



# American Recycler

NewsVoice of Salvage, Waste and Recycling

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## FOCUS: Metals

### Russian-Ukraine war alters the metal industry



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## Smart recycling and waste procedures

by MAURA KELLER

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Today's smart waste and recycling management technologies are truly that: smart. Thanks in part to significant technical advancements, AI technology and the Internet of Things (IoT) are resonating with recycling industries professionals at a growing rate.

"The biggest impact of AI and IoT on the waste management industry is the invention and adoption of smart bins – their ability to report fill levels in real-time have become the critical centerpiece of IoT-enabled waste collection and disposal processes," said Fabian Kochem, head of global product strategy at INCE, an IoT connectivity and software company. "This capability, combined with AI algorithms, enables communities to plan the most optimized pickup routes, reducing fuel consumption and CO2 emissions. Studies have found that the use of Smart Bins reduces collection trips and distance travel by half, resulting in a 30 percent reduction in fuel consumption."

Quite simply, waste is not being sorted manually anymore, but instead AI-powered robotic arms are being used to separate recyclable from non-recyclable materials faster and with fewer errors. As Kochem explained, due to high precision in detection and analysis, recycling facilities can operate at much higher efficiency and see a significant increase in the number of materials recycled.

"AI and IoT have really increased the efficiency of the industry by digitizing formerly manual operations. Due to real-time IoT data and AI, the industry has been enabled to sustainably optimize entire waste collection, disposal, and recycling processes," Kochem said. As he explained, this development has allowed the industry to operate at significantly lower costs. Furthermore, it has led to large advances in recycling productivity, generating more output from less waste, which is a very important factor for tackling today's challenges of climate change.

Carling Spelhaug, senior marketing communications manager at AMP Robotics, explained that AI can learn to identify anything a person can be taught to identify. It can identify brands, form factors, certain types of damage, etc. This provides an entirely new dimension to sorting capabilities. AI then digitizes an image of each item it sees on a conveyor belt.

"AI can record the number of items of a desired commodity type and derive additional data from those objects," Spelhaug said. "This capability, combined with the mass of produced scrap bales, can offer detailed insights into



Molok creates waste containers that utilize the coolness of the ground to minimize odors. The oldest waste is at the bottom, in the coolest part of the container and utilizes gravity for compaction using its own weight. This allows each container to hold approximately 20 percent more waste. PHOTO COURTESY OF MOLOK LTD.

the trends of a specific material flow – say PET bottles or PET thermoforms – in a given materials recovery facility (MRF), a network of MRFs, or even across a geography. This is powerful data for planning and understanding the supply of desired materials."

At the facility level, Spelhaug explained that the data AI generates can help recyclers scrutinize their operations, identify inefficiencies and take instantaneous action to rectify them. AI-driven material characterization solutions provide actionable, data-driven insights throughout the facility and provide the tools necessary to centralize data collection and reporting.

For AMP Robotics robots, while it depends on the facility and how many shifts it runs, costs can drop by as much as 50 percent or even 70 percent by replacing hard-to-secure human labor in various sorting roles. "AI-driven automation also produces a higher-quality end product, increasing revenue opportunities for the facility," Spelhaug said. "AI can be deployed without changing the industry or any one facility's way of doing business."

Moreover, AI significantly decreases the cost of measuring what's happening in a facility. "Each AI sen-

sor can identify nearly all the different material types that are of interest," Spelhaug said.

And when it comes to sorting, AI is the enabling technology essential for materials recovery facilities (MRFs) to generate and capture data to optimize recycling operations. According to Spelhaug, vision-based AI software identifies and characterizes objects in real time, digitizing each item that passes by. These items are captured as a new form of data, including object counts, packaging descriptions, and more.

"AI is helping the industry overcome inconsistent access to and use of recycling data," Spelhaug said. "AI and computer vision can identify and describe the objects that pass through MRFs and transform them, both desired commodities and undesired contaminants, into data. Digitizing the waste stream provides transparency about what is and isn't getting recycled to create better solutions on the path toward a circular economy."

#### Key Areas of Success

Stacy Savage, founder and chief executive officer of Zero Waste Strategies LLC, pointed to several key areas

See SMART RECYCLING, Page A4

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# Ohio University awarded grants from DOE to develop products from coal waste

The Department of Energy (DOE) has funded six research and development projects that will repurpose domestic coal resources for high-value graphitic products and carbon-metal composites that can be employed in clean energy technologies. Ohio University's Institute for Sustainable Energy and the Environment was awarded two of the six awards, one that explores how coal waste can be reimagined as energy storage and the second aims to develop ultra-conductive carbon metal composite wire for electric motors.

## Turning coal waste into energy storage

The DOE awarded \$999,976 to support the first project, which will focus on developing electrochemical processes to convert coal-based materials to two-dimensional carbon materials for supercapacitor applications. The project is led by principal investigator John Staser, associate professor of chemical and biomolecular engineering. Additionally, OHIO faculty members Jason Trembly, professor of mechanical engineering and director of the Institute for Sustainable Energy and the Environment, and Damilola Daramola, assistant professor of chemical and biomolecular engineering, will support this project, alongside industry partners CFOAM LLC and Capacitech Energy.

Supercapacitors are typically used for energy storage. The project aims to develop advanced processes, called the electrochemical coal to 2-dimensional materials (e-Coal2D) process, to transform coal-based materials into new materials that enhance the capacity of electrochemical supercapacitors. CFOAM, one of the industry collaborators, has developed coal-derived materials that are used as the raw material to generate the final product. Then, Capacitech Energy, a leader in cable-based capacitors, will evaluate the two-dimensional materials in their systems.

Coal's unique structure and composition make it well-suited for use as a raw material for producing various high-value carbon products. The ultimate goal of this project is to continue to find ways to reimagine coal waste to reduce greenhouse gas emissions and create jobs.

## Understanding ultra-conductive carbon metal composite wire for electric motors

Led by principal investigator Yahya Al-Majali, assistant professor of mechanical engineering and assistant director of the Institute for Sustainable Energy and the Environment, this project

aims to develop cost-effective carbon metal composites with enhanced bulk electrical properties for use in electric motors. This project was developed from a broader mission to increase American energy efficiency and reduce greenhouse gas emissions globally.

See OHIO UNIVERSITY, Page 7

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# Smart recycling

Continued from Page 1

within the recycling industry where AI and IoT is having a significant impact.

•Predictive maintenance – Once an AI system is installed inside the indoor bins and/or outdoor dumpsters, the tech can track fill levels of the containers and identify contamination.

As Savage explained, this allows workers to remove contaminants before hauler pickup, such as large cardboard boxes that may have wound up in the landfill trash dumpster instead of the recycling dumpster. This can also help identify any illegal dumping on the property, such as mattresses placed in dumpsters.

•Route optimization – Some larger businesses have “on-call” services for very large containers, such as 20, 30, or 40 cu.yd. compactors.

“When sensor tech is implemented, an automatic ping is sent to the hauler for pickup when it’s 75 to 80 percent full, instead of following a rigid service schedule, when the container may not be full,” Savage said. “This is also useful in municipal residential programs where radio frequency ID (RFID) tags are used to determine material weights in each curbside bin so hauling trucks aren’t overfilled, which can damage vehicle tires, brakes and shocks over time. It also allows haulers to know bin locations, especially after a natural disaster, such as a flood, when bins are easily moved in rushing water.”

•Smart bins – Some of these bins have cameras and if you hold an item in front of the camera, it will take a photo, process the image internally, and then tell you which bin to place it in.

“When people have a lack of confidence at two- or three-bin systems that handle landfill trash and recycling, with a possible composting option, there is a very high probability that they will not take the time to decipher what goes where,” Savage said. “Out of frustration, embarrassment, and time constraints, they typically will throw everything in the trash bin instead of properly sorting the items they’ve carried to the bins.”

