 21.5% | 160 | 489 | -67.3% | 671 | 1,178 | -43.0% |
| China | 46 | 48 | -3.7% | 274 | 265 | 3.6% | 661 | 579 | 14.2% |
| Vietnam | 21 | 61 | -64.8% | 210 | 558 | -62.3% | 588 | 1,303 | -54.8% |
| Netherlands | 63 | 43 | 47.4% | 195 | 213 | -8.4% | 577 | 629 | -8.3% |
| India | 51 | 13 | 283.7% | 165 | 329 | -50.0% | 520 | 667 | -22.0% |
| Italy | 38 | 77 | -51.5% | 243 | 157 | 54.9% | 538 | 333 | 61.5% |
| Romania | 42 | 50 | -17.1% | 186 | 209 | -11.2% | 460 | 433 | 6.1% |
| Australia | 75 | 8 | 800.5% | 193 | 75 | 158.8% | 417 | 221 | 88.8% |
| All Other | 353 | 420 | -16.0% | 1,739 | 2,319 | -25.0% | 4,198 | 5,846 | -28.2% |
| Total | 2,318 | 2,380 | -2.6% | 12,211 | 13,959 | -12.5% | 29,100 | 33,644 | -13.5% |
| memo EU-27 | 409 | 444 | -8.0% | 1,841 | 1,729 | 6.4% | 4,521 | 4,196 | 7.7% |

Novelis to establish hydrogen burning trials

Novelis Inc., an aluminum solutions provider and a leader in aluminum rolling and recycling, announced that its Latchford plant in the UK has been awarded £4.6 million to establish hydrogen burning trials as part of the UK Government’s £55m Industrial Fuel Switching Competition, as part of the £1bn Net Zero Innovation Portfolio (NZIP), and the wider regional HyNet project.

Novelis joined HyNet in 2017 and has been supporting the development of the regional infrastructure project as well as conducting its own technical feasibility studies on the use of hydrogen as a direct replacement for natural gas.

With the recently awarded grant by the

Department for Energy Security & Net Zero, Novelis’ Latchford plant will test the use of hydrogen on one of its recycling furnaces in a demonstration phase in 2024.

The trial has been set up in collaboration with Progressive Energy, an independent UK energy company, and requires the installation of new burners and regenerators – both capable of operating with hydrogen or a blended hydrogen/gas input – and replacing the furnace lining material with one suitable for hydrogen.

Depending on the final configuration, replacing natural gas with hydrogen to feed the remelting furnace could reduce CO2eq emissions by up to 90 percent compared to using the same amount of natural gas.

METALS

Novelis builds first onsite solar park



The solar park will supply approximately 12 percent of its Pieve plant's electricity demand and reduce carbon emissions by 1,450 tons annually.

Novelis Inc., a sustainable aluminum solutions provider and a leader in aluminum rolling and recycling, has announced the construction of its first solar park at the company's production site in Pieve Emanuele, Italy. Local authorities granted their final approval for building the more than 28,000 square meters large solar park, which is scheduled to start generating electricity by end of this year.

Novelis is investing \$2.4 million in decarbonizing its production in Pieve, further supporting the development of low-carbon, sustainable aluminium solutions for the European market.

The solar park's annual production of around 4,000 MWh will enable the plant to switch a large portion of its energy sources from carbon-intensive to renewable ones. "Investing in renewable energy generation is crucial to decarbonizing our

operations and meeting our sustainability goals," said Emilio Braghi, executive vice president, Novelis Inc., and president, Novelis Europe. "Further increasing our capabilities to supply aluminum produced with a lower CO2 footprint will also enable us to help our customers reduce their scope three emissions and achieve their decarbonization goals."

Located in the south of Milan, Novelis' Pieve plant is an ideal location to build a solar park as it has a large unoccupied area with high sun exposure.

Novelis has the target to reduce its carbon footprint by 30 percent by 2026, and to achieve carbon neutrality by 2050 or sooner. Besides its strong focus on energy efficiency initiatives and recycling, Novelis will continue to seek opportunities to decarbonize its operations by switching to renewable energy sources.

Steel import permit applications increase

Based on the Commerce Department's most recent Steel Import Monitoring and Analysis (SIMA) data, the American Iron and Steel Institute (AISI) reported that steel import permit applications for the month of June totaled 2,804,000 net tons (NT). This was a 12.8 percent increase from the 2,485,000 permit tons recorded in May and a 20.8 percent increase from the May final imports total of 2,320,000. Import permit tonnage for finished steel in June was 2,111,000, up 12.8 percent from the final imports total of 1,872,000 in May. For the first six months of 2023 (including June SIMA permits and May final imports), total and finished steel imports were 15,017,000 NT and 11,573,000 NT, respectively, from the same period in 2022. The estimated finished steel import market share in June was 24 percent and is 23 percent year-to-date (YTD).

Steel imports with large increases in June permits vs. May final imports

include reinforcing bars (up 189 percent), heavy structural shapes (up 89 percent), ingots and billets and slabs (up 55 percent), hot rolled sheets (up 48 percent) and line pipe (up 34 percent). Products with significant year-to-date (YTD) increases vs. the same period in 2022 include standard rails (up 48 percent), oil country goods (up 36 percent), electrical sheet and strip (up 27 percent), cut lengths plates (up 24 percent) and line pipe (up 21 percent).

In June, the largest steel import permit applications were for Canada (601,000 NT, down 4 percent from May final), South Korea (427,000 NT, up 95 percent), Mexico (423,000 NT, up 50 percent), Brazil (288,000 NT, up 20 percent) and China (108,000 NT, up 134 percent). Through the first six months of 2023, the largest suppliers were Canada (3,614,000 NT, up 1 percent), Mexico (2,331,000 NT, down 21 percent) and Brazil (1,946,000 NT, up 25 percent).

May steel shipments up 3.0 percent from prior month

The American Iron and Steel Institute (AISI) reported that for the month of May 2023, U.S. steel mills shipped 7,721,633 net tons, a 2.4 percent decrease from the 7,910,730 net tons shipped in May 2022. Shipments were up 3.0 percent from the 7,499,979 net tons shipped in the previous month, April 2023. Shipments year-to-date in 2023 are 36,660,154 net tons,

down 4.4 percent vs. 2022 shipments of 38,366,809 net tons for five months.

A comparison of shipments year-to-date in 2023 to the first five months of 2022 showed the following changes: hot rolled sheet, no change, cold rolled sheet, down two percent and corrosion resistant sheet, down four percent.

| Commodity | | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 5 |
|-------------------------|---------------|----------|----------|----------|----------|----------|
| FERROUS | | | | | | |
| #1 Bushelings | per gross ton | \$465.00 | \$469.00 | \$470.00 | \$474.00 | \$485.00 |
| #1 Bundles | per gross ton | 440.00 | 449.00 | 450.00 | 454.00 | 461.00 |
| Structural | per gross ton | 360.00 | 365.00 | 364.00 | 365.00 | 375.00 |
| #1 & #1 Mixed Steel | per gross ton | 328.00 | 329.00 | 330.00 | 331.00 | 335.00 |
| Crushed Auto Bodies | per gross ton | 215.00 | 219.00 | 215.00 | 218.00 | 268.00 |
| Shredded Auto Scrap | per gross ton | 398.00 | 400.00 | 398.00 | 399.00 | 480.00 |
| NON FERROUS | | | | | | |
| #1 Copper Bare Bright | per pound | 3.74 | 3.75 | 3.74 | 3.64 | 3.72 |
| #2 Copper Wire & Tubing | per pound | 3.54 | 3.51 | 3.53 | 3.51 | 3.50 |
| Aluminum Cans | per pound | .71 | .72 | .74 | .73 | .76 |
| Al/Cu Radiators | per pound | 1.76 | 1.75 | 1.80 | 1.80 | 1.83 |
| Aluminum Radiators | per pound | .55 | .57 | .62 | .64 | .66 |
| Heater Cores | per pound | 1.51 | 1.58 | 1.59 | 1.59 | 1.61 |
| Stainless Steel | per pound | .66 | .65 | .65 | .66 | .65 |

All prices are expressed in USD. Printed as a reader service only.

