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THE CIRCULAR ECONOMY AS A CONCEPT FOR CREATING A MORE SUSTAINABLE FUTURE

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

ONE HUNDRED SEVENTEENTH CONGRESS

FIRST SESSION

SEPTEMBER 22, 2021

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THE CIRCULAR ECONOMY AS A CONCEPT FOR CREATING A MORE SUSTAINABLE FUTURE

WEDNESDAY, SEPTEMBER 22, 2021

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The Committee, met, pursuant to notice, at 9:50 a.m. in room 406, Dirksen Senate Office Building, Hon. Thomas R. Carper (Chairman of the Committee) presiding.

Present: Senators Carper, Capito, Cardin, Whitehouse, Merkley, Stabenow, Inhofe, Lummis, and Sullivan.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. I am about to call this hearing to order. In fact, I will call this hearing to order, and I am going to invite our guests, our witnesses, as appropriate, to join us at the table with your nameplate.

I would like to start this morning by thanking this distinguished panel of witnesses for their willingness to join us today as we discuss an issue, and I think, an opportunity, of great importance: That is the transition to a circular economy. A warm welcome to Elizabeth Biser, Roberta Elias, Brian Hawkinson, and Billy Johnson. We look forward to hearing from each of you this morning.

I have to confess I love the idea of a circular economy. I studied a little economics at Ohio State as a Navy ROTC midshipman, not very much, but enough to get through and on to the Navy. But I love the idea of a circular economy. I love trying to figure out how to use market forces to get things done. I like the idea of considering the things and the materials that help constitute and make a circular economy possible, materials that can be reused over and over again instead of ending up in a landfill somewhere.

As an avid recycler and composter, I have always believed in environmental stewardship since my days growing up as a Boy Scout in Danville, Virginia, where we moved from Beckley, West Virginia. Over the years, I have come to feel even more strongly that it is our moral duty to leave behind a cleaner, healthier planet for our children and for the generations that follow.

Let me make one thing clear: Driving toward a circular economy is not just doing something about the disdain or disgust we feel in seeing the trash that litters too many of our highways and our streams. It is an essential part of the solution to a series of crises

facing our Nation and our globe today: Escalating climate change, overflowing landfills, and oceans that are choked with a mass of plastic greater than the weight of all the fish in the sea.

The actions that put us in this mess are not the fault of any one person. That is why it is up to all of us to work together on finding solutions. This is what we call in the Navy an all hands on deck moment.

Over the past few weeks, several of our Senate colleagues and I, including Senator Capito, Senator Boozman, Senator Whitehouse, Senator Merkley, and others have joined us in engaging with a host of stakeholders in a series of roundtable discussions on the concept of a circular economy, and what that concept looks like in practice across a multitude of industries and levels of government. What we heard was, in part, sobering, but also, I am happy to report, it was encouraging.

We heard from solid waste workers about the challenges they face with contaminated recycling streams and the impact of China's National Sword Policy on their ability to effectively manage domestic waste, especially plastic.

We heard about the need for better product design and infrastructure upgrades so that companies can have their products returned to them in good condition to be reused.

And we heard about the devastating impact of the fashion industry on our environment. Did you know that every second, almost a dump truck's worth of textiles goes into our landfills, every second, and that the fashion industry is responsible for something like 10 percent of global emissions, more that the aviation sector and the maritime shipping sector combined? I didn't know those things. My guess is that most of our colleagues and their staff, our staffs, didn't know them, either.

Fortunately, we also discovered that with awareness and motivation, we can do a great deal to address the obvious need and change that these damaging behaviors provide.

One of those products that stood out for me was aluminum. Few of us realize, for example, that 75 percent of aluminum ever mined is still in use today. I am going to say that again: 75 percent of aluminum ever mined is still in use today. That is important because aluminum products made from recycled materials use 95 percent less energy than it would take to create them from first use materials, 95 percent less energy. Indeed, in most cases, recycled products are more energy efficient, which translates directly into reducing greenhouse gas emissions, something we all know we need to do.

That is the power of a circular economy.

The roundtables also taught us more about the potential we have to recapture and recycle the critical minerals found in lithium-ion batteries. Of course, that capacity helps our Nation in many ways, driving us and our transportation fleet to a carbon neutral future and relieving us from uncertain and oftentimes hostile foreign sources for those critical minerals.

Finally, we also heard great success stories from industries that have stepped up to take more responsibility for the full life cycle of their products. I am glad to see Mr. Hawkinson from the paper industry here today.

Welcome, especially.

With a national recycling rate for all products, I believe it is right around 35 percent across the country, the paper industry's recycling rate of over 60 percent, almost twice the national rate, really does stand out. The paper industry shows how companies can and should help the cause by ensuring that their products can live on by being recycled into new products.

Thank you for that example. I can say we lead by our example.

Companies must step up and take greater responsibility for reducing, reusing, and recycling their products. While we can't make industry successful in this effort, we can help make it possible for industries to succeed. We know that if industry, along with environmental advocates, and all levels of government join forces to reach these inspiring and essential goals, the return on our investment will be exponential.

And that is our challenge to our witnesses before us today, and frankly, to all of us. Please tell us what our Government needs to do to better ensure that you succeed in your efforts to establish a circular economy, one that helps bring our solid waste problems under control, reins in unsustainable greenhouse gas emissions, reduces our overall consumption, and meets this critical moment in our Nation's history.

Someday, I expect to be asked in the future by our three sons and their children this question: "What did you do to stop climate change and help save our planet when you had the chance? What did you do, Dad?" And I want to be able to look them in the eye and tell them that we did everything we could, everything we could. To me, today's hearing is an important step in enabling this country of ours to do just that.

Let us seize the opportunity. Let us convey a strong sense of urgency and embrace the chance to create a circular economy that allows us to be our better selves, respecting our planet, taking care of each other, and not wasting the precious resources that our creator has bestowed upon us.

Each of you as witnesses here today bear a larger than average share of the responsibility to get us to that better place. You have the knowledge, you have the skill, and I believe the will to do so. With apologies to the late Jim Morrison, I believe you have the will to do so, to help us today to light your fire so that together, we can prevent many of the wildfires that have been engulfing large swaths of our country throughout much of this year and last.

With that, I have said enough. I turn it over to Senator Capito, our Ranking Member, for any comments that she might like to make.

Senator Capito, great to be with you.

OPENING STATEMENT OF HON. SHELLEY MOORE CAPITO, U.S. SENATOR FROM THE STATE OF WEST VIRGINIA

Senator CAPITO. Thank you, Mr. Chairman. Interesting reference to Jim Morrison.

Senator CARPER. You just never know when he will pop up.

Senator CAPITO. He has a West Virginia connection, too.

Senator CARPER. I am anxious to hear about it later.

Senator CAPITO. Thank you for calling today's hearing today.

Senator CARPER. Would that connection be wild and wonderful? [Laughter.]

Senator CAPITO. Probably.

Both Chairman Carper and I are members of the Senate Recycling Caucus, as are a few of our other EPW colleagues. We see recycling as a win-win solution that presents significant environmental and economic benefits.

Recycling can reduce waste going to landfills and the incinerators, conserve natural resources like timber and water, and save energy. In fact, many recent developments in waste management are reducing greenhouse gas emissions and contributing to an all of the above strategy to address climate change.

Hand in hand with those environmental benefits, recycling creates domestic jobs and supports American manufacturing. We have seen significant bipartisan progress on this issue in recent years when we passed our Save Our Seas Act and Save Our Seas Act 2.0, which help improve our ability to clean up waste and combat marine debris.

But marine debris is only one piece of the puzzle. There is also significant funding in the Infrastructure Investment and Jobs Act that the Senate passed last month, and we hope the House passes as well, for recycling infrastructure and education to reduce contamination in the recycling stream.

While these investments will help us to reach EPA's ambitious National Recycling Goal of recycling 50 percent of waste by 2030, other challenges do remain. I want to highlight two of the challenges today. One is the need to expand materials processing and manufacturing here in our own country, and No. 2 is a lack of demand for recycled materials.

The issues with China taking, or more recently, not taking our recycling materials and the issues with supply lines laid bare by the pandemic made clear we need to do more of the material processing and manufacturing right here in America.

The investments in our Nation's roads and bridges that are in the Infrastructure Investment and Jobs Act would help expand American manufacturing. Reliable infrastructure is critical for economic development and creating job opportunities.

When China stopped importing our trash, the economies of municipal recycling changed dramatically. Cities must incur significant costs to collect recyclables, and in some instances, the cost of paying businesses to accept those recyclables if they can no longer be profitably sold.

Some municipal systems have taken on the costs and burden of storing bales of recyclables waiting for an improvement to the market. This is all due to a lack of domestic demand for our recycled materials.

Market demand for these materials can create the incentives to invest in the recycling system and expand access to recycling across the country, especially in rural areas like my State of West Virginia.

While some of my colleagues in Congress have proposed various policies, regulations, and mandates, they don't create effective long term markets. Falsely inflating that market for recycled goods with Federal dollars doesn't help, either. It simply prolongs the

unviability of the sector, which could end up right back where we are today when the funding is gone.

The best way to address the depressed demand for recycled materials is to develop new innovative markets and technologies. Today, we will learn about one example from Mr. Hawkinson—and he was on our roundtable, we appreciate that—which is Georgia-Pacific's new Juno Technology that is rescuing recyclable materials from trash.