### Challenges With Technology

Implementing AI and IoT does bring some challenges for the waste industry, as Kochem explained how companies can find it hard to afford the initial investment costs, and may struggle to find experienced personnel who can install and maintain these solutions.

“This becomes increasingly difficult when new technology must be integrated with existing legacy systems,” Kochem said. “When it comes to IoT, many waste management companies operate in areas with limited connectivity, which complicates implementation. Overall, some parts of the waste management industry are resistant to adopt new technology and fight against inevitable change.”

According to Spelhaug, training a neural network to detect objects in the recycling stream is not easy – but it’s an entirely different challenge when you consider the physical deformations

that these objects can undergo by the time they reach a recycling facility. They can be folded, torn, smashed, or partially obscured by other objects.

“There’s also the challenge of staying up to date with the continual changes in consumer packaging,” Spelhaug said. “Any mechanism that relies on visual observation to learn associations between packaging and material types will need to consume a steady stream of data to ensure that objects are classified accurately.”

### Further Advancements

In the future, Kochem said to keep an eye out for huge advances around AI-powered drones, which can be used to collect garbage and pick up litter. Spain already cleans their beaches this way, ultimately protecting marine wildlife. Drones can also be used to measure the state of disposal sites, e.g., to reliably find out the current capacity, or even to monitor invisible and hazardous methane emissions.

“Drones will play an ever-important role in complying with local regulatory and environmental laws,” Kochem said.

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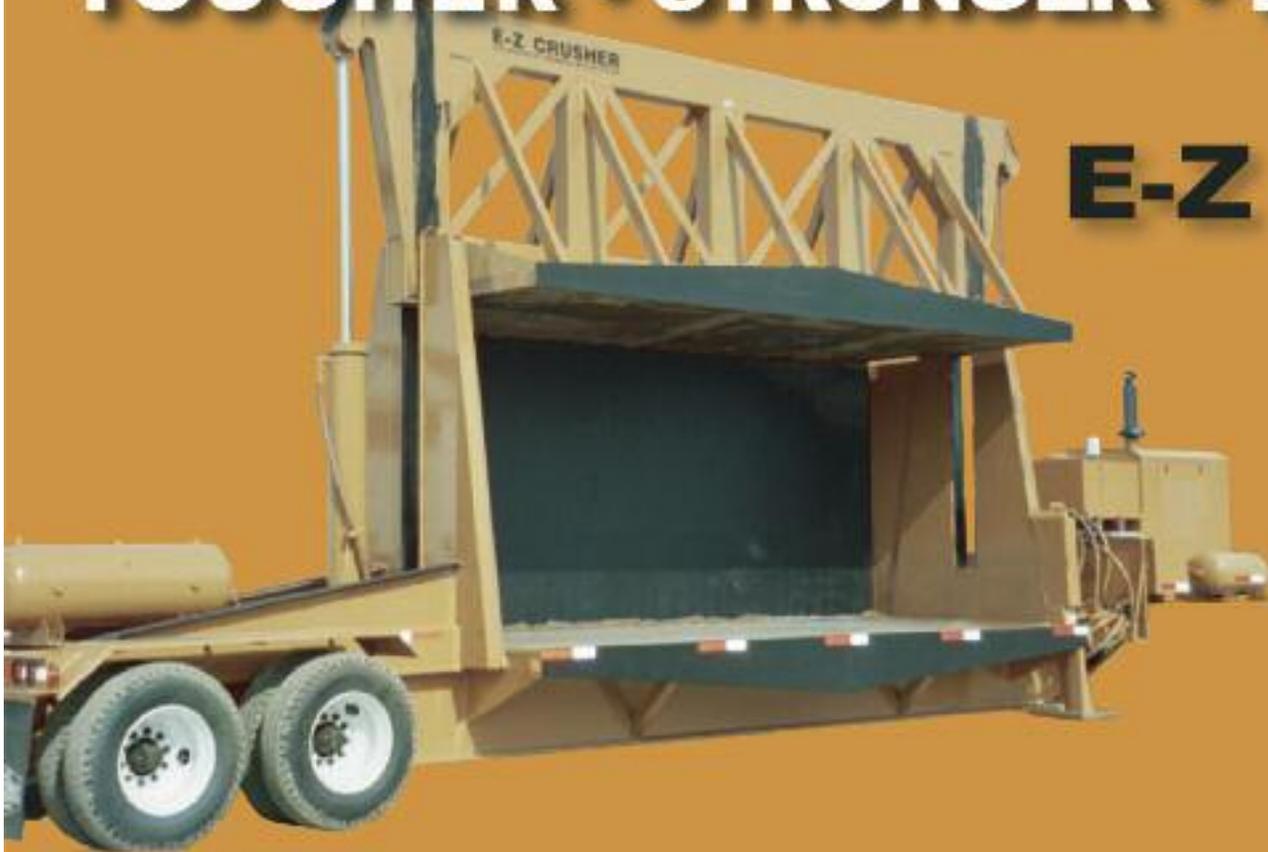
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## Komar acquires Maren Engineering

Komar Industries, a designer and manufacturer of industrial waste and recycling processing systems, has acquired Maren Engineering Corporation, an equipment manufacturer and technology innovator in baling and shredding systems.

“Maren has been a leader in the industry since 1962 with its highly engineered and efficient balers and shredders,” said Mark Koenig, Komar’s president and chief executive officer. “Bringing Maren into the Komar family enhances the value and service provided to our customers and helps them optimize their most challenging recycling and waste applications.”

Maren will continue to be led by its existing leadership team, who will become shareholders in the combined organization as part of the transaction. The respective leadership teams see tremendous value in leveraging each company’s capabilities to drive further innovation within the waste and recycling industry.

## Ohio University

■Continued from Page 3

Using materials derived from coal waste, specifically nano-graphite and graphene, carbon metal composites will be created using novel metal forming processes. The performance of the finished material, which will take the form of an ultra-conductive wire, will then be tested and quantified to ensure readiness for real-world applications. The wire is intended to be used in electric motor applications, which further supports technology to ultimately reduce greenhouse gas emissions.

The award from the DOE totals \$1 million with a \$250,000 cost share. Industry partners include MetalKraft Technologies LLC, Fisk Alloy Inc., CONSOL Innovations, Hydro Precision Tubing North America, AmeriCarbon LLC, SP2 Carbon Technology Co and Clear Skies Consulting LLC. Additionally, a team of Ohio researchers will support this project, including Jason Trembly and David Drabold, distinguished professor of physics.

Development of the carbon metal composite wire will not only reimagine use for coal waste, but its application will offer key environmental and economic advantages.

Introducing coal-derived graphitic carbons into electrical wire could significantly reduce American energy consumption, preventing up to 14 million tons of carbon dioxide emissions, and saving consumers \$4.3 billion annually if just 20 percent of alternating current (AC) motors use ultra-conductive wire. Lastly, this technology will potentially create new manufacturing jobs for coal communities.

# Republic Services rolls out fully integrated electric collection trucks

Republic Services, Inc., a leader in the environmental services industry, announced plans to significantly scale its electric truck fleet through a long-term deal with Oshkosh Corporation. It will begin operating two fully integrated electric recycling and waste truck prototypes this fall, and expects EVs to represent half of its new truck purchases in the next five years.

Republic operates the country’s fifth largest vocational fleet with 17,000 trucks, with electric collection trucks currently operating in two states. The Company has made the industry’s largest commitment to fleet electrification through a multi-supplier vendor strategy. Oshkosh’s McNeilus business unit is one of Republic’s longtime providers of recycling and waste collection truck bodies.

Republic provided insights to Oshkosh engineers regarding operational, safety and ergonomic features for the truck. The chassis and body are designed as a single unit, maximizing interior space and creating a unique, streamlined exterior. Safety features include an enlarged windshield for improved visibility, 360-degree cam-



eras, lane-departure sensors and automated braking.