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Liebherr 944
S/N ZK041492
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SN: DHKCEWARPM5001611
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2018 Doosan DL300-5K-US11
S/N: 076, Hydraulic Locking Front Differential,
Quick Coupler, 4.5 Yard Bucket
\$135,000



2019 Doosan DL250-5 US20 "High Lift"
S/N 632, 1645 Hours, Quick Coupler, 3.5 YD Bucket
\$105,000



2013 Doosan DL250-5 US20 "High Lift"
S/N 118, 2953 Hours, Quick Coupler, 3.5 YD Bucket
\$90,000



2020 Doosan DL200-5 US20 "High Lift"
S/N 007, "Low Hours", Hydrostatic Transmission,
Quick Coupler, 2.5 YD Bucket
\$114,000



2017 Doosan DL250-5 US11
S/N 362, 1575 Hours, Hydraulic Locking Front
Differential, Quick Coupler, 3.5 YD Bucket
\$94,000



2008 Sierra RB6000
\$375,000.00



2018 Doosan DL250-5 US10
S/N 343, 1520 Hours, Quick Coupler, 3.5 YD Bucket
\$95,000



Doosan DX225LC-5
SN: DHKCEBBUPF0001153
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2017 Doosan DX530LC-5



Doosan DX210W-5
SN: DHKCEWARVI5001224
\$180,000



2018 Doosan DL250-5 US10
S/N 522, 2325 Hours, 3.5 YD Bucket
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WASTE

EGLÉ to develop plan to reduce food waste

Michigan disposes of more than one million tons of food waste through its municipal waste stream each year. Food waste is the largest source of material disposed of in the state's landfills and waste-to-energy facilities. According to U.S. Department of Agriculture (USDA) estimates, 30 percent to 40 percent of the state's food supply is lost to waste. The nonprofit Project Drawdown estimates that wasted food is responsible for roughly eight percent of global emissions and ranks food waste reduction as the most impactful solution to address climate change.

The MI Healthy Climate Plan – Michigan's roadmap to a healthy, prosperous, carbon-neutral economy for all Michiganders by 2050 – recommends that Michigan adopt and pursue a joint USDA/U.S. Environmental Protection Agency goal to reduce food loss and waste by half no later than 2030.

The food waste roadmap project will engage stakeholders throughout Michigan's food system in identifying strategies to guide policymakers on potential incentives, funding mechanisms, technical assistance, outreach, policy changes, and other programs that could be developed to reduce food waste among Michigan businesses and institutions.

The project team is seeking collaborators to join a series of virtual discussions to develop recommendations for cross-sector solutions. Sessions will present current research and the potential applicability of best practices and policies and will draft recommendations for each interest area. Individuals with experience in food loss or food waste within agriculture, food processing and production, grocery and retail, food service, and transportation and logistics sectors are invited to participate by signing up on the Michigan Sustainable Business

Forum website, misbf.org, or at <https://form.jotform.com/230866368233158>.

Working sessions will focus on the following topics:

- Production standards: Current date labeling verbiage and utilization and potential universal verbiage and standardization of low-waste and efficient packaging and production protocols.

- Food donation: Current liability and incentive policies for food donation, technical support needed for constructive donations, and the Michigan food recovery landscape.

- Waste reduction technologies, practice improvements, employee training: Best practices for waste reduction, including supply chain demand planning, methods for measuring food waste, and barriers to effective employee training and engagement.

- Secondary markets: Channels for food surplus (such as animal feed and FlashFood); best practices for food measurement and transport; price impact concerns; business-to-business, business-to-consumer, and upcycling programs; and education and communication tools for industry sectors and the public.

- Infrastructure improvements: Food industry stakeholders' needs for food collection, processing, storage, and distribution. Resources needed to overcome infrastructure barriers.

- Community awareness and education: Practices to reach household markets with recommendations, involve industry sectors to lead and educate the community, and innovative ideas and progress in food waste reduction.

- Agency collaboration and leadership: Mutually beneficial food system partnerships, how to invite changing perspectives, and how to distribute resources and materials through trusted agencies.

Kent wins contract for plastic waste advanced recycling program

Kent, a leading engineering company in the energy and chemicals industries, has been appointed as the Front-End Engineering Design (FEED) contractor for potential expansion of ExxonMobil's advanced recycling facilities.

Kent will provide FEED services for potential new units across seven sites under this advanced plastics recycling global portfolio program, based on the success of a trial unit in Baytown, Texas designed by Kent during 2021 and 2022. These new units are under assessment at ExxonMobil facilities located in Baytown (Texas), Beaumont (Texas),

Baton Rouge (Louisiana), Joliet (Illinois), Sarnia (Canada), Rotterdam (The Netherlands) and Antwerp (Belgium). The first unit at Baytown started up late last year as one of the largest advanced recycling facilities in North America.

By turning difficult-to-recycle plastic waste back into raw materials that can be used to make new plastic and other valuable products, ExxonMobil's advanced recycling technology can divert plastic waste from landfill or incineration and help to meet customer goals for circularity.

SWANA recognizes safety programs

The Solid Waste Association of North America (SWANA) recognized the recipients of the 2023 SWANA Safety Awards. This year's winners are Anne Arundel County, Maryland, Department of Public Works, Bureau of Waste Management Services for Biggest Safety Improvement; City of Goodyear, Arizona, Public Works Department for Workplace Wellness Program; City of Tacoma Washington, Solid Waste Management for Best Safety Innovation, and Leck Waste Services for Best Safety Training Program.

"During the pandemic, we looked at companies' Covid responses and recognized those who addressed concerns for our essential workers and kept them healthy," said Suzanne Sturgeon, SCS Engineers' safety manager and SWANA national safety committee chair. "It's important now to look beyond that, and we made the decision to recognize how wellness programs contribute to health and safety of employees and how effective and multi-faceted safety training programs provide employees with various opportunities."

Biggest Safety Improvement

Anne Arundel County Department of Public Works – The 2023 SWANA Safety Award for Biggest Safety Improvement goes to the Anne Arundel County, Maryland, Department of Public Works, Bureau of Waste Management Services. The Bureau of Waste Management Services fostered a truly collaborative approach where each level contributed from their unique vantage point to

develop a comprehensive and effective safety program.

Workplace Wellness Program

City of Goodyear – The 2023 SWANA Safety Award for Workplace Wellness goes to the City of Goodyear, Arizona, Public Works Department. The City of Goodyear subscribed to the whole employee philosophy, encompassing the spirit, heart, mind, and body with the goal of achieving ultimate satisfaction and maximum contribution.

Best Safety Innovation

City of Tacoma, Washington – The 2023 SWANA Safety Award for Best Safety Innovation was awarded to the City of Tacoma, Washington, Solid Waste Management. For the City of Tacoma, it was via a Safety Coordinator Program that provides individuals with entry-level training in the field of occupational safety for a one-year term. This has helped decrease their days away, restricted, or transferred (DART) rate by 44 percent.

Best Safety Training Program

Leck Waste Services – The 2023 SWANA Safety Award for Best Safety Training Program was awarded to Leck Waste Services. This is the first year that this award has been presented. Leck Waste Services used a proactive approach towards training and provided employees with electives that they could use to build their careers. This resulted in better employee retention and decreases across the board for recordable incidents, days away from work, workers' compensation and auto liability.

Anaergia builds organic waste-to-renewable energy project

Anaergia Inc. has been selected as the Energy Recovery Contractor for a new system that will produce renewable power from wastewater sludge at the East County Advanced Water Purification (East County AWP) facility now under construction in Santee, California. Anaergia anticipates the Energy Recovery project will also eventually digest food waste along with the wastewater sludge. Anaergia is expected to design and build the waste-to-renewable energy facility.

The East County AWP facility is part of an Advanced Water Purification Program that is a partnership among Padre Dam Municipal Water District, the City of El Cajon, the County of San Diego, and Helix Water District. The program is expected to produce up to 11.5 million gallons per day of new local drinking water.

Anaergia's project at the East County AWP is expected to produce renewable power from biogas created by anaerobically digesting wastewater solids and potentially locally-sourced organic waste. Anaergia plans to integrate a

waste-to-renewable power system that includes a biogas conditioning system, combined heat and power (CHP) generation, as well as an optional receiving station with storage tanks for organic waste deliveries. The organic waste reception would provide a local outlet for recycling organic waste that is required to be diverted from landfills under California law. The law is designed to reduce planet-warming methane emissions.

"By including the technologies that create energy from organic waste, the East County AWP facility is doing the right thing for the environment and for the people it serves," said Brett Hodson, chief executive officer of Anaergia. "This project serves as a model for other facilities. It leverages proven technology, adds resilient infrastructure, and brings economic benefits to the utility."