Last week, Chairman Carper and I hosted a roundtable that the Chairman talked about, where we had the opportunity to learn about some of the technological advances in the recycling sector. For example, one company has successfully recycled over 2 million pounds of post-use polystyrene at their facility in Oregon through chemical recycling. Developing and deploying this technology could not have come at a better time, as this material was used in the COVID-19 vaccine production for everything from testing kits to the cooler shipment boxes that kept the vaccine at the needed temperature during delivery and storage.

Now, what would otherwise have been considered trash can be safely recycled into new products like medical grade and food grade plastic, while reducing waste that ends up in our landfills. The supply chain challenges that emerged and are still with us were among the most significant realizations that struck us, I think, during COVID-19, especially our reliance on other countries to produce essential products. I hope these realities won't quickly be forgotten and that we can use those experiences as motivation to retain and bring back manufacturing jobs in this country.

One way we can accomplish this is fostering innovation and not stifling it. I look forward to hearing from our witnesses today on the best way to accomplish that.

Thank you, Mr. Chairman.

Senator CARPER. Senator Capito, thanks for a wonderful statement, and thanks even more for your leadership on this issue. We are working on a lot of issues together, and I am delighted this is one of them. It is certainly an important one.

I just want to give a shout out to Senator John Boozman, who is the co-chair of the Senate Recycling Caucus, and his team for all of the work that they do.

I think Taylor Meredith deserves a special shout out from your team, Senator Capito, and from Senator Boozman's office, I want to mention Andrew Kelly and Joe Brown with a special thanks.

We have on our own team here on the majority side of the Committee, in addition, Annie, who is sitting over my left shoulder; Mary Frances Repko, who is our staff director; John Kane, and Trevor Malone. I am grateful to all of you and more, all of you and more.

One of my favorite sayings is from the King Sisters from Kent County, Delaware, Dover, members of my team have been forever, teamwork makes the dream work, and we have got some pretty good teamwork on this Committee, and we are going to try to get some dreams accomplished as a result.

Thanks again, Senator Capito, for your statement and for everyone who has worked to help make today possible.

I want to briefly introduce our witnesses, starting with Elizabeth Biser. She is the Secretary of the Department of Environmental Quality for the State of North Carolina, my wife's native State.

She sends her best to you today.

Secretary Biser oversees the State agency, whose mission is to protect North Carolina's environment and natural resources.

I understand that you live not far from where my wife's two sisters live, in the Greater Raleigh area. We thank you for joining us today.

We are also joined by Roberta Elias, the Director of Policy and Government Affairs at the World Wildlife Fund.

Welcome, Ms. Elias. Great to see you.

Brian Hawkinson, again, of the American Forest and Paper Association, will be testifying today. Mr. Hawkinson is the Executive Director for Recovered Fiber at the AF&PA, and we want to thank you for joining us today.

Good to see you, Mr. Hawkinson.

Our final witness, no stranger to these parts, Billy Johnson, Chief Lobbyist of the Institute of Scrap Recycling Industries, where he works with industry to advance recycling policies.

Great to see you, Billy. Welcome today.

Why don't we start with Secretary Biser?

You may begin when you are ready.

Senator INHOFE. Mr. Chairman, please.

Senator CARPER. Senator Inhofe.

Senator INHOFE. Mr. Chairman, could I be recognized for unanimous consent request in that, this may go longer than I anticipated it would. I do ask unanimous consent that the article I referred to earlier by Andrew Wheeler be made a part of the record of today's deliberations, particularly during the deliberations of Mr. Johnson.

Senator CARPER. Without objection, so ordered.

[The referenced information follows:]

The Heritage Foundation

BACKGROUNDER
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INSTITUTE FOR ECONOMIC FREEDOM

The Need to Examine the Life Cycles of All Energy Sources: A Closer Look at Renewable-Energy Disposal

Andrew R. Wheeler

KEY TAKEAWAYS

The Biden Administration and some lawmakers are moving forward with a historic shift to "zero emissions" energy production without planning for the aftermath.

Renewable-energy advocates focus on zero emissions without considering the materials used in the production of the source or the ultimate disposal of the byproducts.

The government should not intervene in energy markets, including for renewable resources—but since it is, taxpayers deserve a full accounting of costs and benefits.

Every source of energy—including fossil fuels, wind and solar power, and nuclear power—have both positive and negative attributes. Often, proponents or opponents of a certain source gloss over, or hype up, specific challenges or benefits in order to promote their favored solution. In order to make informed decisions about which energy sources can meet America's energy needs, policymakers and the public need to know about the entire life cycle of all energy sources. For example, proponents of fossil fuels often highlight their affordability and reliability, while ignoring the effects of waste disposal or extraction. Likewise, renewable-energy advocates focus on "zero emissions" without considering the materials used in the production of the source or the ultimate disposal of the byproducts or equipment.

This paper, in its entirety, can be found at **http://report.heritage.org/bg3653**

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The environmental life cycle of an energy source can be broadly grouped into three categories: (1) the extraction or production of the source material and the equipment required to do so; (2) the generation of the energy and the resulting emissions; and (3) the waste disposal of the byproducts or equipment. All aspects should be considered when evaluating the best energy source for a given use or purpose, including the benefits and the costs for each.

For years, large provisions of U.S. environmental laws, and their corresponding regulations, have been drafted to address the life cycle challenges of fossil fuels. The effectiveness of the laws and regulations must be constantly re-evaluated to ensure that public health and the environment are protected. For example, numerous laws govern oil extraction, the emissions of the refining process, the impact on water quality, and the disposal of waste materials. The natural gas sector is regulated by rules on fracking, extraction, pipeline emissions, and transportation. Coal is regulated, among other ways, through mining restrictions, limits on emissions from power plants, and the closure of coal-refuge ponds. All fossil fuel sources have historically contributed to the creation of large-scale waste sites addressed under the Superfund program for cleanup, and fossil fuels produce air pollution and greenhouse gases.

But as Congress and the Biden Administration, as well as many states, move to limit or reduce the use of fossil fuels in favor of renewable energy, there has been little or no recognition of the negative life cycle consequences of renewable-energy sources, specifically wind, solar power, and electric batteries. Without a full understanding or debate of the issues, decisions made today will create the environmental problems of tomorrow.

All three primary forms of renewable energy—wind turbines, solar panels, and electric batteries—rely on substantial source materials in the production of the equipment. Solar panels and batteries (and to a lesser extent wind turbines), are highly dependent on mining extraction for rare earth minerals and other components, such as arsenic and gallium (for solar panels) and lithium and manganese (for batteries).[1] The production of the fiberglass windmill blades is both energy intensive and requires substantial energy to transport the component parts. The environmental impact of the mining activities, typically in developing countries, are rarely acknowledged or debated, nor are their mining practices considered. Accusations of child labor and the real environmental degradation due to the lack of meaningful environmental laws or standards are often overlooked.[2]

Proponents of renewable energy focus almost exclusively on the positive attributes of its generation, ignoring the equipment-production and waste-disposal issues. The zero emissions of renewable-energy production are unparalleled as an energy source except for nuclear power. There are negative environmental consequences of generation, though, such as bird deaths on windmill farms, and bird and other wildlife deaths attributed to solar panels.[3,4] However, the difference between renewable energy and fossil fuels in terms of air emissions is stark. Unlike conventional carbon-based fuels, renewable-energy technologies typically do not emit nitrogen oxides, sulfur dioxides, mercury, and other air pollutants or greenhouse gases during energy generation.

The remaining category, waste disposal, is absent in most public policy discussions for renewable-energy sources. The issue itself will grow in importance as the use of renewables increases and older equipment reaches the end of its useful life. The rest of this *Backgrounder* examines some of the waste-disposal issues surrounding renewable-energy sources.

Solar Panels

Solar energy use in the United States has grown from five gigawatt hours (GWh) in 1984 to 133,000 GWh in 2020.[5] Solar panels must be installed by specially trained technicians. The panels can be cumbersome to transport and, since principally made of glass, are breakable. The safe removal of the panels also requires specially trained technicians to ensure possible recycling or the more likely scenario of waste disposal without destroying the materials or releasing the hazardous substances contained within the solar panels.

In the United States, materials are classified as hazardous either because they are a listed hazardous waste under federal law and regulations, or they exhibit hazardous characteristics, such as toxicity. Solar panels themselves are not classified as hazardous but are considered hazardous due to their component materials. Solar panels and photovoltaic (PV) modules contain multiple toxic materials including arsenic, cadmium, copper, lead, selenium, silicon, and silver. The inclusion of these hazardous materials in the solar panels triggers the hazardous waste–transportation and waste-disposal regulations and requirements under the 1976 Resource Conservation and Recovery Act.[6] In addition, there are specific regulations tied to the recycling of products containing hazardous materials.[7]

> **The inclusion of hazardous materials in solar panels triggers U.S. hazardous waste-transportation and waste-disposal regulations and requirements.**

A majority of states allow the disposal of solar panels in municipal landfills.[8] This could create hazardous waste-cleanup issues well into the future depending on the scale and type of the materials involved. California has moved forward with regulations designating solar panel waste as "universal waste," which offers less stringent regulatory requirements for handling and storage and is meant to encourage recycling, which does not always work.[9] Other examples of universal waste include fluorescent light bulbs and some batteries. Washington State has taken the most aggressive approach in dealing with used solar panels by requiring the manufacturers to finance a takeback and recycling system for all panels sold after July 1, 2017.