“As the operator of 17,000 trucks, Republic Services is uniquely positioned to advance decarbonization through our commitment to electrification, delivering meaningful environmental and economic benefits,” said Jon Vander Ark, president and chief executive officer. “Our engagement with Oshkosh on the truck of the future will accelerate the transition of our fleet while providing advanced safety features and technology. We’ll continue to invest in innovations that will help reduce emissions, benefit the environment and help our customers meet their own sustainability goals.”

Two automated side-load prototypes for residential collections will hit the road in Phoenix this fall, with additional vehicles planned in 2024 for locations including Santa Ana and Carlsbad, California, and the Portland, Oregon area.

The recycling and waste collection business is well-suited for electric vehicles, with trucks operating consistent routes and returning to a base to recharge overnight. This new truck leverages Republic’s environmental services leadership and Oshkosh’s experience with purpose-built, heavy-duty EVs, including fire trucks, aircraft rescue and firefighting vehicles, defense vehicles, access equipment and concrete placement vehicles.

Republic Services is putting sustainability in action through industry-leading commitments to advance circularity and decarbonization. The company set a goal to reduce absolute Scope 1 and 2 greenhouse gas emissions by 35 percent by 2030 and is the only U.S. environmental services provider to have its emissions reduction target approved by the Science Based Targets initiative.



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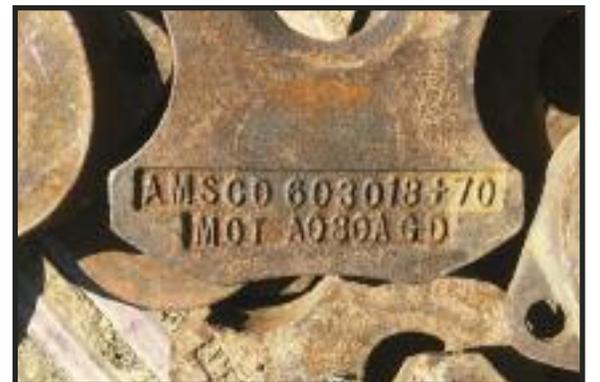
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## AUTOMOTIVE

# Honda strikes deal with Battery Resourcers

Battery Resourcers, a lithium-ion battery recycling and manufacturing company, signed an agreement with American Honda Motor Co. to recycle Honda & Acura Electric Vehicles (EV) batteries.

The safe and affordable recycling of spent lithium-ion batteries is a significant challenge for carmakers and battery manufacturers, especially since millions of EVs are expected to hit the road in the coming years and new regulations mandate recycling of spent batteries and the use of recycled metals in new batteries. In the future, Battery Resourcers and Honda will also work together to improve recyclability and to reintegrate recycled material back into Honda's material supply chain.

"We are proud to work with sustainably minded companies like Honda to revolutionize the lithium-ion supply chain and build a more sustainable future," said Battery Resourcers chief executive officer Mike O'Kronley. "Our innovative, closed-loop recycling process addresses environmental and regulatory issues while unlocking the hidden value in spent lithium-ion batteries. As a result, we can provide safe, convenient and environmentally responsible recycling solutions at an affordable cost."

Founded in 2015 as a spinout from the lab of Prof. Yan Wang at Worcester Polytechnic Institute, Battery

Resourcers completed a \$20 million Series B equity round with financing led by Orbia Ventures, the venture capital arm of the multinational Orbia, and other investors including At One Ventures, TDK Ventures, TRUMPF Venture, Doral Energy-Tech Ventures and Jaguar Land Rover's In-Motion Ventures.

Unlike other battery recycling companies, Battery Resourcers offers a fundamentally new approach to lithium-ion battery manufacturing, starting with a mixed stream of used lithium-ion batteries and ending with the production of finished, battery-ready cathode active materials. With 97 percent metal recovery, Battery Resourcers currently produces Nickel Manganese Cobalt (NMC) based cathode active materials.

Honda's batteries will initially be processed by the company's recently expanded site in Worcester, Massachusetts and later at a new commercial scale plant that will be operational in the spring of 2022. The new site will be capable of processing more than 20 million pounds of batteries.

The company is also engineering a novel process for graphite recovery and purification, which will enable it to return both the cathode and anode active materials back to manufacturers of new batteries.

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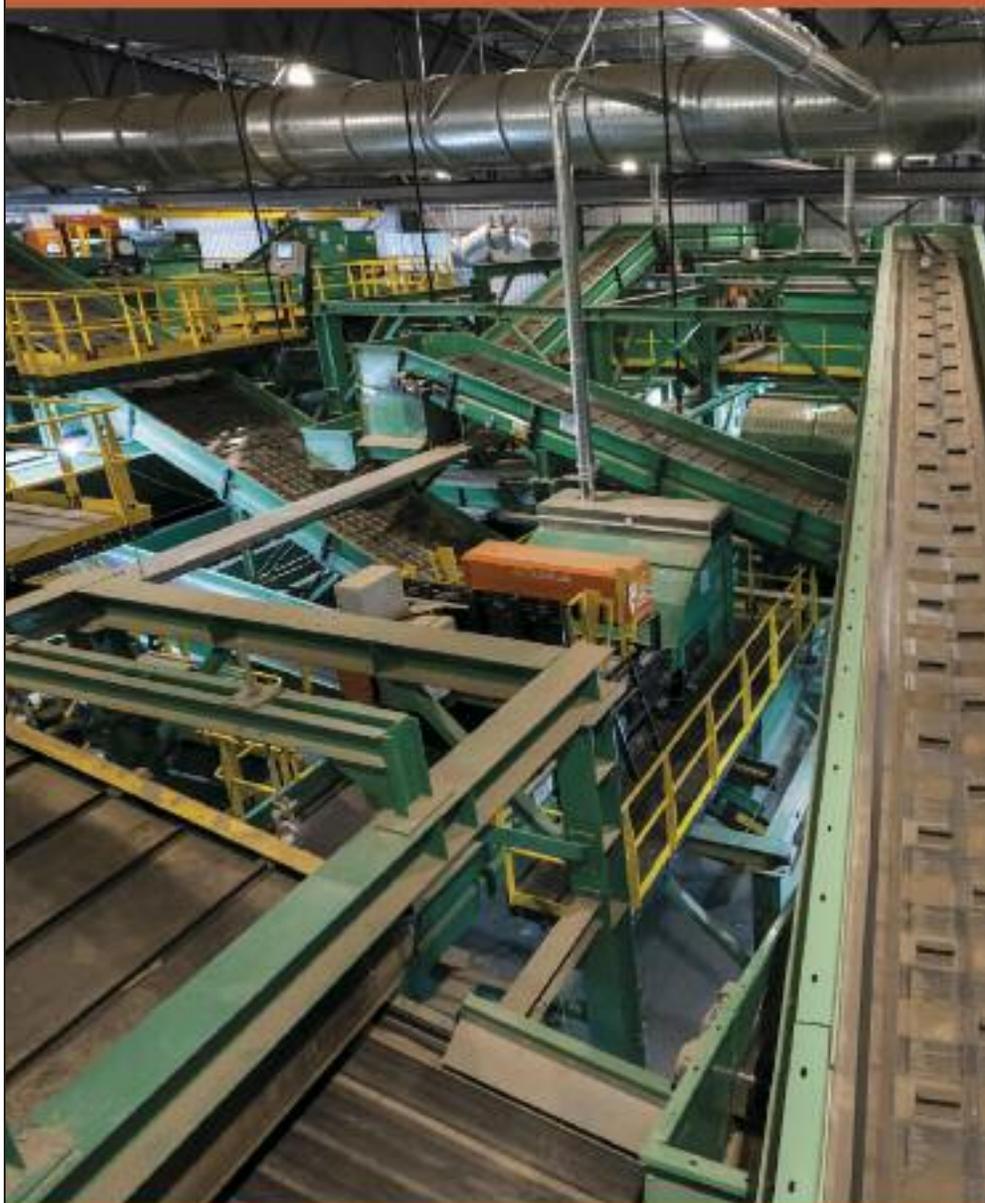
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## AUTOMOTIVE

# Ford announces new solar power plant



Ford's new solar power plant at its Almusafes manufacturing facilities in Valencia, Spain.