Anaergia's energy recovery project complements other portions of the new East County AWP facility, including the facility's anaerobic digesters, which are fitted with Anaergia's OmniMix mixers, designed for co-digestion applications.

BUSINESS BRIEFS

Quest Resource appoints Perry W. Moss as senior vice president of sales

■ Quest Resource Holding Corporation, a leader in environmental waste and recycling services, has appointed Perry W. Moss as senior vice president of sales. Moss brings 30 years of experience in sales and operations leadership. Moss will be responsible for driving and maximizing revenue growth and overseeing sales strategies.

Moss was co-founder and chief advisor to Rubicon Technologies, Inc. As Rubicon's first president, he oversaw end-to-end commercial activities, successfully leading teams in achieving double-digit, and year-over-year growth. Prior to Rubicon, Moss spent more than six years at Oakleaf Holdings where he contributed to major account wins that helped to more than double the revenue base. Prior to Oakleaf, Moss was director of business development and played a key role in the successful growth of Smurfit-Stone's Waste Reduction Services business unit.

Waste Pro promotes assistant division manager in Florida

■ Waste Pro USA Inc., Longwood, Florida, has promoted Glenn Schweiger to assistant division manager in Milton, Florida.

Schweiger's responsibilities includes budgeting, hiring, and managing the Milton division employees, which currently serves more than 51,000 residential and commercial customers.

SWANA is hiring a new executive director

■ The Solid Waste Association of North America (SWANA) of Silver Spring, Maryland is hiring a new executive director/chief executive officer. This is an exciting opportunity for an innovative, experienced executive to grow an association and to further position it in the solid waste and resource management profession.

SWANA is seeking an inspirational leader to represent the association in the solid waste sector, advise the board of directors on leading practices in governance as well as support and empower the staff to achieve success on behalf of the association.

The search is being led by Vetted Solutions, an executive search firm specializing in association and nonprofit recruiting and consulting based in Washington, D.C., that focuses on chief executive officer and senior staff positions.

For confidential consideration, please contact Vetted Solutions at SWANAED-Search@vettedolutions.com or call +1 202-544-4749.

Alicia Garcia-Franco named chair of BIR's articles of association

■ BIR president Susie Burrage OBE has appointed Alicia Garcia-Franco as new chairwoman of the organization's articles of association and internal rules committee.

Garcia-Franco is director general of BIR's Spanish member association FER and has been at the head of the organization since 1994. Over the years, she has been active within BIR, in particular in the framework of its network of national recycling associations with a focus on legislation affecting the recycling sector. Since 2014, she has held the position of vice president of EuRIC, the European Recycling Industries Confederation. She is an executive committee member of CONFEMETAL (Spanish Metal Confederation), a permanent commission member of UNE, the sole Spanish standardization organization, and board member of AENOR International, a knowledge management company active in conformity assessment, training and information services.

Casella Waste Systems to develop renewable natural gas capacity at select landfills

■ Casella Waste Systems, Inc., a regional solid waste, recycling, and resource management services company, and Waga Energy, a global expert in the production of renewable natural gas (RNG) from landfills, announced the signing of a commercial agreement on July 10, 2023 to develop renewable natural gas facilities at three Casella landfills. As part of the commercial agreement, Waga Energy will deploy the capital required to fully fund construction of the projects and will own and operate the RNG infrastructure. Casella and Waga Energy will share in the revenue generated from the RNG facilities once operational.

Commercial operations are expected to start in approximately 24 months given the timeline for permitting and construction. The initial production across these three sites is expected to total approximately 1,300,000 MMBtu per year of RNG.

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BUSINESS BRIEFS

Quest Resource appoints Audrey P. Dunning to board of directors

■ Quest Resource Holding Corporation, a leader in environmental waste and recycling services, announced that Audrey P. Dunning has been elected to its board of directors. Dunning will serve on the audit, nominating and corporate governance committees of the board. In connection with Dunning's election, the board increased its size from six to seven directors.

Dunning is a technology and business growth leader with expertise in technology enablement, digital transformation, customer engagement, risk management and compliance, with a successful track record in the financial services, technology and professional services industries. She has served in chief executive officer and senior executive roles, as well as director of public and private companies.

Dunning is currently the founder and chief executive officer of AMP Growth Advisors, a firm that specializes in strategic planning, business development, and executive coaching, and advises on digital transformation and technology risk management. Dunning's director experience includes currently serving on the board of TransAct Technologies and previously serving on the board, audit, risk, and technology committees of TriState Capital Holdings through its acquisition by Raymond James Financial. Dunning also previously served as a director of the Pittsburgh Branch of the Federal Reserve Bank of Cleveland, and on the board of Dollar Bank, FSB. For 10 years, Dunning served as chief executive officer of Summa Technologies, a digital solutions consultancy company through its acquisition by CGI, Inc., a global technology consulting firm. Prior to Summa, Dunning held sales leadership positions at IBM and Xerox Corporation. In 2016, she was the recipient of the Greater Pittsburgh Athena Award, a program that recognizes exceptional women leaders who demonstrate professional excellence, actively assist others through mentorship, and contribute to the community.

Waste Pro promotes Mike Viers to division manager

■ Waste Pro announced that Mike Viers has been promoted to division manager in Athens, Georgia.

Viers began his career in solid waste 24 years ago as a helper. He continued to learn the business, working his way up to operations manager in five years. In 2015, Waste Pro acquired the company Viers was working for, and he has been with Waste Pro ever since.

As division manager, Viers will manage all aspects of operations, budgeting, hiring, and training through the Athens division, including the newly acquired service area of Winder, Georgia. The division has approximately 65 employees who operate 35 trucks and serve 35,000 residential and commercial customers in a 15 county area.

Original One Parts merges with Headlights Depot

■ Original One Parts, LLC, a portfolio company of private equity firm Kinderhook Industries, LLC, has merged with Headlights Depot.

Serving the auto collision industry, Original One Parts operates out of two warehouse and remanufacturing facilities located in Texas and Maryland. With its nine strategically located distribution centers supplying business and consumer customers, Headlights Depot adds to Original One's capability to deliver a robust product line of reconditioned, recycled and aftermarket headlights and taillights to both collision professionals and consumers anywhere in the U.S. quickly and affordably.

Headlights Depot's owners Eric and Jay Tannenbaum will both continue working with the newly merged business.

Jay Tannenbaum will perform the duties of chief operating officer and Eric Tannenbaum those of president.

VLS Environmental Solutions promotes Raul Pena to chief information officer

■ VLS Environmental Solutions, a provider of environmental services, has promoted Raul Pena to chief information officer. Pena began with VLS in May 2022 as the vice president of IT and was promoted to chief information officer in June 2023.

Pena brings a wealth of experience and knowledge to this role. He is a senior financial and technology executive with a proven record in providing strategic financial leadership, and business process improvement for service organizations. He has developed and implemented financial and operational controls focusing on value creation and sustainable growth in fast paced environments.

Prior to joining VLS Environmental Solutions, Pena spent 10 years at Saber Power Services, LLC, an engineering, procurement, and construction firm in the high voltage electrical space. He served as vice president of technology, subsequently, chief financial officer. Before that he spent 13 years at Omni Data Services Group, a re-manufacturer of specialty travel-related hardware, IT operations and quality areas.

KEITH partners with Ecovative Renewables to expand reach

■ KEITH Manufacturing Co., the provider of WALKING FLOOR® technology, announced a new partnership with international distributor Ecovative Renewables General Trading LLC, part of Rais Hassan Saadi Group (RHS Group). The partnership will allow KEITH to expand its reach into new markets.

This mutually beneficial partnership brings KEITH's WALKING FLOOR conveying systems to markets already established by Ecovative's parent company RHS Group. Ecovative Renewables now adds the innovative walking floor system to its growing product and service portfolio.



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Ground rubber applications growing

by MAURA KELLER

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For years, tire derived rubber has been used to manufacture numerous recycled rubber products. By mechanically shredding tires and then magnetically separating the steel from bead and tread wires, high quality rubber granules are liberated for further use.

According to John Sheerin, director of U.S. Tire Manufacturers Association's (USTMA) End-of-Life Tire Programs, ground rubber applications have been growing recently, including mats of all types, loose fill and poured in place playground surfaces, landscaping mulch and infrastructure applications like sign bases, car stops, and weights.