While large-scale solar facilities are operated by professional companies that, in theory at least, should implement best-case removal practices, the same cannot be said for individual businesses or homeowners. Requirements differ significantly by state or by locality, with most states not regulating the disposal of solar panels at all. With some solar installations expected to last up to 30 years, it is likely that many installations will no longer be owned by the same homeowner or operated by the same business at the end of their life cycle, complicating long-term planning for disposal services. When it is time for the solar equipment to be replaced, the burden could fall on the new installation company or homeowner. The question would remain as to who bears the cost of safely removing and disposing of the older material.

The materials themselves are capable of being recycled, to some extent, however, the cost is currently prohibitive. The cost to recycle one solar panel is approximately $20 to $30 while the cost to dispose of the same panel at a landfill is $1 to $2.[10] The increasing volume of older solar panels reaching the end of their life cycle, coupled with the higher cost of panel recycling, has prompted many within the industry to store old solar panels until the recycling costs are reduced. This, in turn, creates new handling issues if the panels are not stored correctly or degrade significantly over time in storage releasing the toxic materials. One U.S. manufacturer, First Solar, operates a recycling facility in Ohio that can recycle approximately 90 percent of the semiconductor material and glass collected from its used thin-filmed panels.[11]

One of the approaches in the European Union is to hold manufacturers of solar panels responsible for their disposal at the end of their useful life. Under the waste, electrical, and electronic equipment (WEEE) Directive, producers of solar panels are legally responsible for the collection, treatment, and monitoring of the end-of-life management of their solar panels.[12] A similar approach in the United States would be complicated due to the high volume of imported solar panels. According to the National Renewable Energy Laboratory, PV modules and cell imports are at historically high levels despite tariffs imposed by the United States,[13] and Wood MacKenzie reports that 85 percent of solar panels sold in the U.S. are imported.[14] Since many of the foreign manufacturers are Chinese, there is concern that they may not be solvent or in existence in a generation. This may increase the burden on the U.S. installation industry, the property owners, and the disposal and recycling facilities.

The expected volume of the solar-panel waste stream is staggering, considering America's lack of a PV-waste-management system. The International Renewable Energy Agency projects that up to 78 million metric tons of solar panels will have reached the end of their life by 2050, and that the U.S. will be producing 6 million metric tons of new waste annually.[15] It is estimated that around 26,000 tons of solar panels ended up as waste in 2020 alone, and that number is excepted to increase each year.[16] These projections do not take into account the recent accelerated push for solar power by the United States.

> The U.S. waste-stream system is not equipped to deal with a large influx of solar panels today.

In a recent article in the *Harvard Business Review*,[17] the authors report that the combination of the solar tax credits and the year-over-year diminishing performance of older panels will incentivize property owners to replace their older panels at a much faster rate, accelerating the need to dispose of the older panels now as opposed to in the future. The waste-stream system is not equipped to deal with a large influx of solar panels today. If the panels are simply sent to landfills, there is a real possibility of lead and cadmium leaching into the ground water. Likewise, if the panels are stored indefinitely, they could leach out due to degradation or improper storage. The Superfund sites of the past 40 years were mostly created to clean up the damage caused by the improper disposal or storage of historic waste. This country should not repeat those mistakes with renewable sources.

While there have been some limited advances in the recycling of solar panels in the United States, the amount of the material recycled is just a fraction of the amount of waste produced each year. This will grow exponentially as the older solar panels installed in the early 2000s reach the end of their useful life. This end may be artificially accelerating due to the tax code treatment and the development of more efficient solar panels making older panels obsolete before their time. If the U.S. continues to promote greater usage of solar technologies without solving the waste issues, it will merely punt the not-too-distant—and likely overwhelming—environmental problems a bit further down the road.

Wind Turbines

Wind energy in the United States has grown from 40 GWh in 2011 to more than 118 GWh at the end of 2020.[18] While wind turbines are manufactured in several different designs—from the wind turbines found in increasing numbers across the American landscape, to offshore windmills, to small modular units located on buildings.

Wind turbines in general consist of three distinct parts—the tower, the nacelle, and the rotor blades. The tower, generally constructed of steel, stands up to approximately 295 feet tall and weighs around 19,000 pounds. The nacelle, which holds the gears and the main driveshaft, has a fiberglass shell and weighs around 22,000 pounds. The blades are typically made of fiberglass with a hollow core, although there are experimental blades made from lightweight woods and aluminum. The blades are around 50 feet long and weigh around 2,500 pounds. At the base of each tower is a utility box that converts the energy into electricity and is linked to nearby towers through underground pipes to other turbines and a transformer.[19] Offshore wind turbines are even larger and can reach 410 feet with blades of 623 feet.

The average life span of a wind turbine is only about 20 years before the mechanical and structural components decay to the point of replacement, provided there has been consistent maintenance and upkeep over the life span of the turbine.[20] For example, the gearboxes typically must be replaced every eight to 10 years.

Once a turbine has reached the end of its life span, at least in the U.S. market, there are few options for disposal. Some of the parts can be recycled, but the blades themselves, composed of resin and fiberglass, cannot be easily recycled and mostly end up in landfills. Although GE recently announced a deal to start recycling its blades for use in cement manufacturing, it is unknown how quickly the technology can be widely deployed.[21]

Very few landfills in the U.S. can deal with the extremely large turbine blades, which are only getting larger with technological advances.[22] It is projected that at least 8,000 blades will be retired each of the next four years in the U.S.,[23] and landfill owners have begun to experiment with disposal techniques. First, the transportation of the blades is difficult: In order to fit on three semitrucks, each blade must be cut into three pieces using expensive specialty equipment. The two sites with the most blade-cutting experience are in Iowa and Wyoming, and both have struggled with their disposal.[24]

There is an export market for developing countries, and many wind turbines from Europe and some from the U.S. end up in Latin America, Africa, and parts of Asia. While this may seem like a benevolent gesture, the U.S. is selling turbines that are near the end of their life spans to countries that do not have the same waste-management practices as Western countries do, exacerbating global environmental problems.

> The U.S. sells aged wind turbines to countries with weak waste-management practices, exacerbating global environmental problems.

A recent study from scientists at the Lawrence Berkeley National Laboratory found a significant drop-off in wind-turbine performance after 10 years—corresponding to the expiration of the wind-energy production tax credit (PTC).[25] Their study suggests that regular maintenance drops off after the PTC expiration makes it less economically viable to pay for the maintenance. If this in fact bears out, wind turbines might have an even shorter life span than expected, resulting in an even larger influx of turbines for disposal in the next few years.

Some states, such as North Dakota, have created a decommissioning policy requiring new wind projects to set aside funds to remove and dispose of old turbines at the end of their life spans.[26] But there is no nationwide policy. Ownership of wind farms differs significantly from ownership of solar panels, since wind farms are predominately owned by large utilities or companies that manage the farms on behalf of utilities as opposed to solar-panel installations, which range in ownership from homeowners to large corporations. Despite the relatively smaller universe of wind-farm owners, in most cases, the financial planning for the disposal of the turbines has not occurred. While the disposal of the turbines does not involve the

same level of hazardous materials, the sheer volume of the waste threatens to overwhelm landfills and the disposal process, while the transportation of the components certainly adds negative environmental aspects to the wind-turbine footprint.

Batteries

Battery storage is the key to transforming renewable energy from intermittent to baseload generation. Large-scale battery facilities will be needed to store energy produced at solar and wind farms, and batteries are the key component in making electric vehicles (EVs) feasible.

The large stationary storage facilities built in conjunction with the grid use several different technologies, although more than 90 percent are based on lithium-ion chemistries. (Nickel- and sodium-based batteries account for most of the remaining systems while "flow battery" systems are starting to increase.) In 2010, the U.S. had seven large-scale battery-storage systems accounting for 59 megawatt hours (MWh) of power capacity. By 2018, according to the U.S. Energy Information Administration, the U.S. had 125 systems accounting for 869 MWh of capacity. It is important to note that 53 of the large facilities are co-located with renewable-energy facilities, and that number is expected to double by 2023. Additionally, there is 234 MWh of small-scale storage capacity, with the majority of it in the commercial and industrial sector, and a third in residential properties.[27] The use of large-system and small-system batteries is going to increase quickly over the next few years.

EVs are typically powered with lithium-ion and lithium-polymer batteries. Other types of EV batteries include lead-acid, nickel-cadmium, and nickel-metal hydride. The lithium batteries are very similar in structure to the lithium batteries used in cell phones, computers, and other electronic equipment. The batteries themselves typically contain cobalt, lithium, and nickel, all mined materials, usually from sources outside the U.S.[28] Lithium is mined predominately in Bolivia, Chile, and China. Additionally, the batteries include a number of rare earth minerals, such as neodymium, which is used as part of the motor magnets and mined predominately in China.

