



ENVIRONMENTAL SYSTEMS DIVISION NEWSLETTER

ENVIRONMENTAL
SYSTEMS DIVISION

01 JANUARY 2022

The ESD Newsletter is a monthly newsletter involving ALL members of ESD. Members are encouraged to forward materials, authored papers on Environmental and Environmental Systems topics, and comments on newsletter topics or current events to the Editor. Your participation is greatly appreciated.

The ESD newsletter features **Five** Sections:
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1. ESD DIVISION NEWS

ASME ESD IMECE 2022 TRACK Postponed until 2023

The ASME Environmental Systems Division has decided to hold off on the new Track until IMECE 2023. More information will follow early in 2022.

If you want to volunteer to be Chair or Co-Chair or have ideas for specific sessions, please contact Arnie Feldman (jjsenv@att.net). [Back to Newsletter's Page 1](#)

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ASME Dixy Lee Ray Award

Nomination deadline: Nominations should be submitted by January 15, 2022

The Dixy Lee Ray Award, established in 1998 "for outstanding engineering achievement in environmental protection through improvements in technology, science and policy" recognizes significant achievements and contributions in the broad field of environmental protection.



Achievement in the following areas will be recognized:

Environmental engineering, including environmental technology and related topics;
other environmental areas, including environmental health, environmental sciences, environmental management and policy, and related topics.

The award was established in honor of Dixy Lee Ray's advocacy to the development of those technologies that serve humanity. She believed that the engineering profession was uniquely qualified to develop and implement environmentally acceptable technologies.

The person winning this award will be presented with:

- a \$1000 honorarium,
- a bronze medal,
- a certificate, and
- will also receive a travel grant (not to exceed \$750) to attend the presentation ceremony.

Click *here* for nomination instructions.

Those seeking additional information should contact the Award Committee Chair. A list of past winners of this award is available on the ASME website (<https://www.asme.org/about-asme/honors-awards/achievement-awards/dixy-lee-ray-award>).

Questions?

Contact the Dixy Lee Ray Award Committee Chair, Arnie Feldman at jjdsenv@att.net.

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ASME/A&WMA WASTE INFORMATION EXCHANGE

ESD, the Research Committee on Energy, Environment and Waste (RCEEW) and the Materials Energy Recovery Division (MER), in conjunction with the Air and Waste Management Association (A&WMA) are planning a Waste information Exchange (WIE) in 2022 in the DC



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Metropolitan Area. The WIE is being modeled after the [Air] Information Exchange, which has been held annually since 1975 in Research Triangle Park (RTP), NC, in which USEPA (QAQPS and ORD) are key participants. The WIE will not require a written paper and any graphics used will be made available to attendees at the discretion of the speaker. The purpose of the Information Exchange is to make participation as a speaker as easy and simple as possible. The idea is to invite experts to come talk about research or regulations on which they are working without having to spend a lot of time in preparation. The WIE will cover policy updates, regulatory changes, and research on the latest waste topics.

ESD, RCEEW and MER are looking for individuals who want to participate in the planning including Track Chairs, Session Chairs, and Panel Chairs. In addition, ESD is looking for a Technical Chair to represent them on the planning Committee.

If you are interested in volunteering or want further information, please contact Arnold Feldman at jjdsenv@att.net.

Look for more information on the WIE in future ESD Newsletter's and on the web in Linked-In and Facebook. [Back to Newsletter's Page 1](#)

2. ENVIRONMENTAL TECHNOLOGIES

A car made from recycled plastic? This could be the future

Automakers are racing to make their vehicles more sustainable -- the industry's favorite buzzword -- by turning environmentally unfriendly materials into seat cushions, floors, door panels and dashboard trims. First it was reclaimed wood. Then "vegan" leather. Now, plastic waste from the ocean, rice hulls, flaxseeds and agave are transforming the manufacturing process. Ford in particular has been championing the use of renewable materials in its vehicles. In 2008 it replaced the petroleum-based polyol foam in its Mustang sports car with seat cushions made from soy, an industry first. More recently a group of researchers started examining how to transform some of the 13 million metric tons of ocean plastic, which threaten marine life and pollute shorelines, into parts for future Ford vehicles. The result? Wiring harness clips in the new Ford Bronco Sport that were once nylon fishing nets. Ford acquires the recycled plastic from its supplier DSM, which collects the nets from fishermen who are paid to return them. The nets are harvested, sorted, washed and dried before they're cut into small pellets and injection-molded into harness clips, which weigh about 5 grams and guide wires that power side-curtain airbags in the Bronco Sport. Ford is currently testing the recycled plastic's durability for the Bronco Sport's wire shields, floor side rails and transmission brackets. Automakers deliberately added plastics to reduce the weight and cost of vehicles and increase performance and fuel economy.