The USTMA Scrap Tire Management Report for 2021 illustrates that ground rubber uses have increased. More specifically, the report shows that the ground rubber market increased by 29 percent since 2019, making it the largest scrap tire market, consuming roughly 28 percent of all scrap tires in the following areas:

- Molded and extruded products – Products like rubber mats and flooring increased by 25 percent and consumed 485 thousand tons.
- Rubber mulch – Increased by 54 percent and consumed 391 thousand tons. Home and facility improvement activities during Covid shutdowns are credited in part for this.
- Rubber modified asphalt – Consumed slightly less than the 2019 report showed with 141 thousand tons of scrap tires. Covid interruptions to construction funding and market development impeded the growth of this promising market.
- Fine ground rubber – A material used in new tires, coating, sealants and exports consumed another 79 thousand tons of scrap tires.

“Unfortunately, scrap tire markets as a whole have not grown quickly enough to absorb the increased generation,” Sheerin said. “Even though the markets for scrap tires have shifted and changed, further development of these markets is needed to keep pace with annual generation.”



Rubberized asphalt concrete is a road paving material made by blending ground-up recycled tires with asphalt and other conventional materials. VESTENAMERS/GTR

Since scrap tire management is primarily the responsibility of state governments, Sheerin said it is important for states to have robust scrap tire management programs that generate revenue streams to fund research that develops and assesses existing and emerging markets and addresses scrap tire abatement. “USTMA continues to work closely with states to encourage the adoption of effective elements of state scrap tire programs identified in the our 2021 report document,” he said.

Bjornulf Ostvik, chief executive officer of Ecogensus, said the recycled rubber market is dominated by the recycled tires market (tires are already a separated waste stream.) The general consensus is that the generation of scrap tires (some 300 million tires per year in the U.S.) is outpacing the demand for recycled rubber.

“This, of course, has reverberating effects on other recovered rubber waste,” Ostvik said. “Historically, waste-to-energy applications represented a significant pathway for scrap tires but demand has been declining. There is increased focus now on asphalt and general roadway applications (e.g., as an aggregate), as well as other conventional applications such as playgrounds, running tracks, landscapes, and small projects such as decks, ramps and patios.”

An ongoing evolution

Although rubber recycling has been readily embraced by various industries over the years, rubber recycling has become more consistent and high-quality materials are now expected.

As Sheerin explained, mechanical shredding is the industry standard, but cryogenic grinding is also used to produce finely ground material.

“We have seen a shift towards ground rubber applications and away from what was historically the largest market – tire derived fuel,” Sheerin said. “This is because solid fuel combustion has been declining, while new and better ground rubber markets have grown. The mulch market has grown significantly, and the rubber modified asphalt market is poised for growth as well.”

With the passing of the Bipartisan Infrastructure Law (BIL), USTMA has been focused on expanding opportunities to grow scrap tire markets that offer sustainable infrastructure solutions. USTMA continues to support the use of scrap tires in rubber modified asphalt (RMA) and tire derived aggregate in civil engineering projects. In USTMA's recent 2023 legislative priorities letter, the USTMA explained that RMA increases pavement service life and reduces road maintenance activities, leading to

significant cost savings compared to traditional asphalt. It reduces CO2 emissions by 32 percent, lowering energy consumption over the lifetime of pavement as compared to traditional asphalt. RMA also provides performance and safety benefits by increasing skid resistance, reducing road noise and reducing road spray in wet conditions.

Given RMA's proven economic, environmental and performance benefits, USTMA urged Congress to:

- Identify RMA as a preferred pavement material for federal projects;
- Support funding for research to further study RMA use benefits, including supplementing preliminary findings of reductions in environmental impact when using RMA.

The USTMA letter also addressed the use of Tire Derived Aggregate (TDA), large shreds of scrap tires that can be used as cost-effective infill material for roadside embankments, retaining walls and stormwater infiltration galleries.

As the USTMA pointed out, TDA reduces costs compared to traditional mined minerals like gravel, since the lightweight recycled material costs less to transport. “It provides improved drainage in stormwater infiltration galleries due to its larger void space compared to gravel,

See **GROUND RUBBER**, Page B6

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Continental Tires utilizes rice husks and recycled plastic bottles in tire production



Continental is on the road toward becoming the most progressive manufacturer in the tire industry in terms of sustainability. Photo courtesy of Continental

Car tires are round, black and made of rubber. Look closer, however, and you'll see that the design of tires and the interaction of the various materials that go into making them are extremely complex. But for some time now, the material experts and tire engineers at Continental have been bringing about a silent revolution. By 2050 at the latest, all tires are to be made of sustainable materials. There is still a long way to go until then. But step by step, it is becoming apparent which raw materials will find their way into tire construction in the future. These include waste products from agriculture – such as the ash from rice husks – rubber from dandelions, recycled rubber or PET bottles.

Claus Petschick, head of sustainability at Continental Tires, is clear about Continental's mission, commenting, "Continental is on the road toward becoming the most progressive manufacturer in the tire industry in terms of sustainability. We aim to use 100 percent sustainable materials in our tire products by 2050 at the latest." He added, "Our innovative power enables us to break new and even more sustainable ground. This encompasses everything from the origin and sourcing of our materials through to the reuse and recycling of our tires."

Already today, around 15 to 20 percent renewable or recycled materials are used in a standard passenger car tire from Continental. To further increase the proportion of sustainable materials and

conserve valuable resources, Continental continuously analyzes and reviews all raw materials used in tire production.

Depending on the application, season and environment, tires have to fulfill specific requirements. This can be seen in, for example, the tread design. But in other areas – the composition of the rubber compound, for example – these changes are not so readily visible. Passenger car tires from Continental consist of as many as a hundred different raw materials.

Their precise composition has a major impact on the tires and their handling characteristics. The ability to deploy the various materials with their unique properties and interdependencies in specific ways is a complex balancing act for Continental's engineers and material experts. Only when all the materials are ideally matched to each other can safe, energy-efficient and durable high-performance tires be created.

Natural rubber still essential thanks to its exceptional properties

Natural rubber is essential for ensuring outstanding tire performance. This natural product accounts for between 10 and 40 percent of the entire weight of modern high-performance tires. Its special properties include the high level of strength and durability, which are caused by the strain-induced crystallization of the rubber. The tire industry is the biggest consumer of global rubber production, accounting for more than 70

percent. However, Continental considers natural rubber a sustainable material only if it is sourced responsibly. Therefore, the company employs an integrated approach aimed at making the complex and fragmented supply chains for natural rubber more sustainable. Including using cutting-edge digital technology, local involvement and close collaboration with capable partners with the goal of improving transparency and traceability along the entire value chain. Meanwhile, with its Taraxagum project, Continental is pursuing an innovative approach to ensure that it can become less dependent on natural rubber grown primarily in southeast Asia. The tire manufacturer is working alongside partners on industrializing the extraction of natural rubber from specially cultivated dandelion plants.

Sustainable plant-based fillers

In addition to rubber, fillers such as silica are essential to tire assembly. Silica, for example, helps to optimize characteristics such as grip, rolling resistance and tire life. In the future, rice husks will be used as the source material for sustainably produced silica. Rice husks are a waste product of rice production and cannot be used as food or animal feed. Silica derived from the ash of rice husks is more energy-efficient when used in manufacturing than that obtained from conventional materials such as quartz sand.

Plant-based oils – such as rapeseed oil and resins based on residual materials from the paper and wood industries – already offer an alternative to crude-oil-based fillers in Continental's tires. Only oils that meet technical quality standards and are not suitable for consumption are used. Oils and resins allow for flexibility in terms of tire compounds and so improve the material's grip.

Expanding the circular economy

Continental is aiming for fully circular operations in its tire production by 2050 at the latest. In addition to the use of renewable materials, the company is working systematically on using recycled raw materials in tire production. This is intended to ensure that carbon black – another crucial filler in rubber compounds – can be obtained on a large scale in the future. Continental recently signed a development agreement with Pyrum Innovations with a view to further

optimizing the recycling of materials from old tires. To do this, Pyrum breaks the old tires down into their constituent parts in an industrial furnace using a special pyrolysis process. In this way, valuable raw materials contained in end-of-life tires can be extracted and recycled. Both companies are working towards obtaining high-quality raw materials from the pyrolysis oil obtained for Continental's tire production in the medium term, in addition to the direct use of high-quality carbon black. In the long term, the premium tire manufacturer and Pyrum are aiming to establish a closed-loop circular economy concept for the recycling of old tires.