PHOTO COURTESY OF FORD OF SPAIN

Ford is looking to the future with a new solar power plant at its Almusafes manufacturing facilities in Valencia, Spain. By 2035, Ford is committed to having zero emissions electric vehicles for all vehicle sales in Europe and targets carbon neutrality across its European footprint of facilities and suppliers. This latest initiative, which began operating in late 2022, highlights the company's on-going drive to meet that commitment.

The photovoltaic area, that converts solar energy into electricity, is in a non-productive area of the plant covering two zones of solar panels, capable of producing the equivalent power every year to run 1,400 average homes.

The current production of close to 4,641 megawatt hours per year will increase this summer by 3,762 megawatt hours per year, the equivalent of 1,100 additional average homes. In practice, this means that Ford's Valencia factory will be making a meaningful reduction in its current electricity demand from the national grid this year.

Ford is looking to expand the areas of solar panels on further non-productive land targeting to reach 10 megawatts of peak power by 2024. The feasibility of potential future solar panel installations on the roofs of factory buildings is also being studied.

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**WASTE**

# Winters Bros. releases State of Waste report

Winters Bros. Waste Systems, a leading waste solution provider on Long Island, New York, released its first "State of Waste" report that provides a detailed review of the trends, challenges, and opportunities facing Long Island's waste and recycling infrastructure. The report was prepared using information from a variety of sources including federal, state, and local institutions, agencies, and organizations. Outlined in the report are the very real and very serious environmental, public health, and economic issues that are confronting municipalities and businesses across Long Island in light of the closure of the Brookhaven Landfill in 2024. The report outlines the crisis and, more importantly, identifies 14 action steps to address it and improve waste management and recycling on Long Island.

"The waste crisis Long Island is facing cannot be understated," said Jimmy Winters, executive vice president and an owner of Winters Bros. Waste Systems. "The 2.9 million people who live on Long Island produce more than 14 million pounds of waste every day. We, in the solid waste industry, along with public officials, municipal officials, regulators, and community members must work together to develop solutions. Our hope and expectation is that our State of Waste report is a step towards meaningful results."

The report states that Long Island's population produces over 2.6 million tons of municipal solid waste per year, not including an additional 5.3 million tons of waste that is produced from construction, renovation and demolition projects annually. Most non-recycled residential waste is burned and the ash residue is disposed of on Long Island, primarily at the Brookhaven Landfill. Most commercial waste from businesses, offices, stores and restaurants is transported off the Island for disposal. Of the waste that leaves Long Island, 91 percent is transported by truck, while the other nine percent is transported by rail.

Winters Bros. offers 14 different recommendations on how this waste crisis can be addressed in the report, and cooperation between public and private entities are at the crux of them all. Municipal and private waste management professionals must work together to create a solid regional approach to finding solutions that address the waste crisis on an Island-wide scale.

This would involve all parties working alongside the New York State Department of Environmental Conservation to facilitate solutions, policies and planning to successfully manage Long Island's wastes. Improving infrastructure is another focus of the State of Waste.

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## BUSINESS BRIEFS

### CMC appoints Peter Matt as president

■ The board of directors of Commercial Metals Company has appointed Peter R. Matt as president, effective as of April 1, 2023, succeeding Barbara R. Smith who will remain chairman and chief executive officer. Matt will continue to serve on the board of directors of the company, which he joined in June 2020.

Matt is a seasoned global business leader with significant experience across a range of manufacturing companies in metals and metals-related industries. Since January 2017, Matt has served as executive vice president and chief financial officer of Constellium SE, a global aluminum fabrication company. Prior to joining Constellium, Matt served as a managing partner for Tumpline Capital, LLC from 2015 to 2016. From 1985 to 2015, he held various leadership positions with Credit Suisse.

### Simplicity names Skawinski as new territory sales rep

■ Simplicity Equipment and Service has named John Skawinski as a territory sales representative. The Rhode Island native joins Simplicity and will represent the Westfield, Massachusetts company covering Maine, Vermont and New Hampshire.

Simplicity Equipment & Service was founded in 1997 with Ryan Cullen acquiring ownership in 2020. The Massachusetts firm offers equipment such as Komptech, Indeco Breakers and Dymax.

### APR elects new board of directors for 2023

■ The Association of Plastic Recyclers (APR) announced its newly elected executive committee and board of directors to lead the organization for 2023. Roxanne Spiekerman of PreZero US has been re-elected chair for the upcoming year, with Tom Frantz of Technimark serving as vice chair, and Michael Westerfield of Dart Container serving as treasurer.

The APR membership elected the following new members to the board for 3-year terms:

- Cherish Changala, Revolution
- Jimmy Lawler, Sims Municipal Recycling (SMR)
- Jon Stephens, Natura PCR
- Michael Westerfield, Dart Container

They join APR's existing board members: John Caturano, Nestlé; Nicole Janssen, Denton Plastics; Maite Quinn-Richards, Closed Loop Partners; Scott Saunders, KW Plastics; and Julie Zaniwski, Pepsico.

### Steel Dynamics declares cash dividend increase

■ Steel Dynamics, Inc. announced that the company's board of directors declared a first quarter cash dividend of \$0.425 per common share, a 25 percent increase over the company's 2022 quarterly rate. The dividend is payable to shareholders of record at the close of business on March 31, 2023 and is payable on or about April 14, 2023.

### Suncor Board names Kruger as president and CEO

■ Suncor announced that its board of directors has unanimously selected Rich Kruger to be the company's next president and chief executive officer, effective April 3, 2023. Kruger will also join the Suncor board of directors. The announcement follows a rigorous global search process conducted by a special committee of the Board. The committee undertook an extensive evaluation of a number of highly qualified candidates with the support of an international executive recruiting firm.

Kruger had a long and successful career with Exxon Mobil Corporation for 39 years, leading Imperial Oil Limited as chairman, president and chief executive officer from 2013 through 2019 before retiring from the company. Mr. Kruger successfully drove a strong performance culture by focusing on safety, reliability and operational excellence – enabling the company to deliver exceptional financial results and unprecedented returns to shareholders.

Kris Smith, who has been the interim chief executive officer since July 2022, will work with Kruger to facilitate a smooth leadership transition before assuming the role of chief financial officer and executive vice president of corporate development, at the conclusion of Suncor's annual general meeting in May. Alister Cowan, the current chief financial officer, plans to retire but has offered to remain through the end of the year to support the transition to Smith and to provide advisory services.

### Mecalac adds three new dealers, expands coverage

■ Mecalac, a designer, manufacturer and distributor of compact construction equipment for urban environments, has added three new U.S. dealers, including one specializing in railroad equipment, while existing dealers have expanded their coverage areas. Mecalac now has a total of 22 dealers in the U.S. and Canada.

**Mecalac's three new dealers include:**

•Columbus Equipment Company, which covers the state of Ohio. The company has more than 70 years of experience, offering heavy equipment sales, parts, service and rentals through nine branch locations.

•Anderson Equipment Company provides Mecalac equipment to customers in West Virginia, western Pennsylvania and most of New York state. Founded in 1935, Anderson Equipment Company offers earthmoving and mobile equipment to the construction, mining, roadbuilding and specialty material handling industries.

•Superior Sales & Service, headquartered in Plattsmouth, Nebraska, covers North America and specializes in railroad equipment. The dealer will offer Mecalac's full line of dedicated railroad excavators primarily to Class 1 Railroads and related contractors.