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For German automaker Audi, sustainable materials are a launching point to becoming net CO2 neutral by 2050. Recycled PET bottles are ground up and transformed into a polyester yarn, accounting for 89% of the seat material in Audi's fourth-generation A3 car. An additional 62 PET bottles were recycled for the carpet in the A3. The carpet and floor mats in the all-electric e-tron GT are made from Econyl, a recycled nylon fiber constructed from fishing nets. The e-tron GT's 20-inch wheels are also assembled from low-CO2 emission aluminum. (Ref. 1)
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Chemical Recycling” — A Summer of Disillusionment

The main form of “chemical recycling” that takes place in the United States is not recycling at all. Actual recycling recovers materials after use and returns them to the manufacturing cycle, where they are used to make new products, giving those materials another life as part of a circular economy. Processes like “chemical recycling” typically use plastic materials to generate a limited amount of energy in a one-time process, destroying them rather than giving them another material use. Pyrolysis and gasification of plastic are two processes that illustrate the fallacy of the phrase “chemical recycling” because rather than recycling plastic waste back into plastic products, these technologies usually turn plastic into fuel that will be burned, releasing greenhouse gases and toxic pollution. EPA is currently considering regulations on pyrolysis and gasification units under the Clean Air Act, which according to my research are sorely needed. Other forms of “chemical recycling” include solvent-based processes and chemical depolymerization. While some of these processes may result in actual recycling of materials (plastic back to plastic), these processes are far less common than the practice of using plastics as fuel. Solvent-based processes and depolymerization are not free of their own dangers. These processes attempt to separate main plastic components from contaminants and additives. This is necessary because plastics contain a mix of chemical additives that enhance the material properties of plastic, including the texture, UV resistance, lifespan, and many others. Recent research discovered thousands of previously unknown chemical additives in plastic, many of which are classified as substances of concern.

The problem with plastic starts far before it ends up littering the earth, which end-of-life solutions like “chemical recycling” do not address. Burning plastics for fuel is just another form of fossil fuel energy, which harms the environment and our health. Many issues stem from the toxic nature of plastic itself, and the real solution lies in eliminating unnecessary single-use plastic and dramatically changing our systems to center around sustainable materials that can be recycled and repurposed over and over again. The Break Free from Plastic Pollution Act provides a template for more appropriately addressing the plastic waste crisis we currently face and policy makers should not be fooled by the plastic industry’s greenwashing of “chemical recycling.” (Ref. 2)
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3. ENVIRONMENTAL REGULATIONS

EPA: Say No to Burning Plastic AKA “Chemical Recycling”

The Biden administration and EPA Administrator Michael Regan have promised to be different, focusing their agenda on restoring scientific integrity and centering environmental justice in federal decision-making. If the Administration is serious about these commitments, it must reject the chemical industry’s ongoing efforts to weaken health protective safeguards and win federal endorsement for “chemical recycling.” The entire world has been horrified by the graphic evidence of plastic waste and its widespread impacts of filling our oceans, polluting our rivers, contaminating food and drinking water with microplastic, overwhelming poor countries with mounds of plastic trash (largely exported from richer countries) and killing wildlife. Widespread burning of plastic is the chemical industry’s offered “solution” to the global plastic waste crisis that the industry itself has created. But actual recycling recovers materials after use and returns them to the manufacturing cycle, where they are used to make new products, giving those materials another life as part of a circular economy. Processes like incineration or “chemical recycling” typically use plastic materials to generate a limited amount of energy in a one-time process, destroying them rather than giving them another material use.