Recycled rubber from end-of-life tires

In addition to pyrolysis, Continental is also making use of mechanical processing of end-of-life tires. Rubber, steel and textile cord in particular are separated, in a highly sophisticated process, from one another. The rubber is then prepared for re-use as part of new rubber compounds.

Continental has a long history of working consistently to introduce end-of-life tires into the circular economy to conserve resources and the environment. A material known as "Conti-Reclaim" has been obtained as part of the truck tire retreading process at the company's plant in Stöcken, Germany since 2013. It has been used in tire production at Continental for years. To expand the range of applications for the recycled rubber and optimize the properties for the various fields of application, Continental uses not only "Conti-Reclaim" but also recycled rubber from other suppliers.

Recycled plastic bottles in tire casing

Continental is working with partners to obtain high-quality polyester yarn for its tires from recycled PET bottles. PET bottles often end up in incinerators or landfills otherwise. With its ContiRe.Tex technology, the tire manufacturer has developed a more energy-efficient and eco-friendly alternative that allows it to reuse between nine and fifteen plastic bottles for each tire, depending on the tire size. The recycled PET has already replaced conventional polyester in the structures of some tire casing. The PET bottles used are sourced exclusively from regions where there is no closed recycling loop.

Tire Stewardship BC and Ocean Legacy Foundation partner to remove scrap tire pollution

Tire Stewardship BC (TSBC), an environmental not-for-profit group dedicated to the collection and recycling of scrap tires in British Columbia, announced that they are providing a five-year annual grant of \$30,000 to Ocean Legacy Foundation (OLF). The funding will be used to support OLF scrap tire clean-up expeditions across British Columbia.

"Ocean Legacy Foundation is an important partner of ours and we're delighted to offer them our support over a multi-year period," said Rosemary Sutton, executive director, Tire Stewardship BC. "They're doing important work

to protect our oceans, combat pollution in our communities, and divert waste from landfills. For example, in 2022, OLF and partners removed over 2,400 scrap tires from a small island off the Sunshine Coast of B.C., and the tires were sent to a tire recycling facility in Delta, B.C. Our scrap tire recycling program is one of the most successful in North America and the oldest recycling program in Canada. Since the program was first established in 1991, over 100 million tires have been recycled, and every year the equivalent of over five million scrap vehicle tires is recycled into new products."

Ocean Legacy Foundation, initiated in 2013, is a Canadian non-profit organization that develops and implements worldwide programs to respond to plastic pollution, with the goal of ending the plastic pollution crisis. They combine education, policy recommendations, infrastructure development and restorative cleanup activities to prevent this pollution from occurring while co-developing solutions to manage the plastic pollution and resources that exists. The EPIC program provides valuable skill and community capacity development with local communities to develop new tools that can be

utilized to prevent plastic pollution and protect their local environment.

"Ocean Legacy Foundation is the only organization that accepts foam-filled tires from beach cleanups and dock deconstructions. They remove the foam from the tires and then we recycle them. Prior to their help with the foam removal, these tires ended up in our landfills," added Sutton. "What is great about our partnership with Ocean Legacy Foundation and these clean-up expeditions is that the scrap tires that are collected in B.C. are processed and re-purposed in the province, contributing to the circular economy."

Global tire recycling market size share worth \$8.32 billion by 2032

Custom Market Insights has published a new research report titled “Tire Recycling Market Size, Trends and Insights By Process (Pyrolysis, Shredding), By Product (Crumbed Rubber, Tire Derived Fuel, Others), By Application (Manufacturing, Construction, Rubber Products, Others), and By Region – Global Industry Overview, Statistical Data, Competitive Analysis, Share, Outlook, and Forecast 2023–2032” in its research database.

“According to the latest research study, the demand of global tire recycling market size and share was valued at approximately \$6.22 billion in 2022 and is expected to reach \$6.43 billion in 2023 and is expected to reach a value of around \$8.32 billion by 2032, at a compound annual growth rate (CAGR) of about 3.7 percent during the forecast period 2023 to 2032.”

Tire Recycling Market: Growth Factors and Dynamics

- **Industry collaboration:** Collaborative efforts among industry players are driving the tire recycling market. Companies, associations and research institutions are working together to develop innovative recycling technologies, improve recycling efficiency, and explore new applications for recycled tire materials. Such collaborations foster knowledge exchange and accelerate the growth of the market.
- **Sustainable Development Goals:** The tire recycling market aligns with the United Nations’ Sustainable Development Goals (SDGs). Recycling tires contribute to several SDGs, including responsible consumption and production, climate action, and sustainable cities and communities. The pursuit of these global goals by governments, organizations, and individuals further supports the growth of the tire recycling market, as it addresses pressing environmental and societal challenges.
- **Environmental Awareness:** Increasing concern for the environment is driving the demand for tire recycling. Improper tire disposal leads to pollution and health risks. Recycling tires reduces waste, conserves resources, and minimizes negative impacts on ecosystems.
- **Government Regulations:** Governments worldwide are implementing strict rules to promote tire recycling. These regulations aim to reduce tire waste in landfills and encourage recycling technologies. Compliance with these regulations is essential for tire manufacturers, retailers, and consumers.
- **Demand for Recycled Tire Products:** The market is witnessing a rise in demand for recycled tire products. These products are used in road construction, civil engineering, and manufacturing new tires, footwear, and consumer goods. Recycled tire products are cost-effective and durable, making them increasingly popular.
- **Technological Advancements:** Tire recycling technologies have improved, enhancing the efficiency of the recycling process. Innovative techniques like cryogenic grinding and pyrolysis extract valuable materials from used



Photo courtesy of Custom Market Insights

tires, expanding the range of recycled tire products.

- **Circular Economy Initiatives:** The concept of a circular economy, focusing on reusing and recycling resources, is gaining momentum. Stakeholders are adopting circular economy principles to reduce waste and promote sustainable resource use, driving the growth of tire recycling.
- **Tire Recycling Market: COVID-19 Analysis**
The COVID-19 pandemic has had a significant impact on the tire recycling market, with the industry experiencing both positive and negative effects. Here are some of the key impacts:
 - **Disruption in Supply Chain:** The tire recycling market experienced significant disruptions in the supply chain due to the COVID-19 pandemic. Lockdown measures, travel restrictions, and temporary closure of recycling facilities impeded the collection and transportation of used tires, affecting the overall volume of tires available for recycling.
 - **The decline in Tire Demand:** The economic slowdown and reduced mobility during the pandemic led to a decline in tire demand across various sectors, including automotive, construction, and industrial. With fewer tires reaching their end-of-life stage, the supply of used tires for recycling diminished, impacting the tire recycling market.
 - **Resumption of Operations:** As restrictions eased and economic activities resumed, tire recycling facilities adapted to the new normal. They implemented safety protocols, social distancing measures, and remote work arrangements to ensure the health and well-being of their employees.
 - **Government Support and Incentives:** Governments recognized the importance of maintaining a sustainable tire recycling industry and provided support to mitigate the impact of the pandemic. Financial assistance, grants, and incentives were offered to support the continued operations of recycling facilities and encourage the use of recycled tire products.
 - **Innovation and Diversification:** To overcome the challenges posed by COVID-19, the tire recycling industry focused on innovation and diversification. Companies explored new recycling technologies, such as advanced pyrolysis and devulcanization processes, to improve efficiency and increase the range of recycled tire products.

Bridgestone releases Bridgestone 3.0 Journey 2023 Integrated Report

Bridgestone Corporation has released its latest integrated report – Bridgestone 3.0 Journey 2023 Integrated Report. This report provides a comprehensive understanding of Bridgestone Group’s approach and initiatives aimed at enhancing corporate value over the medium to long term.

Under its unchanging mission of “Serving Society with Superior Quality,” Bridgestone Group has set forth a vision – “Toward 2050, Bridgestone continues to provide social value and customer value as a sustainable solutions company” – and is promoting a transformation to realize this vision, with the Bridgestone E8 Commitment as the axis.

The Bridgestone 3.0 Journey 2023 Integrated Report4 presents Bridgestone Group’s journey of transforming into a sustainable solutions company, while continuing to grow and place emphasis on the input of its stakeholders.

The following is an overview of the topics, key points and activity progress reported in Bridgestone 3.0 Journey 2023 Integrated Report.