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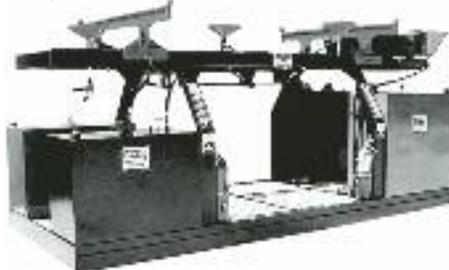
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## Russian-Ukraine war alters the metal industry

by MAURA KELLER

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It's been over a year since Russia invaded Ukraine and it affected a myriad of industries, including the metals recycling market.

According to Irina Tsukerman, business and geopolitical analyst, president of Scarab Rising, Inc., a media and security strategic advisory, both of the iron and steel industries in Ukraine have been disrupted by the war. Prior to the war, Ukraine was a major supplier of these metals to Turkey, China, and parts of the EU.

"Just half of the iron plant's blast furnaces are currently operational, which has significantly affected the production," said Tsukerman. "Other steel plants have ceased production altogether. This has affected the global steel market, especially in Central Europe, disrupting the supply chain." Other critical metals and raw materials endangered by the war include nickel, aluminum (of which Russia is one of the leading global producers), palladium, potash, and vanadium. Many of these are important to the transition to renewables.

Greg Pendura, chief executive officer of Regenx, the first non-smelter company to extract precious metals from diesel catalytic converters, said metals and commodities that are sourced in Russia and Ukraine have additional supply pressures, especially energy.

"Global COVID-related concerns and recession fears are having a stronger impact on over all metal pricing on a global basis due to anticipated supply and demand," Pendura said. Higher energy costs, not only in Europe but worldwide, are affecting metal pricing and will add to the problem as recessionary fears subside in the future. In addition, China beginning to ease its COVID restrictions will have a large impact on metal pricing. U.S. metal pricing will see increases as a result.

"Certain base metals, such as nickel, are currently seeing rising price



In normal circumstances, massive cargo vessels are shipped from Ukrainian ports carrying exports of bulk iron ore. In the environment in the current war, these tons of shipments have ceased entirely.

PHOTO BY NEACSU RAZVAN CHIRNOAGA | DREAMSTIME

pressure due mainly to batteries for EVs," Pendura said. "But overall recessionary fears are having a negative impact on short-term pricing. Precious metals such as platinum, palladium and rhodium are currently seeing downward pricing pressure due to anticipated reduction in demand due to worldwide economic factors."

As Tsukerman further explained, sanctions on Russian steel by EU further complicated the picture. Moreover, Ukraine, for its own part, has significant untapped deposits of lithium, which are essential for EV batteries, as well as titanium and iron ore needed for various industries.

"All of that caused market prices for metals to skyrocket, affecting, of course, the U.S. European steel producers are now looking to secure steel else-

where and this presents an opportunity for the U.S., which has an independent steel supply," Tsukerman said. "However, since entire industries are shifting gears as a result of war-related adjustments and disrupted supply chains, U.S. steel actually saw demand drop." The reason for that also includes escalating energy costs, which are affecting production in various industries.

As the war has continued, Tsukerman pointed out that U.S. steel shifted production to focus on pig iron, toward electric arc furnaces. It has also shifting domestic supply and its raw materials in Europe.

"This is, in part, in response to the war and is also disrupting specifically the supply of pig iron. Companies are trying to shift to other materials to minimize dependency on pig iron," Tsuker-

man said. "There are also discussions that these developments may cause the U.S. to shift to green steel production, but that is going to take time and additional resources."

### Impact on Metals Recycling

Meanwhile scrap prices in the U.S. are likewise being affected.

According to Pendura, typically a Ukrainian/Russian war would show pricing pressure on metals produced in these countries, especially with imposed sanctions on Russia. This would be positive for the recycling industry but due to economic factors, this has not been evident except for energy.

"Nonetheless, the future for the recycling industry is very robust. The cost in traditional mining for the

See WAR IMPACT, Page B6

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American Recycler News is not responsible for non-inclusion of manufacturers and their equipment. Manufacturers are to contact American Recycler to ensure their company is listed in the Equipment Spotlight.

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# 877-777-0043

# Tesla applies for ultra-hard steel patent for the Cybertruck

Tesla has applied for a patent on the new material it is using to build the upcoming Cybertruck. The company seeks a patent on the ultra-hard steel alloy.

The Cybertruck is not only distinct for its look but also for the exoskeleton and "ultra-hard" steel used for the body. It is the same material SpaceX, another company controlled by chief executive officer Elon Musk, uses to build its next-generation spaceship, Starship.

Tesla now wants to own a patent on the steel alloy that it developed in-house.

The patent application is titled "Ultra-Hard Cold-Worked Steel Alloy." Tesla explains how the material is used in a vehicle:

"In some embodiments, at least one exterior panel and/or body of the

vehicle comprises the steel alloy. In some embodiments, the vehicle architecture is designed such that the exterior panels of the vehicle also contribute to the vehicle's structural performance, wherein such exterior paneling of a vehicle may be referred to as an "exoskeleton." In some embodiments, the exterior panel is formed from a monolithic metal sheet of the steel alloy. In some embodiments, the corrosion resistance of the monolithic metal sheet allows for the exterior panel of the vehicle to be utilized without application of an anticorrosion coating or corrosion protective agent (e.g. paint). In some embodiments, an exterior surface of the exterior panel does not comprise paint."

There is no official information on who will produce the new steel for Tesla.

# Comstock subsidiary sells facility

Comstock Inc. announced agreements by LiNiCo Corporation, Comstock's 88 percent owned subsidiary, to sell LiNiCo's facility at 2500 Peru Drive, McCarran, Nevada, for a gross price of \$27 million. The facility was being leased pursuant to an agreement that permitted LiNiCo to purchase the facility for a purchase price of \$15.25 million, of which \$3.25 million was previously paid. Comstock expects to receive net proceeds of approximately \$12.5 million from the sale of the LiNiCo facility, plus any remaining pro-

ceeds from a \$1.5 million hold-back deposited in escrow, for up to 18 months, to cover the cost of any potential environmental remediation items subsequently identified by the buyer.

LiNiCo's facility will receive, sort and store waste LIBs with capacity for expansion. Comstock's Storey County properties additionally boast a fully permitted mining and metal beneficiation platform that will be ideal for piloting LiNiCo's crushing, conditioning and separating infrastructure.

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## Explosion at Ohio metals plant leaves one dead and injures over a dozen

Emergency crews were called to an explosion at I. Schumann & Co., located in Oakwood, Ohio. The explosion sparked a large fire and sent more than a dozen people to hospitals, with at least one person dying from their injuries, authorities said.

The blast scattered debris for a couple of hundred yards, damaging several vehicles, while the fire caused a smoke cloud visible for miles.

Firefighters were able to get the fire under control quickly.

Oakwood Fire Captain Brian DiRocco said that 13 people were transferred to several area hospitals.

Authorities confirmed 46 year old Steve Mullins died from his injuries. He was a plant maintenance worker.

I. Schumann & Co. LLC, which is a fourth-generation family-owned and managed business, "recycles and trades a wide variety of scrap and produces brass and bronze alloys in ingot and pellet forms," according to its website.

The company said in a statement that "an explosion of unknown origin" injured employees and significantly damaged its facility.

The I. Schumann statement added, "We will work alongside investigators in their search for answers as part of our commitment to Northeast Ohio, where we have been operating for more than 100 years. Our thoughts and prayers are with our team members and their families at this difficult time."

## Steel imports up 18 percent in January over December

Based on preliminary Census Bureau data, the American Iron and Steel Institute (AISI) reported that the U.S. imported a total of 2,607,000 net tons (NT) of steel in January 2023, including 2,000,000 NT of finished steel (up 18.3 percent and 7.3 percent, respectively, vs. December 2022). Total and finished steel imports are down 14.4 percent and 12.2 percent, respectively, vs. January 2022. Over the 12-month period February 2022 to January 2023, total and finished steel imports are down 5.2 percent and up 5.0 percent, respectively, vs. the prior 12-month period. Finished steel import market share was an estimated 24 percent in January 2023.