The solutions to the plastic crisis lie in making and using less plastic, and replacing needed uses with non-toxic renewable, reusable, compostable, and/or recyclable and recycled materials. While the solution primarily needs to be addressed at the level of large-scale industrial manufacturing and use, consumers looking to support the effort can push for systemic change, starting with support for restrictions on the manufacture and use of single-use plastic. Fortunately, a more appropriate solution – one that won’t increase toxic pollution and harm communities -- has been brought to the table: the Presidential Plastics Action Plan (PPAP), a roadmap to addressing the plastic waste crisis without adopting the plastic industry’s false solutions, which has garnered more than 500 supporting organizations. On the legislative side, there is the Break Free from Plastic Pollution Act, which will take a number of critical steps for solving the plastic waste crisis, including curtailing many of the single-use plastics that are a major source of the problem, and increasing the amount of recycled content in products. It will also exclude “chemical recycling” from the definition of recycling. EPA and the Biden administration should reject the chemical industry’s Orwellian efforts to rebrand burning plastic as “recycling” and abandon such efforts by the previous administration – including the proposed change to the definition of incineration and the Department of Energy’s “partnership” with the plastics industry. These industry-friendly policies of the last administration will not help solve the plastic pollution crisis; instead, they will make the ongoing problems of plastic waste and toxic pollution worse, particularly in overburdened communities the Biden administration has vowed to protect.(Ref. 3) **[Back to Newsletter’s](#)**

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U.S. Should Create National Strategy by End of 2022 to Reduce Its Increasing Contribution to Global Ocean Plastic Waste, Says New Report

The United States should create a national strategy by the end of 2022 to reduce its contribution to plastic waste in the ocean, including substantially reducing the amount of solid waste generated in the U.S., says a new report from the National Academies of Sciences, Engineering, and Medicine. The report also recommends the U.S. establish a nationally coordinated and expanded monitoring system to track plastic pollution in order to understand the scale and sources of the U.S. plastic waste problem, set reduction and management priorities, and measure progress in addressing it. Reckoning with the U.S. Role in Global Ocean Plastic Waste concludes plastic waste in the U.S. is ubiquitous and increasing. Worldwide, at least 8.8 million metric tons of plastic waste enter the world's oceans each year — the equivalent of dumping a garbage truck of plastic into the ocean every minute — and in 2016 the U.S. generated more plastic waste than any other country, exceeding that of all European Union member states combined. Plastic waste has devastating impacts on the ocean's health, marine wildlife, and communities. Without changing current practices, the report says, plastics will continue to accumulate in the ocean with adverse consequences.

The report says today's recycling processes and infrastructure are grossly insufficient to manage the complexity and quantity of plastic waste produced, and that a large portion of plastic waste is disposed of in landfills. While the U.S. solid waste management system is advanced overall, the committee that wrote the report concluded there is both a need and opportunity to expand and evolve municipal solid waste management in the U.S. to ensure it better manages plastic waste, and serves communities and regions equitably, efficiently, and economically. "Plastic waste is an environmental and social crisis that the U.S. needs to affirmatively address from source to sea," said committee chair Margaret Spring, chief conservation and science officer at Monterey Bay Aquarium. "Plastic waste generated by the U.S. has so many consequences — impacting inland and coastal communities, polluting our rivers, lakes, beaches, bays, and waterways, placing social and economic burdens on vulnerable populations, endangering marine habitats and wildlife, and contaminating waters upon which humans depend for food and livelihoods." The report recommends the U.S. establish a coherent, comprehensive, and crosscutting federal policy and research strategy to reduce its contribution of plastic waste to the environment and ocean. This strategy should be developed by a group of experts, or external advisory body, by Dec. 31, 2022. The strategy's implementation should be assessed by Dec. 31, 2025.

Recognizing U.S. actions taken to date, no single solution will be sufficient to address the problem, the report says, and therefore the national strategy should employ a suite of interventions at every stage of plastics' flow into the ocean. It should also build on efforts underway, fill gaps in coverage, and apply lessons learned in the U.S. and other countries. Taking a leadership role in preventing plastic pollution would position the U.S. to shape and influence global plastic production, design, and innovation — and possibly create new economic opportunities, the report says. While government will play a critical role in

organizing a national strategy, collaboration across actors in plastic waste systems will be essential, as will a robust monitoring and research program and active public engagement.