EV batteries tend to reach the end of their life cycles with anywhere from 70 percent to 80 percent of their original capacity intact. This is comparable to spent nuclear fuel rods, which maintain up to 80 percent of their fuel capacity when they are discarded. Originally, EV batteries were lead-acid and reached the end of their life after three or four years; over the past 10 years the industry has transitioned to lithium-ion batteries. Today, all electric vehicles sold in the United States come with a warranty of 100,000 miles, or eight years.[29] While

in many cases the fine print specifies that in order to be replaced a battery must be unable to hold any charge, some companies will replace the battery if the charge drops below a 70 percent or 60 percent threshold.[30]

A recent study found that EV batteries lose, on average, 2.3 percent of their capacity each year.[31] However, the life span of the battery depends on individual circumstances. Batteries that are charged too often, or depleted to low levels on a regular basis, degrade faster, as does exposure to heat.[32]

Once an EV battery has reached its end of life, the batteries are either repurposed, refurbished, recycled, or disposed. Some companies are looking at ways of repurposing the batteries for uses that do not require a full charge, such as household-generation storage.[33] Others are refurbishing the batteries, a process that entails disassembling the battery pack individually and testing the cells and replacing any needed parts, which is both cumbersome and expensive. Recycling the batteries must be done by a licensed and trained recycler due to the weight, complexity, and toxic components of the batteries.[34] Finally, batteries are disposed of in landfills, which can cause chemical fires and leach chemicals into the groundwater.

Recycling EV batteries consists of several different practices. The most common recycling method is to shred the battery and then separate the metals using pyrometallurgical techniques (burning). This process wastes most of the lithium. The next most common method is hydrometallurgical metal reclamation, which uses a series of acid washes to separate the materials. The third method of EV battery recycling is physical separation, where the components are physically separated using mechanical processes.

> **Only a small number of materials can be reclaimed through recycling, and the process is highly energy intensive.**

There are byproducts of all three methods, ranging from acids to slag material, and it is important to note that only a small number of materials can be reclaimed, and the processes are very energy intensive. While it is possible to recycle up to 50 percent of the material in batteries, it is estimated that, worldwide, only 5 percent of batteries are recycled.[35] The recycling process is further complicated because the battery electrolyte is flammable, explosive, and highly toxic, and it forms highly corrosive hydrofluoric acid upon contact with water.[36] It is also more expensive to recover lithium through recycling than it is to mine it, further complicating recycling efforts.

According to the International Energy Agency, there were 10 million EVs on the world's roads at the end of 2020.[37] But in the U.S. last year, only 2 percent of new vehicles sold were EVs.[38] President Joe Biden issued an executive order to increase sales of zero-emission vehicles to 50 percent by 2030 as part of his climate goals.[39] This of course means a large influx of EV batteries. Currently there are no requirements in the U.S. to recycle EV batteries, and consumers and manufacturers are left to their own devices. Many EV manufacturers take back the older batteries upon purchase of a new battery, but there is no requirement. Likewise, there is no federal requirement for the manufacturers on whether they recycle or dispose of the used batteries once collected.[40] While California is currently examining potential requirements, policy recommendations are not expected until 2022.[41] With the anticipated increase in EV sales over the next decade it is imperative that decisions are made today about what to do with the coming onslaught of used EV batteries.

The Infrastructure and Jobs Act[42] passed by the U.S. Senate in August 2021 includes significant funding for battery-recycling pilot programs, a voluntary battery-labeling program, and the development of a regulatory framework for recycling batteries. The act does not address the ultimate waste-disposal issues except by stating that the goal of the recycling section is to reduce waste and that the goal of the voluntary labeling section is to reduce safety concerns regarding the improper disposal of batteries.

Ultimately, regardless of recycling or reuse programs, the hazardous materials in the batteries will eventually reach the end of their life and necessitate disposal. Reliance on pilot grants to solve problems in a nascent industry (battery recycling) would be fine, if not for President Biden's national goal of a 50 percent increase in EV sales by 2030. Americans cannot afford to put off the unanswered question of how to dispose of EV batteries at the same time that the federal government is accelerating their deployment.

Conclusion

As a country and as a society, Americans value and depend on affordable and reliable energy—and Americans have never been more dependent on energy than today. In addition to electricity, heating and cooling, and transportation, Americans now rely on personal devices powered by energy, such as smartphones and computers. Yet the Biden Administration, some in Congress, and several states are moving forward with a historic shift in energy production without planning for the aftermath.

Recycling rates of traditional commodities, such as paper, aluminum, glass, and plastics, are at a 20-year low, yet the government would have Americans believe that they will easily be able to recycle renewable-energy materials and byproducts. Recycling PV modules or EV batteries is simply not feasible if the costs are a magnitude larger than the raw materials. This is the same dilemma as with some plastics and glass recycling, where raw materials are cheaper than the recycling process. And, sending old windmills to developing countries under the guise of recycling only prolongs their disposal, burdening underdeveloped governments that are even less equipped to deal with them than is the United States.

U.S. disposal laws, while equipped to deal with toxic materials related to fossil fuel generation, have yet to be tested by the coming deluge of renewable-energy waste. Granted, the laws and regulations for fossil fuels had to catch up with those waste streams, and some of the sites addressed by the 1980 Superfund law dated back to the 19th century. That is no excuse to delay planning for the environmental problems everyone knows are just down the road.

Today, the Biden Administration and Congress are working overtime to incentivize the use of renewable sources, yet they are not proposing solutions to deal with the renewable waste. If the renewable sources would grow organically at their own pace, instead of a forced, almost exponential, growth, there would be more time to plan for their end-of-life disposal. By forcing this rapid expansion of renewable energy, the Biden Administration is creating future problems while turning a blind eye to desperately needed solutions. If the federal government is so aggressively promoting the use of renewable energy through government regulations and subsidies, it should be responsible for ensuring that the waste-disposal issues are addressed.

Renewable energy is a vital part of Americans' future energy mix, but policymakers must not allow the goal of clean emissions to cloud their judgment or close their eyes to the negative environmental impacts. There are no panaceas for America's energy needs, and policymakers and the public must be willing to look at the positives and negatives of all energy sources.

Andrew R. Wheeler, former Administrator of the U.S. Environmental Protection Agency, is a Visiting Fellow in the Thomas A. Roe Institute for Economic Policy Studies, of the Institute for Economic Freedom, at The Heritage Foundation.

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Senator CARPER. OK, with that, I think we are ready for our first witness, Ms. Biser.

STATEMENT OF HON. ELIZABETH BISER, SECRETARY, NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY

Ms. BISER. Chairman Carper, Ranking Member Capito, and members of the Committee, thank you for the opportunity to speak with you today about North Carolina's approach to creating a circular economy.

The term circular economy means transitioning from a make-take-waste society to one in which we treat end of life materials as commodities that can be put to good economic use, creating jobs and economic investment in our communities.

North Carolina has long been on the path of creating a circular economy. In sharing our lessons learned with you, I am going to harken back to how we all learned about environmental stewardship, the three Rs of reduce, reuse, and recycle.

I will begin with reduce. One of the best ways to reduce waste is to prevent it from happening in the first place. Nineteen years ago, my agency launched a program called the Environmental Stewardship Initiative. This free and voluntary program is open to any entity in North Carolina that wants to go above and beyond the minimum regulatory requirements for their management of waste, air, water, and energy.

In the past 15 years, our partners have saved over $95 million and have experienced similarly impressive environmental results. For example, they have reduced their collective CO_2 emissions by over 32 million metric tons, which is the equivalent to the CO_2 from the energy used by 3.8 million homes for a year. The Environmental Stewardship Initiative shows the power of public-private partnerships in creating a more circular economy.

Next, let us talk reuse. Traditionally, reuse is seen in programs such as the refillable glass milk containers that my family gets at the grocery store. Nationwide, this is a policy that is still developing.

For today's purposes, I want to examine the ways we prioritize keeping materials within the circular economy by recruiting industries to our State who can use the end of life materials as manufacturing feedstock. In North Carolina, companies like Owens-Illinois and Ardagh use recycled glass to create new bottles. Within 30 days, the bottle that you are holding today can be back on the shelf with a new life.

This is a great example of a circular economy, and I am proud to say that the entire process from the resident placing their bottle in the recycling bin to the sortation at the material recovery facility to the glass processor to the bottle manufacturer all takes place within the State of North Carolina.

To have material to feed these businesses, though, we need to look at the last R: Recycle. Recycling alone isn't a circular economy, but a circular economy can't exist without recycling. Having a strong State recycling program, one that supports local recycling programs and coordinates regional and statewide solutions, is a key component for success.

In the early 2000s, a combination of policy changes led to significant improvements in our recycling rates. The State established a disposal surcharge, a portion of which supported grant dollars for recycling infrastructure. North Carolina also enacted a number of landfill disposal bans for readily recyclable materials, such as aluminum cans and plastic bottles, recognizing that these materials are not waste, but commodities that were needed as vital feedstock by North Carolina manufacturers.

To complement these policy changes, North Carolina led a robust economic development effort to recruit industry and strengthen market demand for recycled materials. Now, more than 15,000 North Carolinians are directly employed by the recycling sector, with a total payroll of $759 million.

While North Carolina is making great progress, like every State, we have a way to go before we have a truly circular economy. We have a lot of work to do to decrease the amount of wasted food ending up in our landfills. According to the EPA, wasted food is the largest segment of our waste stream. The USDA estimates that 30 percent to 40 percent of our Nation's food supply is wasted each year. This waste occurs even as 13.8 million households are experiencing food insecurity. It is not just a waste problem. It is also a climate problem. Approximately 15 percent of total U.S. methane emissions come from landfills.