Key finished steel products with a significant import increase in January compared to December are heavy structural shapes (up 99 percent), cut lengths plates (up 83 percent), ingots and billets and slabs (up 79 percent), sheets and strip all other metallic coatings (up 55 percent) and mechanical

tubing (up 36 percent). Products with a significant increase in imports over the 12-month period February 2022 to January 2023 compared to the previous 12-month period include line pipe (up 47 percent), oil country goods (up 44 percent), standard pipe (up 39 percent), heavy structural shapes (up 39 percent) and wire rods (up 14 percent).

In January, the largest suppliers were Canada (593,000 NT, up 14 percent vs. December), Mexico (456,000 NT, up 10 percent), Brazil (395,000 NT, up 711 percent), South Korea (139,000 NT, down 40 percent) and Japan (136,000 NT, up 14 percent). Over the 12-month period February 2022 to January 2023, the largest suppliers were Canada (6,875,000 NT, down 1 percent vs. compared to the previous 12-months), Mexico (5,187,000 NT, up 5 percent), South Korea (2,796,000 NT, up 1 percent), Brazil (2,587,000 NT, down 34 percent) and Japan (1,275,000 NT, up 10 percent).

## AISI applauds congressional push to preserve steel tariffs

Kevin Dempsey, president and chief executive officer of the American Iron and Steel Institute (AISI), issued the following statement lauding members of the Congressional Steel Caucus who sent a letter to President Joe Biden in support of preserving tariffs on imports of foreign steel:

"We are pleased and grateful that so many members of Congress have championed the American steel industry and our workers by supporting the preservation of the existing steel tariffs. We appreciate that a bipartisan group of 37 members of Congress, led by Steel Caucus chairman and vice-chairman, Reps. Rick Crawford (R-AR) and Frank

J. Mrvan (D-IN), respectively, have sent a compelling letter to president Biden emphasizing the national security implications of unfairly traded imports and global steel overcapacity have had on our industry – and that the steel tariffs have significantly reduced foreign steel imports. We appreciate that the members of the Steel Caucus continue to recognize that the new investments American steelmakers are making, and our global leadership in clean steel production, would be at risk if the existing Section 232 program does not remain in place. We look forward to continuing our work with the Congressional Steel Caucus members."

## January 2023 crude steel production

World crude steel production for the 63 countries reporting to the World Steel Association (worldsteel) was 145.3 million tonnes (Mt) in January 2023, a 3.3 percent decrease compared to January 2022.

### Crude steel production by region

Africa produced 1.2 Mt in January 2023, down 4.9 percent on January 2022. Asia and Oceania produced 107.5 Mt, down 0.2 percent. The EU (27) produced 10.3 Mt, down 15.2 percent. Europe, Other produced 3.3 Mt, down 17.5 percent. The Middle East produced 3.8 Mt, up 19.7 percent. North America produced 9.1 Mt, down 5.6 percent. Russia & other CIS + Ukraine produced 6.5 Mt, down 24.9 percent. South America produced 3.6 Mt, down 0.6 percent.

The 63 countries included in this table accounted for approximately 97 percent of total world crude steel production in 2022. Regions and countries covered by the table:

•Africa: Egypt, Libya, South Africa, Tunisia

•Asia and Oceania: Australia, China, India, Japan, Mongolia, New Zealand, Pakistan, South Korea, Tai-

wan (China), Thailand, Vietnam

•European Union

•Europe, Other: Macedonia, Norway, Serbia, Turkey, United Kingdom

•Middle East: Iran, Qatar, Saudi Arabia, United Arab Emirates

•North America: Canada, Cuba, El Salvador, Guatemala, Mexico, United States

•Russia & other CIS + Ukraine: Belarus, Kazakhstan, Russia, Ukraine

•South America: Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela

### Top 10 steel-producing countries

China is estimated to have produced 79.5 Mt in January 2023, up 2.3 percent on January 2022. India produced 10.9 Mt, down 0.2 percent. Japan produced 7.2 Mt, down 6.9 percent. The United States produced 6.5 Mt, down 6.8 percent. Russia is estimated to have produced 5.8 Mt, down 8.9 percent. South Korea produced 5.5 Mt, down 9.8 percent. Germany produced 2.9 Mt, down 10.2 percent. Brazil produced 2.8 Mt, down 4.9 percent. Iran is estimated to have produced 2.7 Mt, up 27.7 percent. Turkey produced 2.6 Mt, down 17.6 percent.

*A guy asked a girl to go to a dance. She agreed, and he rented a suit. The store had a long line, so he waited and waited, and finally he got his suit.*

*He decided to buy flowers and the flower shop had a long line, so he waited and waited, until he finally had flowers.*

*He picked up the girl and went to the dance. There was a long line to get in, so they waited and waited.*

*Finally, they got into the dance, and the guy offered to get the girl a drink. She asked for punch, so he went to the drink table, and there is no punch line!*



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**Parcel 2:** This lot includes an approx. 22,000sq. ft. warehouse with office space, 2 loading docks with 16' door, & Reznor heaters.

**Parcel 3:** This parcel features a 1-acre concrete slab and approx. 10,000sq. ft. office/warehouse building along with an empty, .10-acre empty residential lot.

**Additional amenities include** 460amp service to all buildings & all underground service.

**WEDNESDAY, MAY 17:** 100s of lots of equipment: items to include (10) trucks, (50) trailers, (16) forklifts, roll-off containers, compactor boxes, platform scales, balers, plastic granulators, plastic wash line & liquidation system, shop equipment & office supplies.



\*Auction conducted by Hess Auction Group assisted by Hess Auctioneers.\*

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# EQUIPMENT SPOTLIGHT

## Scrap Handlers

by MARY M. THORNTON

maryt@americanrecycler.com

Metal scrap is definitely a challenging product for material handlers. The EPA's estimate of 2018 ferrous metals generated in the U.S. was 19.2 million tons. The same year, our landfills received 10.5 million tons of steel, or 7.2 percent of all MSW land-filled in America. As the world continues to recover from the effects of a pandemic, the work of recovering metal not only for landfill reduction but to recoup the value involved, scrap handling machines will certainly be part of that process.

Due to the product innovation in grapple technology, Builtrite™ has been awarded a patent for their Knuckle Grip® tool. "With this product, recyclers and scrap metal processors have a new and innovative material handling solution that can significantly improve their operations. We first introduced this new orange peel grapple design to improve the handling of awkward items, achieve better penetration into piles of material and provide a greater volume capacity, which maximizes efficiency with every move of the grapple.

"We listened to customers across North America, and gained even more insight into the challenges they face. Clients asked for better cylinder protection, a better grip for all types



Fuchs a Terex Brand

of recyclable materials and greater holding capacity of any kind of material. Thanks to the voice of the customer, we know we've created a grapple with un-matched characteristics which will absolutely make a real difference for most recycling companies," stated Karl Johnson, director of engineering.

The Knuckle Grip grapple is provided in a variety of fine configurations designed to perform specific handling tasks, and in sizes from .25 cubic yard to 2 cubic yard capacity. As with all Builtrite grapples, heavy duty components and a 2-year factory warranty are standard.

"As a team, we felt it was time to offer something that would actually move grapple design forward. Our intention was to build a tool that is actually different and improves upon products that have been used for many years. The Knuckle Grip provides a whole new level of performance that our customers can actually rely on," said Jason Rice, vice president of sales. Builtrite grapples have been made in the U.S. since 1993.