- **Reducing plastic production**, especially for plastics that are not reusable or practically recyclable, thereby decreasing the need for waste management — for example, by establishing a national cap on virgin plastic production.
 - **Innovating design and materials to develop substitutes** that degrade more quickly or can be more easily recycled or reused, such as through government-sponsored research and development collaborations.
 - **Decreasing waste generation** by reducing the use of disposable plastic products intended for short periods of use, including by limiting products and creating targets for recycling — for example, by creating a ban on specific products based on their toxicity or necessity.
 - **Improving waste management**, including infrastructure, collection, treatment, leakage control, and accounting — for example, by establishing regulatory limits on plastic or microplastic waste discharged into the ocean by river systems.
 - **Capturing waste in the environment**, including from ground litter, storm water, or directly from waters where it accumulates — such as during river or beach cleanups.
 - **Minimizing at-sea disposal** by directly targeting the flow of plastic from vessels or platforms — for example, by increasing enforcement for dumping trash at sea. (Ref. 4)
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4. EDITORIAL BOARD SELECTIONS

Direct pesticide exposure of insects in nature conservation areas

In Germany, the decline of insect biomass was observed in nature conservation areas in agricultural landscapes. One of the main causal factors discussed is the use of synthetic pesticides in conventional agriculture. In a Germany-wide field study, the researchers collected flying insects using Malaise traps in nature conservation areas adjacent to agricultural land. They used a multi-component chemical trace element analysis to detect 92 common agricultural pesticides in ethanol from insect traps sampled in May and August 2020. In total, residues of 47 current use pesticides were detected, and insect samples were on average contaminated with 16.7 pesticides. Residues of the herbicides metolachlor-S, prosulfocarb and terbuthylazine, and the fungicides azoxystrobin and fluopyram were recorded at all sites. The neonicotinoid thiacloprid was detected in 16 of 21 nature conservation areas, most likely due to final use before an EU-wide ban. A change in residue mixture composition was noticeable due to higher herbicide use in spring and increasing fungicide applications in summer. The number of substances of recorded residues is related to the proportion of agricultural production area in a radius of 2000 m. Therefore, a drastic pesticide reduction in large buffers around nature conservation areas is necessary to avoid



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contamination of their insect fauna.

With the identified decline of insects in agricultural landscapes, it is vital to at least preserve threatened insect populations as parts of local biodiversity in the nature conservation areas situated in this landscape. Urgent action is required, as tipping points for already small populations of certain insect species may have been reached. Expanding protected areas or adding an effective buffer zone of untreated or reduced synthetic pesticide use in surrounding crops are potential options to diminish the risk of pesticide exposure and the resulting impacts on these insects and further biodiversity. (Ref. 5) [Back to Newsletter's Page 1](#)

Climate change: Impact of rising temperatures on neurological disorders

According to a joint editorial published by over 200 medical journals earlier this year, climate change is the greatest threat to global public health. Major public health organizations, such as the World Health Organization (WHO) Trusted Source, have also voiced similar concerns. Climate change includes surging temperatures, rising sea levels, and an increase in the strength and frequency of extreme weather events such as flooding, droughts, hurricanes, and wildfires. Climate change can affect Trusted Source human health in a multitude of ways. Rising temperatures, food scarcity, air pollution, and an increase in infectious diseases are a few ways it can impact human health. The health effects of climate change are complex and only partially understood, and a more comprehensive understanding is important to help medical professionals provide the necessary care. A recent systematic review aimed to delineate the impact of global warming on neurological disorders. The study analyzed previous research examining the effects of ambient temperature rises on the occurrence, clinical manifestations, and mortality due to major neurological disorders.

Climate change may render certain parts of the world uninhabitable due to drought, rising temperatures, and other extreme weather events. This will result in the mass displacement of populations, leading to environmental refugees. The study also analyzed research assessing the occurrence of neurological disorders in migrant populations to understand the potential impact on the brain health of climate-related refugees. The study found that a rise in ambient temperature due to global warming may lead to worsened symptoms of neurological disorders and result in higher hospitalization and mortality rates. The effects of migration on the occurrence of neurological disorders were more variable and were also influenced by social, cultural, and economic factors. However, the authors cautioned that these results were preliminary, and the analyzed studies did not specifically aim to evaluate the impact of climate change on neurological disorders and clinical practice. (Ref. 6) [Back to Newsletter's Page 1](#)

Coffee production hurts the planet. Scientists think they may have another way

Coffee is one of the most widely consumed beverages in the world — but the surge in demand is threatening the planet, prompting environmentalists and scientists to look for sustainable ways to produce coffee. “Most coffee goes through a wet-milling process that uses significant amounts of freshwater to de-pulp and wash the coffee. Then the coffee is dried, roasted, shipped and brewed — each of which uses energy,” said Bambi Semroc, senior vice president of the Center for Sustainable Lands and Waters at Conservation International. In the last 30 years, growing demand for coffee has led to a 60% increase in production, according to the International Coffee Organization. From deforestation to a high usage of water and energy resources, research shows that increased coffee production is destroying the planet. Brazil, the world’s largest coffee producer, saw deforestation of its Amazon rainforest reach a 15-year high, according to a report published by Brazil’s National Institute for Space Research.