While our work is not done, I appreciate the opportunity today to share North Carolina's journey with you. With programs that encourage a source reduction of waste, a robust economic development effort to support infrastructure and businesses that reuse materials, and a strong State recycling program, we can make real progress toward creating a truly circular economy.

Thank you.

[The prepared statement of Ms. Biser follows:]



Written Statement for the Record

Secretary Elizabeth S. Biser
North Carolina Department of Environmental Quality

Hearing on "Strengthening Community Recycling Programs: Challenges and Opportunities"

Testimony before the
U.S. Senate Committee on Environment and Public Works

September 22, 2021

Chairman Carper, Ranking Member Capito, and members of the Committee, thank you for the opportunity to speak with you today about the concept of a circular economy and our approach to making a circular economy a reality in North Carolina.

The term "circular economy" means transitioning from a make-take-waste society to one in which we treat end-of-life materials as commodities that can be put to good economic use, creating jobs and economic investment in our communities.

North Carolina has long been on the path of creating a circular economy. Today, I'd like to share our lessons learned with you. I'm going to harken back to how we all learned about environmental stewardship to begin with – the three R's of reduce, reuse, and recycle.

I'll begin with "reduce." One of the best ways to reduce waste is to prevent it from happening in the first place. Nineteen years ago, with the help of EPA start-up funding, my agency launched a program called the Environmental Stewardship Initiative. This free and voluntary program is open to any entity in North Carolina, from large corporations to non-profit organizations, that wants to go above and beyond the minimum regulatory requirements for their management of waste, air, water and energy. Increasingly, companies are making ambitious sustainability goals, and they benefit from technical assistance and peer contacts to know how to make their environmental commitments a reality.

In the past fifteen years, our partners have saved over $95 million and have experienced similarly impressive results in their collective environmental impact. Through strategic changes, they've reduced the amount of waste going to landfills by 4.2 million tons.[1] They have also reduced collective CO_2 emissions by over 32 million metric tons, which is equivalent to the CO_2 produced by the energy usage of 3.8 million homes for a year.[2] The Environmental Stewardship Initiative shows the power of public-private partnerships in creating a circular economy.

Next, let's examine "reuse." Traditionally, reuse is seen in programs such as the refillable glass milk containers that my family gets at the grocery store. Broadly speaking, reuse policy is still developing at the municipal and state level around the country. For today's purposes, I'll examine the ways we prioritize keeping materials within the circular economy by recruiting industries to our state that can utilize end-of-life materials as manufacturing feedstock. In North Carolina, we have a long history of recruiting industries that use recycled materials in their manufacturing processes. Companies like Owens-Illinois and Ardagh use recycled glass to create new bottles. Within thirty days, the bottle you're holding today can be back on the shelf with a new life. This is a great example of a circular economy, and I'm proud to say the entire process, from the resident placing their bottle in the recycling bin to the sortation at material recovery facilities to the glass processor to the bottle manufacturer, is all contained within the state of North Carolina.

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[1] *Environmental Stewardship Initiative.* (2021). NCDEQ. https://deq.nc.gov/about/divisions/environmental-assistance-customer-service/environmental-stewardship-initiative

[2] Ibid.

North Carolina is also home to Jackson Paper, a company that converts used cardboard into 100 percent recycled corrugated sheets, which in turn gets made into cardboard boxes. This company helps divert more than 100,000 tons of cardboard from landfills in our state. It's a great circularity story – especially considering the increased shipping demands over the last year and a half.

To have the material to feed these businesses, we need to look at the last "R" – Recycle. Recycling alone isn't the circular economy, but a circular economy can't exist without recycling. Having a strong state recycling program – one that supports local recycling programs and coordinates regional and statewide solutions with industry partners – is a key component for success.

In the early 2000s, a combination of policy changes led to significant improvements in our recycling rates. The state established a disposal surcharge (essentially a tax on landfilled waste), a portion of which supported grant dollars for recycling infrastructure, such as recycling carts to expand curbside recycling throughout the state. North Carolina has traditionally split its recycling grant money distribution into two streams – one for strengthening local recycling programs and the other for helping build the state's recycling economy. This helps to create a balance in our efforts to ensure that we have both strong collection and robust processing and end markets.

North Carolina also enacted a number of landfill disposal bans for readily recyclable materials, such as aluminum cans and plastic bottles, recognizing that these materials were not "wastes," but commodities needed as vital feedstocks by North Carolina manufacturers. To complement these policy changes, North Carolina led a robust economic development effort to recruit industries and strengthen market demand for recycled materials. As part of these efforts, our state established one of the first market directories in the country in 1989, and it has maintained the effort as a dynamic searchable online database, the data from which has assisted a number of industries in deciding to locate in our state.

More recently, our state recycling program has supported local government collection programs by mapping out the materials accepted by material recovery facilities, or MRFs, and creating custom educational resources that these local governments can use with their residents to increase both the quantity and quality of recycled materials collected. This is just the latest example of a long history of assisting local communities in offering robust recycling services to their residents.

The advantages of a strong recycling program go beyond environmental benefits. More than 15,000 North Carolinians are directly employed in recycling-related jobs in the state, with a total payroll of $759 million.[3] The companies with facilities in our state that put otherwise wasted materials to use in their manufacturing processes are planning to invest at least another $27 million in our state in the next two years. We have worked with our economic development

[3] *Recycling and Materials Management Section.* (2021). NCDEQ. https://deq.nc.gov/conservation/recycling

partners in North Carolina to recruit these industries and provide competitive grants to help expand their operations. We're not alone – communities across the country benefit from recycling industry investments.

While North Carolina is making great progress, like every state, we still have a way to go before we have a truly circular economy. We had nearly 14 million tons of solid waste disposed of in our state's landfills last year.

We also have a lot of work to do to decrease the amount of wasted food ending up in our landfills. According to the Environmental Protection Agency (EPA), wasted food is the largest segment of the country's waste stream, making up 24 percent of the solid waste sent to landfills.[4] The US Department of Agriculture estimates that 30 to 40 percent of the nation's food supply is wasted each year.[5] This waste occurs even while more than 13.8 million households in the United States experience food insecurity.[6] Food waste also contributes to climate change. Approximately 15 percent of total US Methane emissions comes from landfills.[7] We've only begun to scratch the surface on what can be done to reduce food waste. Addressing this issue is an important step towards creating a more circular economy.

EPA and Congress can help bridge the gap. North Carolina has benefited from EPA's investments, whether it was in kickstarting the Environmental Stewardship Initiative, or giving us grant funding to begin a Recycling Business Assistance Center in 1993 to support market development. As we're looking to bridge the gap to a circular economy future, the federal government can again play an important role in strengthening states' ability to respond to infrastructure, program and market needs.

While the work is not done, I appreciate the opportunity to share North Carolina's journey with you. With programs that encourage the source reduction of waste, a robust economic development effort to support infrastructure and businesses that reuse materials, and a strong state recycling program, we can make real progress towards a truly circular economy.

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Did you know?

RECYCLING SAVES ENERGY

Every time a new product is made from raw materials, large amounts of energy are consumed. Reduce your consumption of new products and packaging: buy recycled or used when you can. Consider repurposing, repairing or reusing whenever possible. Recycle whatever is left. Recycling uses less energy, raw materials and fossil fuels. *That* reduces greenhouse gas emissions!

ENERGY IS USED IN THE 5 STAGES OF PRODUCT DEVELOPMENT:

1. EXTRACTION OF RAW MATERIALS
2. MANUFACTURE OF RAW MATERIALS INTO PRODUCTS
3. DISTRIBUTION OF PRODUCTS TO CONSUMERS
4. PRODUCT CONSUMPTION
5. PRODUCT DISPOSAL

ENERGY PLAYS A ROLE IN ALL 5 STAGES. KNOCK OUT ONE OF THESE STEPS BY RECYCLING AND YOU HAVE SAVED ENERGY!

LINEAR ECONOMY MODEL
When we consume





REFUSE, REDUCE, REUSE, REPAIR AND RECYCLE: YOU CAN SAVE ENERGY!