- The Group’s foundation for its transformation toward the future; its history, its journey of taking on challenges and the Bridgestone DNA – focus on quality, respect for being on-site, being attentive and support customers’ problems and challenging spirit – which shaped and refined the company.
- The Group’s commitment toward realizing a sustainable society with the Bridgestone E8 Commitment and 2030 Long Term Strategic Aspiration as the

axis, detailed through the Global CEO Commitment in the report.

- Progress update of the final year of the Mid Term Business Plan (2021-2023) and plan for Mid Term Business Plan (2024-2026), which will be the important phase in evolving to the next stage. Both are aligned with the 2030 Long Term Strategic Aspiration as a roadmap guiding us through an era when “change is becoming commonplace.”
- Update of the Group’s effort to evolve its Sustainability Business Model to a regenerative business model, to realize carbon neutrality and a circular economy across value chain and to realize a nature-positive world where the Group can help stop and reverse the loss of natural ecosystems.
- Business strategy and progress update of premium tire business including the value creation through the fusion of ENLITEN™, which is the base technology for product design as the core for Bridgestone’s unique “new premium” and BCMA, which is the base technology for manufacturing and R&D.
- Update of a new core competency; activities to achieve sustainable motorsports by placing sustainability at the core, which restarts the Group’s journey for excellence to create a new brand power.
- Update of the sources of value creation; technology and innovation, talent strategy, intellectual property strategy and response to global management risk.

USTMA February 2023 forecast predicts higher 2023 tire shipments

The U.S. Tire Manufacturers Association (USTMA) projects total U.S. tire shipments of 334.2 million units in 2023, compared to 332.0 million units in 2022 and 332.7 million units in 2019.

Compared with 2022, original equipment (OE) shipments for passenger, light truck and truck tires are expected to

change by 2.3 percent, 1.3 percent, and -0.6 percent respectively, with a total increase of 1.0 million units. Replacement passenger, light truck and truck tire shipments are also projected to change by 1.0 percent, 1.6 percent, and -5.5 percent respectively, with a total increase of 1.2 million units.

| | 2023 Forecast | 2022 | % vs 2022 | Units vs 2022 | 2019 | % vs 2019 |
|--|---------------|------------|-------------|---------------|--------------|-------------|
| Original Equipment | | | | | | |
| Passenger | 42.6 | 41.6 | 2.3% | 0.9 | 46.3 | -8.0% |
| Light Truck | 6.4 | 6.3 | 1.3% | 0.1 | 5.9 | 8.2% |
| Truck | 6.4 | 6.5 | -0.6% | 0.0 | 6.5 | -1.0% |
| Replacement | | | | | | |
| Passenger | 215.8 | 213.7 | 1.0% | 2.1 | 222.6 | -3.0% |
| Light Truck | 37.9 | 37.2 | 1.6% | 0.6 | 32.5 | 16.3% |
| Truck | 25.2 | 26.6 | -5.5% | -1.5 | 18.9 | 33.0% |
| Total Shipments | 334.2 | 332 | 0.7% | 2.2 | 332.7 | 0.5% |
| Note: All shipment in millions. Figures are rounded. | | | | | | |

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EQUIPMENT SPOTLIGHT

Tire Recycling Equipment

by MARY M. THORNTON

maryt@americanrecycler.com

The global market growth for scrap tire management and rubber remediation applications was projected to reach nearly \$9.5 billion by 2022, according to BCC Research. Scrap tires, the largest portion of rubber refuse, contains many resources and thus offers great flexibility when it comes to recycling potential. They can be reduced to their constituent elements of wire, fabric and rubber, and then used as fuel or in civil engineering projects such as road building. As this overall market continues to grow, these manufacturers provide a wide array of equipment for use by recyclers.

Gradeall's tire recycling products include the MKII tire baler, a tire rim separator, portable and static waste compaction systems, a sidewall cutter and tread cutter. The company offers a tire processing product for agricultural settings as well. "Our products help to make tire disposal easy and cost effective, regardless of the scale of your recycling operation and produce a 850 to 900 kg tire bale, that can be shipped in a 40 ft. container to tire pyrolysis plants and tire producers all over the world," stated Stephen Murphy, managing director. With a force power of 45 tons, Gradeall's MK2 tire baler can process 4 to 6 PAS108 bales per hour and reduce overall volume by 80 percent, with each bale containing up to 110 tires. This baler, is optimal for baling car tires, but also processes truck tires easily, if they are first processed via a sidewall cutter.

The Gradeall MK3 tire baler system employs 75 tons of powerful pressing power. The result is the ability to form three bales per hour, each taking



SEDA Environmental LLC

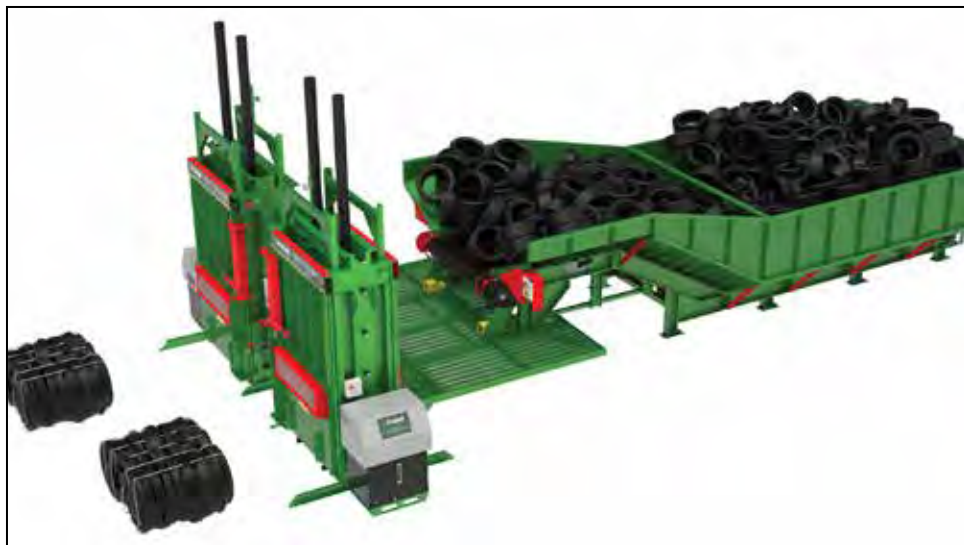
approximately 20 minutes and containing up to 140 tires, depending on their average size. The Intelli-Link feature of the machine provides wireless connectivity to operators, which monitors performance and reports on various, helpful operating factors in real time.

The MK3 can be equipped with Gradeall's baler conveyor (capable of feeding two balers), which saves on the time and effort exerted by operators in loading the MK3. This step also helps in reducing the overall time needed to load and unload bales from containers. The Gradeall truck tire baler produces bales containing up to 12 truck tires and the baler's 50 tons of force reduces tire volume by 60 percent while using a system that also easily ejects

completed bales.

Murphy concluded, "Our tire baler conveyor, an excellent add-on to our MK2 and MK3 tire balers, can be installed to help reduce baler loading time and the physical demands of performing the work manually. Operated using two hands, the machine allows for maximum control, and our tire rim separator is surrounded by guards to protect operators and prevent the scatter of debris."

Greg Wright, vice president of Granutech-Saturn Systems explained, "We offer over 50 years of manufacturing size reduction equipment for the recycling industry. Tire recycling continues to be a very large segment of our sales and I don't see this changing any time soon. The equipment we manufacture and recommend for tire recycling can vary greatly depending on the customer's requirements. Depending on the final product size required, processing rates can range anywhere from 1,000 lbs./hr. to 20 tons/hr." Wright added, "If a customer only wants to make a primary shred or a chip, we would recommend one of our dual shaft shredders, possibly with an external sizing screen, or a quad shaft shredder. If the goal is to reduce tires to a powder, then four stages of processing with various pieces of equipment at each stage are involved, performing various tasks. Reducing tires to crumb



Gradeall International Ltd

See TIRE RECYCLING, Page B5

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www.cmeshredders.com

Eagle International

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www.eagle-equipment.com

Ecoverse Industries

Dan Delciappo
440-937-3225
www.ecoverse.net

Eldan Recycling

Carsten Nielsen
716-731-4900
www.eldan-recycling.com

Gradeall International Ltd

Stephen Murphy
44 28 8774 0484
www.gradeall.com

Granutech-Saturn Systems

Greg Wright
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M&J Recycling

Keith Ely
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www.mjrecycling.com

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Tire Recycling Equipment

Continued from Page B4

rubber is much different than performing a primary shred or chip, as removing the steel and fiber becomes a large part of the process, at different stages and with a variety of equipment.”