An estimated 13,235 square kilometers — equivalent to 2,429 football fields — was lost between August 2020 and July 2021, representing a 22% increase from the previous year. Coffee production also leaves a large water and energy footprint, with 140 liters of water needed to produce just 125 millimeters of coffee, according to the Water Footprint Network. But at the same time, the coffee industry is also vulnerable to climate change. Just this year, Brazil experienced waves of frost and drought in June, which pushed Arabica coffee prices to hit a seven-year high. Commodity experts predict that prices will continue to rise “given the current instability of global markets as well as uncertainties around next year’s outputs of dominant coffee producers — Brazil, Vietnam, and Colombia. “Investments in agricultural development, with a focused dedication to agricultural research and technology, are the most important singular investments you can make,” pointing out that agricultural-specific challenges often leave small-scale farmers vulnerable. Agricultural investments are important to ensure food security goals can be achieved despite global challenges impeding production today,. “Trees are a wonderful place to start because they absorb and hold so much carbon,” implying that agricultural production systems need to be modified to integrate more trees through agroforestry. (Ref. 7)

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Co-processing: The way to a zero-waste industrial sector

The world generates around two billion tonnes of municipal solid waste annually, making waste management a major headache for both industrialised and developing countries. Co-processing is a globally recognised sustainable technology through which waste is used as a source of energy to replace fossil fuels such as coal, petroleum and gas in energy-intensive industries like cement making. According to the World Bank, global waste is expected to grow to around 3.4 billion tonnes by 2050, from the current two billion tonnes of solid waste annually. Currently, at least 30 per cent of this waste is not managed in an environmentally safe manner. More than 90 per cent of waste in sub-Saharan Africa goes to open dumpsites



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and landfills due to the absence of adequate waste disposal and treatment solutions. Waste management and recycling solutions, therefore, have to be accelerated to match the increase of waste. What are the latest techniques and technologies being deployed to deal with the waste management problem? Waste-to-energy solutions are the main trends currently. This entails either generating electricity from waste or co-processing waste as alternative fuels for heavy energy industries such as the cement and steel industries. Proper waste management solutions definitely have a positive impact on our society in terms of sustainability. Geocycle is committed to providing holistic waste management solutions that ensure a zero-waste future.

Other waste disposal partnerships are with logistics companies to dispose of their waste tyres which globally are among the largest and most problematic sources of waste. We are also working with agricultural producers and millers to dispose of their waste, such as rice husks. Over 50,000 tonnes of waste is co-processed by Bamburi Cement every year. More than 500,000 tonnes of waste that could have otherwise ended up in the environment or landfills has been converted into energy in the last 10 years within our industrial operations in Mombasa and Nairobi. (Ref. 8)

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5. ESD NEWSLETTER READER COMMENTS

None received this month.

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ABOUT NEWSLETTER

ENVIRONMENTAL ENGINEERING features the application of environmental technologies to engineering systems to attain optimal performance according to established standards. The Newsletter of the Environmental Systems Division (ESD) will attempt to highlight a variety of environmental technology applications aimed at enhancing engineering systems performances in accordance with the latest standards by presenting excerpts of and links to selected articles from a variety of websites.

DISCLAIMER

Disclaimer: This newsletter may contain articles that offer differing points of view. Any opinions expressed in this publication do not represent the positions of the ESD Executive Board members of the American Society of Mechanical Engineers (ASME).

Upcoming ASME Conferences

 CONFERENCE #ICEM2023
Oct 3 – 6, 2023

ICEM[®] 2023

International Conference on Environmental
Remediation and Radioactive Waste Management[®]

International Conference Centre Stuttgart
Stuttgart, Germany

CALL FOR ABSTRACTS

SUBMIT BY JANUARY 29, 2023





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