BUY LESS = LESS

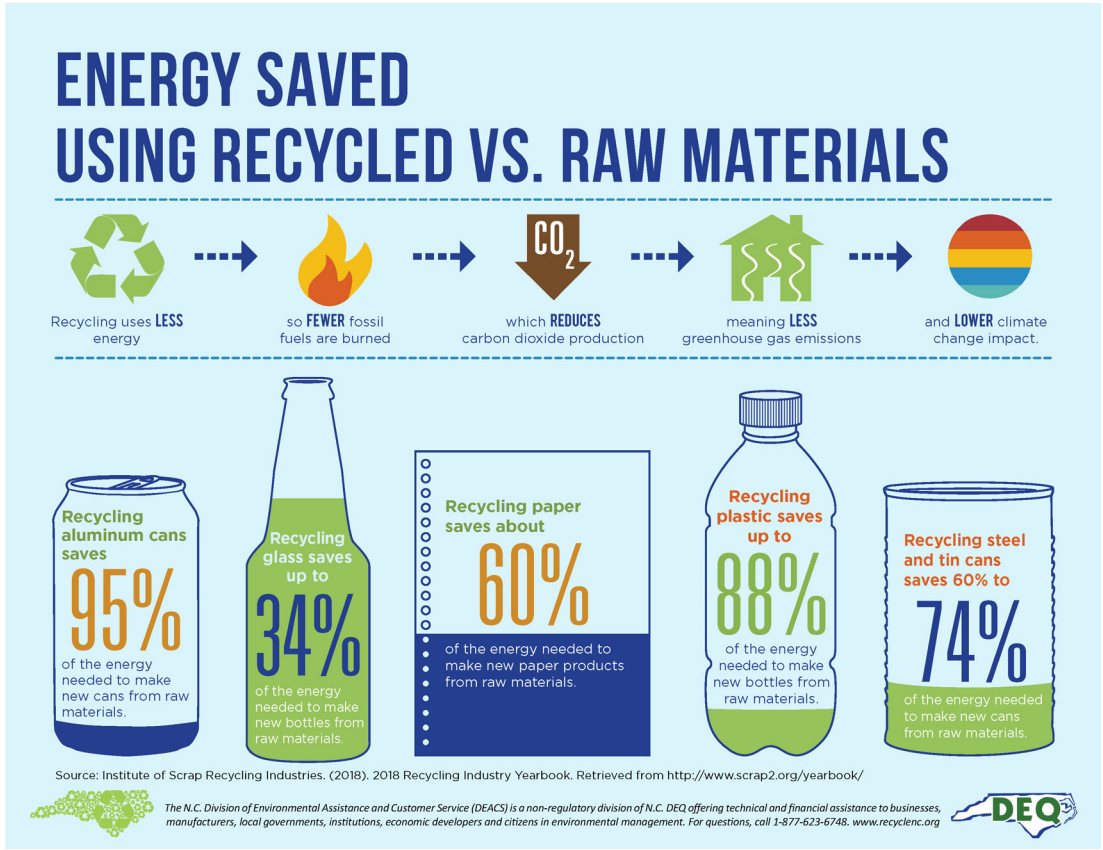
REUSE = LESS

REPAIR = LESS

BUY MINIMAL PACKAGING = LESS

RECYCLE RIGHT = LESS

BUY LOCAL = LESS


ENERGY SAVED
USING RECYCLED VS. RAW MATERIALS
Recycling uses LESS energy
so FEWER fossil fuels are burned
which REDUCES carbon dioxide production
meaning LESS greenhouse gas emissions
and LOWER climate change impact.
Recycling aluminum cans saves
95%
of the energy needed to make new cans from raw materials.
Recycling glass saves up to
34%
of the energy needed to make new bottles from raw materials.
Recycling paper saves about
60%
of the energy needed to make new paper products from raw materials.
Recycling plastic saves up to
88%
of the energy needed to make new bottles from raw materials.
Recycling steel and tin cans saves 60% to
74%
of the energy needed to make new cans from raw materials.
Source: Institute of Scrap Recycling Industries. (2018). 2018 Recycling Industry Yearbook. Retrieved from http://www.scrap2.org/yearbook/
The N.C. Division of Environmental Assistance and Customer Service (DEACS) is a non-regulatory division of N.C. DEQ offering technical and financial assistance to businesses, manufacturers, local governments, institutions, economic developers and citizens in environmental management. For questions, call 1-877-623-6748. www.recyclenc.org
DEQ

Senate Committee on Environment and Public Works
Hearing Entitled, *"The Circular Economy as a Concept for Creating a More Sustainable Future"*
September 22, 2021
Questions for the Record for Secretary Elizabeth Biser

Chairman Carper:

1. *You mentioned in your testimony that the ability to provide good data on available recycled materials has led to industries deciding to build facilities in your state. The presence of those companies has paid dividends, as you also highlighted that 15,000 North Carolinians are directly employed in recycling-related jobs in the state, and that companies using recycled materials are planning to invest at least another $27 million in your state in the next two years.*

    a. *Please tell us a few other ways that you use data to support recycling and circular economy initiatives at the state level?*

        i. **Mapping available feedstock:** With state-level data, we can provide estimates of available feedstock for prospective recycling or manufacturing companies looking to site a facility in North Carolina. We know how much of a particular recyclable is collected by local government programs, and we can use that to identify potential private partners such as haulers or recycling processors to deliver needed material. This data can be compiled for specific geographic areas and can better inform us where investments are needed. We can identify low-performing regions to target with market development and grant funding.

        ii. **Encouraging data-backed best management practices:** We often provide data to local governments to influence decision-making. For example, national studies have shown that recycling programs collecting curbside material with carts recover more materials than programs using bins or bags. In North Carolina, data shows this to be true with cart-based recycling programs recycling an annual average of 299 pounds per household, compared to 197 pounds per household with bags and 91 pounds per household with bins.

        iii. **Benchmarking:** Each year we rank all 100 counties in North Carolina on per capita recycling performance of local government programs. This allows us to see which counties are performing well and which counties have the most opportunity for improvement. Such benchmarking also allows us to offer technical assistance and other state services to the areas with low per capita recycling rates. Conversely, we can use this data to identify counties with high diversion rates per capita and support those efforts, learn from them, and seek to recreate it in other areas of the state. This is a great example of how a strong state recycling program can help support local recycling programs.

b. *How could improving recycling data collection at the Environmental Protection Agency help the federal government implement policies that support a circular economy?*

   i. **Understanding supply and demand:** A robust recycling system requires both a strong supply of quality material being diverted from the waste stream, and also end users to remanufacture that material into new products. Improved data can help identify materials for which supply and demand don't align. For example, recycled PET has a high and growing demand but the national recovery rate of PET bottles was only 29.1 percent in 2018. Therefore, policies should consider how to recover more PET and boost supply. In addition, there is a large data gap for industrial sources of recyclable material. This lack of industrial material generation data is a hindrance to economic development efforts and recruiting manufacturers that need to identify sources of recyclable materials as feedstock for their production.

   ii. **Addressing lack of infrastructure:** There is a need for more infrastructure to help support a circular economy. This includes expanding existing sortation and processing infrastructure, as well as supporting the development of growing areas, such as composting. Data can help identify where the greatest needs are and where to site facilities to have the largest impact.

   iii. **Prioritizing focus areas:** Data is important to understand and identify underperforming areas. For example, the EPA estimates that 68% of wasted food from the residential and commercial sectors is sent to landfill or incinerated. This presents an opportunity for policy to drive better management strategies that support feeding people and animals, composting, and anerobic digestion instead of landfilling wasted food.

   iv. **Improving equity of access:** As we look at infrastructure expansion and encouraging policies to grow a circular economy, it's important to incorporate equity principles into the decision making. Data can help identify and prioritize minority, low-income, or rural communities that traditionally lack access to services and that could also benefit economically from increased access.

2. *There are barriers to accessing adequate recycling services that many minority, low-income, and rural communities face. We heard through testimony that one in seven homes do not have any access to the recycling system and one in three homes face serious challenges to accessing curbside or other easily accessible recycling programs.*

   Given that the transition to a truly circular economy would require participation by everyone in our society, how can we work together to ensure that individuals of every income level have access to recycling services?

   i. **Providing equal access to garbage and recycling:** While curbside service does not make sense in all rural communities, it should be just as easy to

recycle something as it is to throw something away. Rural recycling programs should be optimized for cost efficiency by focusing on quality and using innovative strategies, such as hub and spoke systems. Hub and spoke systems enable rural communities to coordinate and reduce their individual costs. This model utilizes a centralized transfer "hub" that collects material from several different communities, which act as "spokes." The material can then all be picked up from that one location, resulting in significant transportation and other operational savings.

ii. **Offering opt-out recycling services:** Where curbside service is feasible, recycling programs should be universally offered rather than being opt-in or subscription-based. This ensures equity of service and helps lower the cost-per-household by increasing density of collection.

iii. **Increasing education:** For any recycling program, all users, including underserved populations, need access paired with education. North Carolina relies on educational materials such as infographics and printable signs to inform a broader audience. We also offer accepted recycling lists in Spanish, which is the most prevalent non-English language spoken in the state.

iv. **Expanding access to multifamily residences:** Multifamily residences, such as apartment buildings, are another commonly underserved population for recycling access. Significant efforts, including public-private partnerships, are needed to expand recycling access to the multifamily population.

v. **Funding:** Low-income and rural communities do not have the budget to expand recycling services. In North Carolina, the cost of public recycling programs is borne by residents – most recycling programs are funded through household fees, property taxes, or a combination of the two. Solid waste and recycling household fees have also increased over at least the last five fiscal years. In the short-term, low-income and rural communities need grants and financial assistance to offer recycling services since landfilling is often much less costly than recycling. Policy options that support funding mechanisms for recycling services could be considered. Examples include national or state landfill disposal surcharges where funds are allocated to support recycling programs and domestic market development, or policies where at least part of the burden of paying for recycling shifts from local governments/residents to the manufacturers that create the packaging.

vi. **Encouraging markets:** An important long-term solution is increasing demand of recycled materials. For any commodity, higher demand for recyclables will improve cost-effectiveness. The public sector can encourage private industry to utilize recyclable materials in production of new products. In addition, an increased and more robust commitment by both public and private sectors to purchase more recycled content products will also send an economic signal to the industry that there is an available market to tap into.