Fuchs is a specialist manufacturer of material handling solutions for the scrap, waste recycling, port, timber

and forestry industries. Rob Jordan, sales director, described how the Fuchs MHL340 F and MHL350 F "are two leading international models in the recycling and scrap handling industries, as they are the most versatile machines on the market. This is due to their legendary robust build and economical fuel consumption. These loading machines are ideally suited for the typically rough, scrap handling environment. Robust, FEM-designed steel structures and proven components from well-known manufacturers ensure excellent efficiency, performance and durability. The powerful, finely tuned machine hydraulics move even the heaviest loads in almost no time. On request, machines can also be equipped with the Fuchs Quick Connect, a multi-functional hydraulic quick-change system."

Jordan sees leading industry innovations as particularly evident in digitalization, sustainability and safety. "Employee safety is our top priority and all of our machines are delivered with standard and extensive safety equipment. Our unique service platform also offers advantages for daily checks or maintenance work, while our generator systems are among the safest on the market, thanks to ISO guards and sophisticated design," he said.

Fuchs offers digital services that are specifically tailored to the individual needs of customers. "Our telematics, for example, offers much more than just operating hours and machine locations. Automatically generated service reminders and

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See SCRAP HANDLERS, Page B5

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# Scrap handlers ■Continued from Page B4

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optimize use of intelligent digital tools in the service area, which will revolutionize both data management and trouble shooting. Meanwhile, as ongoing sustainability is standard for us, we offer biodiesel models and a broad product portfolio of electrically-powered machines. Additional options in alternative drives are in progress as well," stated Jordan.

Constantino Lannes, president of Sennebogen, said the family-owned, 71 year old company is "the market leader for material handlers in the scrap and recycling industries. We differentiate ourselves by offering the largest number of machines and sizes available and we provide a high quality product with a comprehensive support package, which is also very simple to maintain and repair—as it has no electronic controls. We offer smaller material handlers —40,000 lbs. with a 30 ft. reach — as well as the largest hydraulic material handler in the world — over a million lbs. with a 140 ft. reach. Our machines provide the lowest fuel consumption in the industry, can be mounted on a rubber tired, crawler, and rail undercarriage and can also be custom built to client specs." Sennebogen's electric-driven line of machines, offered since the 1980s, continue to evolve and assist



Sennebogen

customers in reducing their carbon footprint. Most Sennebogen machines are delivered completely assembled and ready to work. Larger models that require assembly on-site, have been previously assembled and tested at the factory, which aids on-site assembly and helps avoid interruptions in customer operations.

Lannes continued, "Our product support package includes the smallest part, such as an O-ring, as well as larger items like axles and all can be shipped 24 hours a day, 7 days a week. Technician telephone support and training for customer technicians at the same level as a dealer or authorized service provider technician, is available at no cost. This enables our customers to

repair their machines and so increase uptime and reduce overall operating costs. The uptime kit delivered with our products contains machine parts that may be needed in 90 percent of issues that may arise. A portal named Learning Hub provides customers, authorized service providers and dealers with access to technical information, trouble shooting guides and training information 24 hours a day and customer machine inspections are free of charge as well.

All of this, the user-friendly machine controls and the customers' ability to do their own maintenance and service provides the highest uptime in the industry with the lowest operating cost."

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# Aqua Metals reports highlights of financial results for full year 2022

## The company realized several key milestones, positioning it for transformation and success in 2023

Aqua Metals, Inc., which is reinventing metals recycling with its AquaRefining™ technology, announced financial results and provided a business update for the fourth quarter and full-year period ended December 31, 2022.

### Recent Highlights:

- Aqua Metals ended the year with \$7.1 million in cash and \$10.9 million in working capital. Management expects to receive an additional \$12 million by the end of March 2023 related to the sale of its former Tahoe-Reno facility.

- Aqua Metals commissioned its recycling pilot operation at its Innovation Center in Tahoe-Reno Industrial Center during the fourth quarter of 2022, and in early 2023, the company produced high-purity copper and lithium hydroxide. The company has and expects to host additional potential strategic partner visits in 2023.

- The company acquired a five acre parcel of land inclusive of an approximately 21,000 sq.ft. existing building and announced plans to immediately improve the building during 2023. Phase 1 of the campus environment and the first Li AquaRefining commercial scale recycling plant will have an expected capacity to process 3,000 metric tons of spent LiB input material into saleable materials (~\$60,000,000 in revenue based on current metals val-

ues). The company also shared its vision for an integrated clean metals campus on the site, with additional buildings and space for 10,000 metric tons of total processing capacity.

- The company's Pb AquaRefining partner in Taiwan (ACME Metal) continued its progress. ACME Metal is producing ultra-pure lead in Taiwan and will continue to operate the Phase I system as a showcase for potential industry partners and future customers to witness first-hand.

"We have recently realized several key milestones to position us for acceleration, transformation and success in 2023," commented Steve Cotton, president and chief executive officer. "We opened our pilot operation in the Tahoe-Reno Industrial Center in December, and we are now beginning to produce high-purity metals like copper and premium products like lithium hydroxide at industrial scale. We also secured the campus for our proposed high-volume commercial operation, and we are hard at work to transform this new facility and then develop our expansion plan to meet our growing needs. We have our primary intake partner, and are moving quickly with our plans to secure long-term offtake partners, completing the buildout of our business model. Our goal this year will be one of commercialization from our vision and proof-of-concept to

meaningful scale production, while advancing our efforts to establish what we believe will be the world's first commercial-scale sustainable Li recycling operation with a sufficient supply of black mass input and partners to purchase our recycled output."

### 2022 Full-Year Financial Results

The company was not in commercial production during 2022 and, as a result, generated no significant revenue during the quarter.

Research and development costs included expenditures related to progressing the Lithium-ion battery AquaRefining technology. Research and development increased approximately 94 percent during 2022 compared to 2021.

General and administrative expenses increased approximately one percent for 2022, compared to 2021.

For 2022, the company had an operating loss of \$15.6 million, compared to an operating loss of \$17.5 million last year. The net loss for 2022 was \$15.4 million, or \$(0.20) per basic and diluted share, compared to a net loss of \$18.2 million, or \$(0.26) per basic and diluted share, for 2021.

As of December 31, 2022, the company had \$7.1 million in cash and cash equivalents. Total cash used in operations for 2022 was \$11.1 million.

## War impact

■ Continued from Page B1

production of all types of metals is rising and this will increase pricing pressure in the future," Pendura said. "Add to this, increased environmental regulations, which will only increase metal pricing in the future. It is far more difficult to find large high-grade deposits today and this will further impact economic feasibility of many of the newer mines. People view mining as a non-renewable resource. Sustainability is a crucial concept. You need to have a strong relationship with mining and recycling. Non-renewable mining, along with recycling, will enhance the principle of sustainable development."

James Hill, chief executive officer of MCF Energy and an energy industry veteran, said the Russian invasion of Ukraine triggered a global energy crisis, and the price of energy being used by smelters in particular has risen. There is speculation smelter closures will take place across Europe ahead of next winter. Due to the current economic slowdown, however, Hill said we may see a stark decline in the demand for metals, at least temporarily.

"The invasion led to immediate and direct consequences on global energy, causing prices to rise sharply and, in turn, causing harm to the U.S. metals industry. Since February of last year, everything from the production of metals to the transfer and sale of metals – in addition to metals recycling, has been impacted," Hill said. "This quick turn of events led buyers and sellers to look for strategic avenues throughout 2022, largely to keep trade channels open, and we will see the continuation of this in 2023.

During the early half of 2022, as Hill pointed out, the industry also saw the cost of U.S. raw materials increase and, at the same time, experienced a drop in demand for raw and processed metals.

"One year later, we are now seeing signs of a rebound, which is correlated to the energy markets," Hill said. "However, uncertainty remains for the latter half of the year."

And according to Tsukerman, as a result of nickel shortages critical for EV production, the U.S. and other countries have launched a critical minerals energy security plan, trying to stockpile materials.