The SEDA T-REC XXL separates tires and rims, fast, safe and efficiently, according to Bruce Henderson, chief executive officer. “Tried and tested, it separates steel or alloy rims from 13” to 22” with ease by bending or snapping the bead off the rim, pinching and puncturing the tire and then slipping the tire off the rim, separating both by brute force. This process guarantees separation of almost all tire and rim types, including smaller ‘bring me home’ wheels and run flats,” said Henderson. The T-Rec XXL

comes standard with laser aided wheel alignment for easy wheel placement and a self-raising shield to protect the operator from any possible shattering of alloy rims. The unit is also available in a 230V 3-phase electric version with a full cycle time of 35 seconds, and the latest gas-powered version with key start boasts a full cycle time of less than 20 seconds. Both units ship fully assembled, direct from SEDA.

Henderson explained how SEDA’s latest innovation – the T-Rec XXL feeder, helps load a stack of wheels on the tire machine, which increases the ease of machine use. This new wheel feeder fits the electric and gas powered versions of the T-REC XXL and advantages of using the two products in unison include: steel and alloy rims from 13 up to 22” accommodates for all kinds of tires (including run flats); fast, safe and efficient processing; laser aided wheel alignment and gas or 230V 3-phase electric options.



Granutech-Saturn Systems

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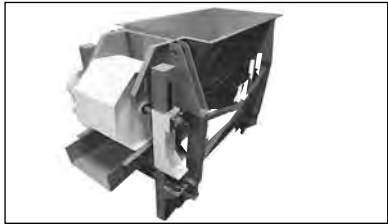
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HERBOLD OFFERS NEW DENSITY SEPARATION TANKS

Herbold sink-swim tanks use water to separate plastics of different densities in post-consumer recycling systems. Three or four transport drums move the material from one end of the tank to the other. During this process higher density plastics like PET and PVC and/or contaminants sink to the bottom of the tank while lower density plastics like PE and PP float on the surface of the water. Tanks are available in three sizes from 78" x 31" up to 157" x 71" with drive motors from 1.5 up to 15 hp.

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North Smithfield, RI 02896
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Rice Lake Weighing Systems' newest addition to the MSI industrial crane scale line is the MSI-6360 Trans-Weigh. The optional anti-heat shield feature allows this crane scale to withstand applications in high temperatures. Equipped with ScaleCore Webservice technology, the MSI-6360 can be remotely controlled and monitored safely from anywhere. Two integrated antennas allow users to connect up to two remote devices via Wi-Fi or RF modules. It is ideal for use in demanding applications and offers legal for trade configurations in capacities up to 70,000 pounds.

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Ground rubber ■ Continued from Page B1

potentially capturing greater water volume with a smaller gallery footprint," the legislative letter stated. "Studies show TDA use in infiltration galleries can reduce metals loading in stormwater. TDA used under railroad tracks also has proven effective and cost-efficient in mitigating ground vibrations from rail lines, a significant benefit to neighboring communities. For these compelling benefits, USTMA urges Congress to fund research and demonstration projects using TDA in federal, state and local construction projects."

"The industry is doing great things on the innovation front, from tire production to scrap tire processing, manufacturers and recyclers are thinking about the entire life cycle of the tire," Ostvik said. "In my opinion, there's a gap between the state of technical innovation and realization in the marketplace. In recent years we've continued to see increases in scrap tire generation, but reports of increases in tire land-filling due to reduced demand for recycled rubber in conventional recycling pathways (e.g. tire-derived fuel). So tire manufacturing itself, and scrap tire processing, have evolved and improved dramatically, but the next frontier is in applications."

"Rubber recycling technology may benefit from the widespread adoption of advanced chemical recycling," Sheerin said. "One example is pyrolysis, the high heat decomposition of tires in the absence of oxygen. Pyrolysis can be used to produce reclaimed carbon black and tire pyrolysis oil which can then be circulated back into new tires. Closing the production loop to place old tire material back into new tires has tremendous environmental benefits and will change the tire industry in the future."

Michael Lobsinger, vice president of operations at Eco-Flex, said his company has created an industry chaining sound barrier wall made of recycled rubber. This can be used by municipalities in the place of concrete and has better sound baffling than the alternative. It has the potential to

recycle all used tires in North America if adopted. Eco-Flex also makes access mats, commercial, automotive, and equestrian products.

"We are seeing different processes used such as devulcanization and pyrolysis," Lobsinger said. "There are some companies testing methods of creating new tires, from the crumb of used tires. There is always innovation taking place, such as I mentioned with our sound barrier wall. Also, consumers and governments are now seeing the importance of using recycled products and environmentally friendly alternatives driven largely by the ESG movement."

Eco-Flex is always testing and creating new products. Each year the company brings two to three new products onto the market.

"With some of the challenges with logistics and the supply chain that we saw during COVID, many companies are looking locally to manufacturers instead of sourcing cheaply made products from China, Lobsinger said. "This is giving companies, such as ours, a greater opportunity to grab the market share for recycled products."

While the tire manufacturing and scrap tire processing industries continue to innovate and make efficiency gains, Ostvik said the big focus is going to be on applications R&D. "That's the exciting new frontier in rubber recycling. Long term, it'll be innovations in advanced materials science that will enable optimal scrap tires and recycled rubber use – areas such as new sustainable and cost-effective TPE (thermoplastic elastomers) compounds and rubber depolymerization," Ostvik said. "In the nearer term, there are a number of companies focusing on new applications ranging from bicycle tires to roadway projects to higher grade carbon black. There is increased awareness of potential safety issues related to consumer uses, which also acts as a driver to discover new applications."

U.S. Tire Manufacturers Association highlights its 2023 federal legislative priorities letter to Congress

As its annual congressional fly-in approaches, the U.S. Tire Manufacturers Association (USTMA) issued its 2023 federal legislative priorities letter to House and Senate leadership of the 118th Congress the letter outlines key areas of continued cooperation to address the evolving areas of tire safety, environmental stewardship, and innovation. USTMA previously engaged with Congress on policies to promote innovative infrastructure technologies and to better position the U.S. tire manufacturing industry to tackle future challenges. The current priorities agenda continues to address those issues while expanding their scope to include equal and standardized access to vehicle data assets and the development of a domestic supply chain of natural rubber.

"Members of USTMA urge the 118th Congress to collaborate to address important issues facing the U.S. tire manufacturing sector and the American public," said Anne Forristall Luke, USTMA president and chief executive officer. "Federal regulations, investment

and research must keep pace with the advancements in automotive technology, and our members stand ready to work with legislators and the Biden Administration to implement the important solutions laid out in our correspondence."

The six policy areas identified in the letter to Congressional leadership by USTMA and its members, representing 12 of the world's largest tire manufacturers, include:

- A unified North American approach to consumer tire information and standards;
- The expansion of sustainable and circular infrastructure solutions for scrap tires;
- Research to identify mitigation solutions for roadway runoff;
- Use and domestic manufacturing of retreaded tires for commercial vehicles;
- Ensuring fair, equal and standardized access to digital vehicle data and infrastructure assets; and
- Developing domestic sources of natural rubber.

Firestone uses recycled plastic in tires

Bridgestone Americas provided a new tire compound that uses recycled plastics in its construction.

As the series' exclusive tire supplier, Bridgestone has incorporated ISCC PLUS certified recycled butadiene, a monomer produced from hard-to-recycle used plastic shopping bags, film, stretch wrap and other flexible polymer packaging, developed in partnership with Shell, in all Firestone Firehawk race tires used at the Indianapolis 500. Bridgestone manufactured all race tires for the 2023 season at the ISCC PLUS-certified Advanced Tire Production Center (ATPC) in Akron. Additionally, Bridgestone partnered with Penske and Indianapolis Motor Speedway to transport all race tires to the Indianapolis Motor Speedway (IMS) with electric 2023 Freightliner eCascadia from Penske Truck Leasing's fleet of electric vehicles during the month of May.

"We are driving to increase sustainability in every area of our business, and we're thrilled to showcase our commitment to sustainability in 'The Greatest Spectacle in Racing,'" said Paolo Ferrari, president & chief executive officer, Bridgestone Americas and joint global chief operating



Bridgestone has incorporated ISCC PLUS certified recycled butadiene in all Indy 500 Firestone Firehawk Hero tires. Photo courtesy of Firestone

officer, Bridgestone Corporation. "We are further committed to a thriving and more sustainable future in motorsports."