Senator CARPER. Thank you so much.
Ms. Elias.

STATEMENT OF ROBERTA ELIAS, DIRECTOR, POLICY AND GOVERNMENT AFFAIRS, WORLD WILDLIFE FUND

Ms. ELIAS. Thanks.

Again, my name is Roberta Elias, and I am the Director of Policy and Government Affairs at World Wildlife Fund. Thank you for the invitation to join today.

Fast moving consumer goods and packaging have become a fixture in all of our lives. Unfortunately, as the quantity of non-durable items has grown, so have production impacts and the presence of waste. Governance needs to catch up with changing realities.

The Nation's solid waste management laws were enacted before disposable items became so prevalent and before we fully understood the potential of recycling. Currently, 20,000 different municipalities govern the Nation's recycling programs, all with different requirements and outcomes. This creates too much uncertainty for industry and confusion for the public.

In fact, the No. 1 thing we have heard in conversations with industry is they want clear and consistent rules of the road. They also want assurances that there will be sufficient high quality recycled content to deliver on promises already made to consumers. The No. 1 thing we have heard in talking to the public, including conversations with many of you, is that the Nation's recycling system is inaccessible and way too confusing.

There are important challenges associated with production and disposal of all materials; however, I will focus the remainder of my framing remarks on plastics. This is because plastics constitute the newest and fastest growing material type. They have also so clearly captured the attention of the American public across demographics and party affiliations and of government leaders.

Mass production of plastics began in many of our lifetimes, only about 60 years ago. In that time, 8.3 billion metric tons of plastics have been generated. The vast majority of that 8.3 billion, or 75 percent, has become waste, and if we have a big challenge now, we will have a much bigger one very soon.

Global plastic production is expected to more than triple by 2050. This growth will account for a full 20 percent of all oil consumption or 10 percent to 13 percent of the entire carbon budget. The current recycling system, which is, again, disjointed across 20,000 municipalities, functions without clear goal posts at an economic disadvantage to landfills. It simply cannot process the sheer volume of stuff.

In the United States, only 34 percent of all municipal solid waste is recycled, and only 13 percent of plastic packaging. Only 2 percent of plastic packaging eschews circularity, where an old product becomes a new one again. The remaining 87 percent of all plastic packaging, our drinks, our snacks, the wrapping around the items shipped to our homes, is either landfilled, incinerated, or leaked into nature. Our favorite brands litter America's iconic landscapes. Eleven million metric tons of plastic enter the ocean each year, or about one dump truck per minute, 24/7, all year long.

Fortunately, there is real reason for hope. We have seen increasing information about the dramatic gains in efficiency and to conservation and health outcomes that can be achieved by shifting in use from virgin materials to recycled content.

Reduction and circularity are also good for business. The Pew Charitable Trusts estimated that the comparative cost of plastic leakage to the global economy between a business as usual scenario and a systems change scenario is over $2 trillion. They also concluded that if implemented appropriately, extended producer responsibility could generate over $12 million and save government $70 billion.

We commend both chambers, and particularly Senators Whitehouse, Menendez, and Sullivan, for the strong action already taken. It is time for the next step.

WWF and the American Beverage Association have drafted joint principles, submitted for the record, which outline key Federal policy priorities. Related concepts are also supported by our OneSource Coalition, including ABA and the beverages, plus Danone, Mars, Unilever, Closed Loop Partners, the National Recycling Coalition, and many others. Almost 900,000 WWF supporters have echoed this call for change.

The WWF and ABA principles reflect the very same concepts that you, Chairman Carper, and others have elevated many times in comments both to the EPA and at previous EPW hearings. The key concepts of the system, known as Extended Producer Responsibility, are phase outs of truly unnecessary and problematic materials, public-private funding mechanisms, accountability, and oversight tied to circular economy objectives, and provisions to achieve public health and environmental justice goals. We also hope a national deposit return system will be included in that system.

The Break Free From Plastic Pollution Act introduced by Senator Merkley—thank you, Senator Merkley—is the high water mark for EPR as articulated above. WWF, ABA, and many others support Break Free concepts. We hope that stand alone EPR legislation will ultimately pass.

We also hope that this chamber will make the most of moving vehicles, including to secure public-private investments in infrastructure, a national deposit return system, and a virgin plastic fee, such as that articulated in Senator Whitehouse's REDUCE Act.

Thank you for your leadership in moving this conversation forward. We are happy to assist in any way that we can as the dialogue continues.

[The prepared statement of Ms. Elias follows:]

Testimony for Senate Committee on Environment and Public Works

The Circular Economy as a Concept for Creating a More Sustainable Future

September 22, 2021

Roberta Elias, Director of Policy and Government Affairs, World Wildlife Fund

Thank you for the opportunity to testify before this committee on this important topic. Fast moving consumer goods and packaging – plastic, paper, aluminum, and glass – have become a fixture in all of our lives. Unfortunately, as the quantity of non-durable items has grown, so have production impacts, the presence of waste, and the awareness that we must do better.

From our conversations with experts, communities, and top domestic companies, it has become clear that both the public and industry want change and that the Federal government is best positioned to set that change in motion. The nation's solid waste management laws were enacted before disposable items became ubiquitous and before the full potential of recycling was understood, both as a key conservation tool and economic engine. Modern challenges require modern interventions.

Twenty thousand different municipalities currently govern the nation's recycling programs, all with different requirements and performance levels.[1] Congress should enact legislation that could be implemented flexibility across all fifty states and as dynamics change over time. Such a nationwide system would provide industry certainty in terms of both compliance and the quality and quantity of recycled content produced each year. It would also provide clarity for the American public currently baffled by a confusing and disjointed recycling system.

We envision a world where the amount of disposable production is reduced and where the end of a product's life is also the beginning of the next. This concept is known as the circular economy. To make it a reality, Congress should enact legislation to establish clear objectives and durable mechanisms for public-private funding, accountability, and oversight. Specifically, we are looking for a framework to prioritize reduction, refill, and reuse models and establish a system for extended producer responsibility (EPR) for all materials. EPR itself should include a national "bottle bill" or deposit return system (DRS). The national DRS element must ensure dedicated funding for purposes related to reduction, reuse, and recycling and equity for companies impacted both by DRS and other aspects of EPR. Additionally, Congress should address the potential budget impacts of a national DRS on states that already have a state level DRS in place that allows unredeemed deposits to be directed to purposes outside the scope of this issue set (i.e. to schools, roads etc). DRS provides unparalleled incentives for individuals and business to return materials to the system and, therefore, must be included in an overall package.

If we are successful going forward, we will no longer see our favorite brands littered in America's iconic landscapes; today's packaging will hold value rather than a momentary place in a stream of virgin material extraction; the public will have consistent access to an intuitive recycling system; and frontline communities will have clear assurances that public health and participation standards exist and are respected. A durable, profitable, green future is possible. Thank you for the opportunity to speak to it today.

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[1] https://recyclingpartnership.org/wp-content/uploads/2018/05/state-of-recycling-report-Jan2017.pdf

In my testimony, I will tell you a bit more about WWF, walk through our sense of the problem, and further outline our recommendations for a solution. On that last piece, I am pleased to be able to outline policy principles that were developed jointly by WWF and the American Beverage Association, the trade association representing America's non-alcoholic beverage industry.[2] These concepts are also supported by our OneSource Coalition[3], including ABA and the leading beverages plus Danone, Mars, Unilever, Closed Loop Partners, the National Recycling Coalition, and many others. WWF, as an organization, supports leveraging existing legislative opportunities as a step to secure momentum.

To step back a bit, let me tell you a bit about WWF as an organization and our work on the specific issues in front of us today. For 60 years, WWF has been protecting the future of people and nature. The world's leading conservation organization, WWF works in 100 countries and is supported by more than 1 million members in the United States and close to 5 million globally. WWF's unique way of working combines global reach with a foundation in science, involves action at every level from local to global, and ensures the delivery of innovative solutions that meet the needs of both people and nature.

In 2018, the global WWF family launched the No Plastics in Nature Initiative. WWF's No Plastic in Nature Initiative works across the life cycle of plastic to reduce the amount of new plastic produced, increase the reuse of plastic already in circulation, and eliminate leakage of plastic into nature. The initiative is built on three core pillars: global governance, business engagement, and plastic smart cities. WWF recognizes that materials production and disposal challenges are global. Addressing a problem of this scale will require global change, one that harnesses public and private sector influence to secure binding international commitments and strategic deployment of dollars and technical assistance.

In the US, the centerpiece of our work has been the ReSource: Plastic activation hub. WWF launched ReSource: Plastic in 2019 with five Principal Members – Keurig Dr Pepper, McDonald's Corporation, Procter & Gamble, Starbucks, and The Coca-Cola Company – and two Thought Partners – the Ellen MacArthur Foundation and Ocean Conservancy. Since then, we have welcomed three new partners: Amcor, Colgate-Palmolive, and Kimberly-Clark and released the inaugural report, *Transparent 2020*.[4] This report established a baseline of plastic use among members and launched the ReSource Footprint Tracker, the main analytical tool through which corporate action and progress are measured. ReSource's second annual report, *Transparent 2021*, is scheduled to be published in December 2021. Results from the first two years and continued tracking in future years will illuminate key challenges, help companies take effective action to reduce plastic waste, and measure progress over time.