"The war has highlighted the U.S. dependency on foreign imports of the

materials critical to renewable industries," Tsukerman says. "Copper too has suffered from similar disruptions. Marketwise, energy traders who have been profiting as a result of rising energy prices, are now shifting towards metals and crops as an investment. Long term, the U.S. will have to readjust to these changes which will probably linger for some time even when the war is over. That also means a slowdown to the timeline of renewables shift."

Pendura said the direction the Ukrainian war takes will be a determining factor in the short term. A Russian victory would lead to tension and uncertainty and would have a negative effect on growth. A Ukrainian victory would impact Putin's position and would in all likelihood have a positive effect on growth.

"The long-term effect on the U.S. metal market will be an increase in production along with increased pricing," Pendura said. "The metals recycling market is going to experience a positive upside for a significant period of time and will be viewed as a positive factor in future economic growth and will be viewed positively from a resource sustainability perspective."

# Novelis opens New Can Customer Solution Center

Novelis Inc., has opened its Customer Solution Center (CSC) for the beverage packaging market in São José dos Campos, Brazil. The center will focus on advancing aluminum beverage can innovation and sustainability solutions in response to growing demand.

The new CSC will serve as an innovation hub in a facility designed for collaboration, most notably with beverage can makers, brand owners, other industry suppliers and scientific partners. Bringing these parties together will inspire ideas and accelerate innovation that will address real-world challenges and advance the adoption of aluminum as the material of choice for beverage packaging. Designed to encourage creativity, the state-of-the-art, 3,000 sq.m. facility features modern laboratories, training rooms, and collaboration space.

“The beverage business is in growth mode and aluminum is quickly becoming the material of choice for beverage can packaging, so we need to be prepared for increased demand as consumers recognize the many drawbacks of other, less sustainable packaging materials,” said Greg Schlicht, senior vice president, global can sales at Novelis. “In addition, our customers are seeking to elevate package appearance and aluminum cans provide an ideal, 360-degree canvas for eye-catching, upscale graphics and product branding. We are committed to investing in innovation to maximize these opportunities.”

Driving the need for constant innovation are the following market trends:

- Consumers desire more sustainable packaging – Today’s consumers are driving a shift toward aluminum as the environmentally friendly choice for beverage can packaging. As the largest producer of aluminum sheet for the beverage packaging market and the largest recycler of used beverage cans, Novelis is leading the market through innovation and customer collaboration.

- The beverage market is expanding – Today’s consumer is demanding and consuming more varieties of packaged beverages, including water, energy drinks, soda, beer, wine, hard seltzers, and other ready-to-drink alcoholic beverages. As the market grows, the need for sustainable aluminum packaging increases, further driving the need for capacity and innovation.

- Interest in specialty cans is growing – Consumers are looking for different packaging options in terms of function and appearance, resulting in new specialty shapes, sizes and surface finishes. In fact, Novelis responded to market demand with its recently launched black-laminated aluminum can end sheet.

The São José dos Campos facility is part of Novelis' growing global network of CSCs, which are designed to speed the application of aluminum solutions through collaboration between the company and its customers, as well as with others in the value chain.

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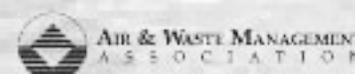
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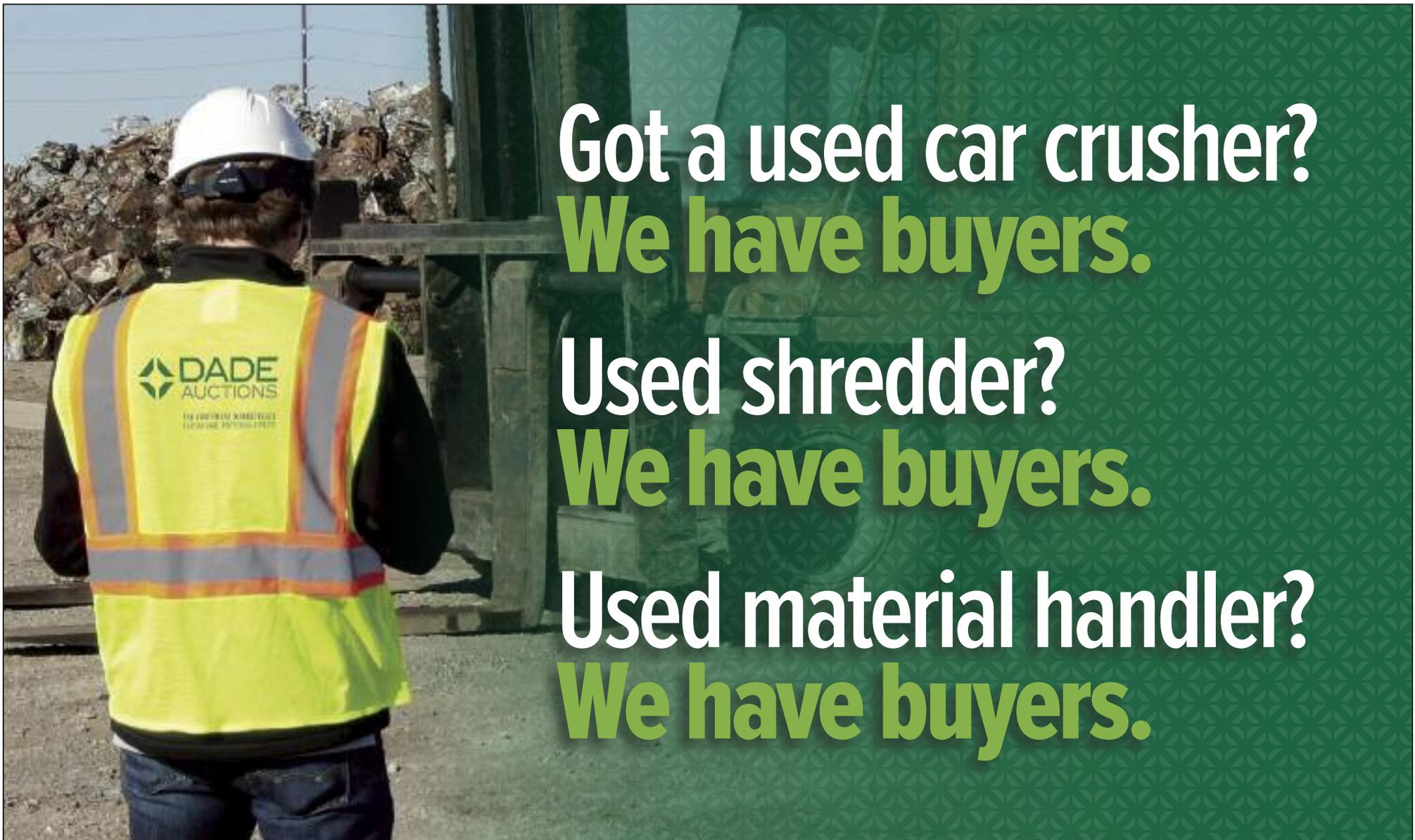
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#1 Bundles	per gross ton	419.00	443.00	442.00	469.00	475.00
Structural	per gross ton	360.00	379.00	375.00	378.00	395.00
#1 & #2 Mixed Steel	per gross ton	325.00	339.00	325.00	339.00	375.00
Crushed Auto Bodies	per gross ton	205.00	208.00	210.00	209.00	265.00
Shredded Auto Scrap	per gross ton	405.00	425.00	478.00	489.00	495.00
<b>NON FERROUS</b>						
#1 Copper Bare Bright	per pound	3.67	3.68	3.85	3.88	3.89
#2 Copper Wire & Tubing	per pound	3.47	3.45	3.67	3.69	3.69
Aluminum Cans	per pound	.71	.72	.75	.74	.76
Al/Cu Radiators	per pound	1.71	1.75	1.79	1.84	1.93
Aluminum Radiators	per pound	.61	.61	.61	.62	.63
Heater Cores	per pound	1.49	1.50	1.53	1.55	1.59
Stainless Steel	per pound	.60	.61	.64	.69	.74

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

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