Firestone Firehawk race tires with sidewalls made using guayule-derived natural rubber were first introduced at the Indy 500 Pit Stop Challenge in May 2022

as a first look before debuting in competition as the alternate race tire at the Big Machine Music City Grand Prix in August of last year. For the 2023 season, alternative tires using guayule-derived natural rubber have been expanded to all street courses.

Goodyear releases 2022 sustainability report

The Goodyear Tire & Rubber Company released its report on corporate responsibility performance for 2022.

The report highlights the progress Goodyear is making toward achieving its short and long-term sustainability goals.

"Sustainability is a key component of our business strategy and an integral part of our culture," said chairman, chief executive officer and president Richard J. Kramer. "In 2022, the work of our associates around the world further demonstrated our commitment to ethical and sustainable processes, materials and programs. Our latest corporate responsibility report shares where we are along our journey – our goal progress, our challenges, our strategies, including our decarbonization roadmap, and what lies ahead – and how we are working with our customers and other stakeholders to help build a better future."

Goodyear's 2022 report is organized around the four pillars of the company's corporate responsibility framework, Goodyear Better Future: Sustainable Sourcing, Responsible Operations, Advanced Mobility and Inspiring Culture. Some of the report's highlights are described below.

Sustainable Sourcing

Goodyear scientists and engineers continued to make significant progress toward the company's 2030 goal of introducing a 100 percent

sustainable-material tire with the development of a demonstration tire made of 90 percent sustainable materials. This demonstration tire has 17 featured ingredients, including four different carbon blacks produced from bio-methane, carbon dioxide, end-of-life tire pyrolysis oil feedstocks and plant-based oil; soybean oil; rice husk ash silica; and bio-renewable pine tree resins.

Responsible Operations

Goodyear continued its work to reduce its environmental impact. In 2022, the company increased its utilization of renewable electricity to 34 percent across its global manufacturing operations, up from 3 percent in 2019.

Advanced Mobility

In 2022, Goodyear continued its focus on improving fuel efficiency by achieving a 32.9 percent reduction in rolling resistance and a 9.4 percent reduction in tire weight in its global consumer tire portfolio, from a 2005 baseline.

Inspiring Culture

In 2022, associate membership in Goodyear's Employee Resource Groups (ERGs) grew by 6 percent. It was also a milestone year for one of the company's ERGs with the Akron-based Goodyear Women's Network (GWN) celebrating its 100th anniversary in 2022.

Goodyear's 2022 report was prepared with reference to the Global Reporting Initiative (GRI) Standards.

Goodyear launches Urban Max BSA(EV) all-position tire for select electric buses

The Goodyear Tire & Rubber Company introduced the newest EV-ready tire for communities around the country looking to drive their buses and transit fleets more efficiently while transitioning to more sustainable battery electric vehicles. The new Urban Max BSAEV (Bus Service All-Position) tire was specially designed in partnership with GILLIG, the manufacturer of American-built heavy-duty transit buses. The Urban Max BSAEV is the first Goodyear tire engineered specifically with low rolling resistance for EV transit and metro buses to help extend range and handle the increased load capacity.

The Urban Max BSAEV 315/80R22.5 is offers an increased load capacity of 10,200 pounds – load range L – as a fitment option on select GILLIG battery electric buses and for today's growing municipal EV fleets. Increased load capacity allows EV buses, like GILLIG's newest Battery Electric, to be equipped with additional battery packs resulting in increased range.

The new Urban Max BSAEV has a variety of features to help today's transit and metro bus fleets, including:

- New tread design with deep siping to help maintain Three-Peak Mountain Snowflake (3PMSF) traction.
- Enhanced 4-belt package delivers a high 10,200-pound load-carrying capacity to help accommodate the increased weight of electric vehicle batteries.
- Innovative low rolling resistance compound helps enhance energy efficiency, which aids in extending electric vehicle range.
- Meets GHG Phase 2 Compliance for metro buses, available on select GILLIG Low Floor Battery Electric buses.



UPCOMING EVENTS

SEPTEMBER

9/25-9/28

Missouri Recycling Association 2023 Annual Conference

DoubleTree St. Louis Hotel
Chesterfield, Missouri
moraconference.org
573-491-42551

9/27-9/29

WASTECON 2023

Hynes Convention Center
Boston, Massachusetts
wastecon.org/events
800-467-9262

OCTOBER

10/12-10/14

Automotive Recyclers Association Annual Convention

Sheraton Kansas City Hotel
at Crown Center
Kansas City, Missouri
a-r-a.org
615-476-4501

10/22-10/24

WV Educational Conference on Litter Control & Solid Waste Management

Oglebay Resort
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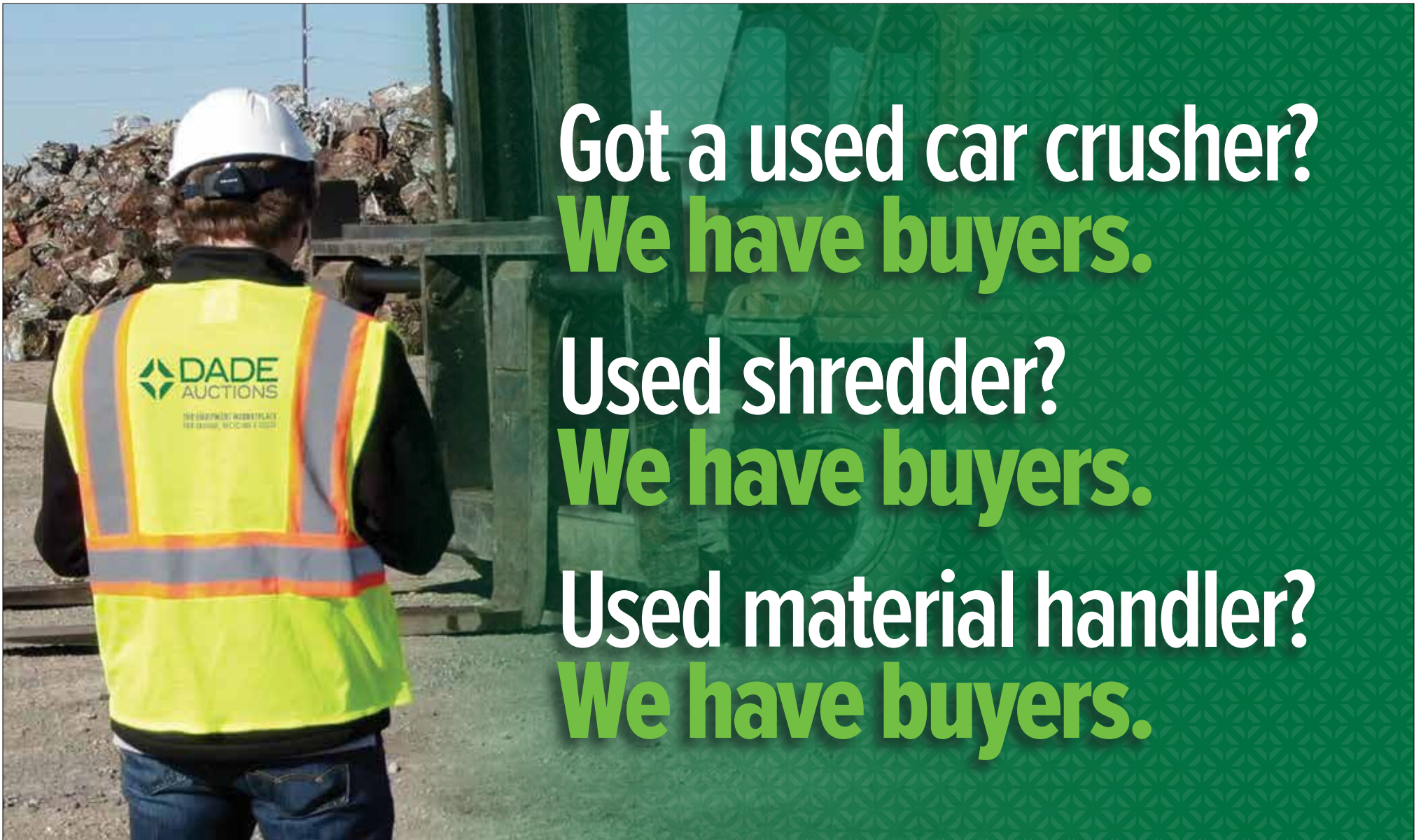
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