WWF has also been engaged in domestic and global policy conversations around reduction, reuse, circularity, technical assistance, and capacity building. We commend both chambers for the strong action already taken, including Senators Whitehouse, Menendez, and Sullivan for spearheading passage of both the Save our Seas Act (S. 3508) and Save our Seas 2.0 (S. 1982). It is time for Congress to take the next step. In fact, recently, almost 900,000 WWF supporters called for government action to address the impacts of virgin materials production, the shortfalls in recyclability, recycling infrastructure, and consumer access, environmental justice, and the impacts of mismanaged disposal. Thank you for your leadership in furthering this much needed dialogue.

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[2] https://www.worldwildlife.org/publications/wwf-and-aba-joint-principles-for-reducing-materials-footprint-and-achieving-circularity

[3] OneSource Coalition *www.onesourcecoalition.org*

[4] Transparent 2020 *https://resource-plastic.com/pdf/Transparent2020.pdf*

The background portion of my testimony focuses on plastics. There are other direct and indirect impacts and ramifications that could be discussed related to the production and disposal of other materials and product types. These include conservation and human and labor rights challenges associated with deforestation, land conversion, and metal, sand, mineral, and ore mining, including rare earth elements.[5] Today, I will focus the remainder of my framing remarks specifically on plastics. This is because plastics constitute the newest and fastest growing material type in this space. They have also so clearly captured the attention of the American public, across demographics and party affiliations, and of government and industry leaders.

We have all seen the statistics around virgin plastics production, the disarray of recycling and solid waste management systems, and the amount and impact of plastic leakage into nature. Here are some of the most relevant data points.

Mass production of plastics began just six decades ago. In that time, 8.3 billion metric tons of plastic materials have been generated, with 75 % of this material or 6.3 billion metric tons becoming plastic waste.[6] Global plastic production is expected to more than triple by 2050, accounting for a full 20 percent of all oil consumption. Expanded production would generate 56 gigatons of greenhouse gas emissions or about 10-13 percent of the entire carbon budget.[7] Underserved communities are disproportionately impacted by emissions from production plants, landfills, and incinerators.

Only 34% of municipal solid waste is recycled annually in the United States and only 13 percent of plastic packaging.[8] Only 2 percent of plastic packaging achieves circularity.[9] Just 52% of homes have access to curbside recycling and the cost of disposal at a landfill remains a fraction of the cost at a recycling center. 1 in 7 homes do not have any access to the recycling system and 1 in 3 face serious challenges to access.[10] 11% of Americans recycle none of their plastic waste and 33% recycle a little or some, with access and uncertainty as the top reasons indicated for low return rates.[11]

The combination of unprecedented virgin production, limited refill and reuse opportunities, and extremely low recycling and circularity rates mean that plastics, in large quantities, end up diverted to landfills and incinerators or leaked into nature. And the problem perpetuates, as one set of virgin-

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[5] Rare earth elements (REEs) are critical to the function of our most commonly used technologies, such as computer hardware, cell phones, televisions, vehicles, solar panels, medical tools, military hardware, and wind turbines. However, REEs are difficult to mine and process as these elements are scattered across every continent and throughout the ocean floor but in very low concentrations and are often found mixed with other elements. These factors result in both significant conservation and labor impacts and challenges.

[6] "Banning single-use plastic: lessons and experiences from countries" UN Environment report (2018) *https://www.unep.org/interactive/beat-plastic-pollution/*

[7] "Plastic & Climate: The Hidden Costs of a Plastic Planet" Center for International Environmental Law (2019) *https://www.ciel.org/reports/plastic-health-the-hidden-costs-of-a-plastic-planet-may-2019/*

[8] "Advancing Sustainable Materials Management: 2018 Fact Sheet" Environmental Protection Agency (2020) *https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf*

[9] "State of Curbside Recycling Report" The Recycling Partnership (2020) *https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2020/02/2020-State-of-Curbside-Recycling.pdf*

[10] "How Americans View the Plastic Problem" World Wildlife Fund (2021) *https://www.worldwildlife.org/blogs/sustainability-works/posts/how-americans-view-the-plastic-problem#:~:text=World%20Wildlife%20Fund%20has%20been,reduce%20our%20reliance%20on%20plastic*.

[11] Ibid.

produced items is replaced by the next. Plastics have been found in our air, water, soil, and food.[12] Every year, 11 million metric tons of plastic enter the ocean.[13] At current rates, by 2050, waste in the oceans will weigh more than all of the finfish combined and 99% of seabirds will have ingested plastic.[14]

In contrast to these troublesome statistics, there is real reason for hope. We have seen increasing information about the dramatic gains in efficiency, conservation, and public health that can be achieved by shifting production and use from virgin materials to recycled content. In fact, a recent Association of Plastic Recyclers report concluded that production of recycled resins reduced total energy consumption by 79% for PET, 88% for HDPE and 88% for Polypropylene.[15] These results hold for energy and water consumption, smog formation, solid waste outputs, and carbon emissions.

Reduction and circularity are also good for business. The Pew Charitable Trusts estimated that the total cost of plastic leakage to the global economy is over $2 trillion.[16] They also concluded that EPR systems could generate over 12 million domestic jobs and save the US government $600 billion.[17]

The American public wants to get to this better place. Recent public opinion polling, commissioned by WWF, demonstrates that the public is concerned and expects the government and companies to do better.[18] 77% of the public believes that too many products are made of plastic and that the problem is becoming unavoidable. 86% of Americans agree we need to transition from an economy relying on virgin material and single-use products to one that leads in recycling rates. 68% of the public believes that companies that produce plastic need to help pay for recycling system upgrades. Out of a suite of proposed regulatory systems, deposit return systems, reusable bag credits, recycled content mandates, and single-use phase outs all received positive public support.[19]

The status quo, both in terms of production and leakage, jeopardizes conservation needs and public health outcomes. Change is possible. If pursued appropriately, it will improve conservation and health results, increase resource efficiency, and spur economic growth. The American public expects no less.

WWF hopes that today's conversation will set the stage for refinement and passage of smart policies and incentives – to emphasize reduction, reuse, and refill systems and set the stage for a circular economy. WWF and ABA have drafted joint principles that outline how US laws or regulations could reduce the overall materials footprint and achieve circularity. These principles echo the very same concepts Chairman Carper and others have elevated many times, including through comments to the

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[12] https://oceanconservancy.org/trash-free-seas/plastics-in-the-ocean/ and https://www.iucn.org/resources/issues-briefs/marine-plastics

[13] "Marine Plastics" International Union for Conservation of Nature (2018) *https://www.iucn.org/sites/dev/files/marine_plastics_issues_brief_final_0.pdf*

[14] Ibid.

[15] "Association of Plastic Recyclers Report: Use of Recycled Platic Linked to Reduced Energy Consumption, Lower Greenhouse Gas Emissions" Association of Plastic Recyclers (2018) *https://plasticsrecycling.org/images/Press_Releases/APR_LCI_Report_release_January2019.pdf*

[16] "Breaking the Plastic Wave: Top Findings For Preventing Plastic Pollution" PEW (2020) *https://www.pewtrusts.org/en/research-and-analysis/articles/2020/07/23/breaking-the-plastic-wave-top-findings*

[17] Ibid.

[18] "How Americans View the Plastic Problem" World Wildlife Fund (2021) *https://www.worldwildlife.org/blogs/sustainability-works/posts/how-americans-view-the-plastic-problem#:~:text=World%20Wildlife%20Fund%20has%20been,reduce%20our%20reliance%20on%20plastic*.

[19] Ibid.

EPA and across two previous hearings before this committee. The key concepts of this system, known as Extended Producer Responsibility (EPR), are phase-outs of truly unnecessary and problematic materials; public/private funding mechanisms and accountability to drive an efficient circular economy based on numeric targets for recyclability, materials recovery, and use of recycled content; and mechanisms to achieve public health and environmental justice objectives. A well-structured, nationwide deposit return system should be incorporated in that EPR model. Additionally, WWF supports US leadership globally to ensure our waste is not exported to nations least able to manage it and that sufficient resources and technical assistance are directed to high leakage areas.

The Break Free From Plastic Pollution Act (BFFPPA, S. 984), introduced on March 25th by Senator Merkley, is the high water mark for EPR as articulated above. WWF, ABA, and many others support BFFPPA concepts. WWF is hopeful that standalone EPR legislation will ultimately pass, but we also recognize the importance of seizing the moment. We hope this Chamber will make the most of moving vehicles to advance progress, particularly where Congress can move forward with a degree of certainty that the change we want to see can be achieved through that vehicle. Our current sense of relevant elements that could be enacted this way include public-private investments in infrastructure, a national deposit return system, and virgin plastic fees such as those articulated in Senator Whitehouse's REDUCE Act (S. 2645).

WWF business partners and key industry voices have made major commitments to measuring and reducing their materials footprint and using recycled content. If these commitments are to be realized, Congress must enact the necessary legislative foundation – to set the rules of the road in a way that can be implemented flexibly across all 50 states and provide certainty and consistency for industry and the public. Thank you for your leadership in moving this conversation forward. We are happy to assist in any way that we can as this dialogue continues.





WWF and ABA Joint Principles for Reducing Materials Footprint and Achieving Circularity

The public is increasingly aware of the environmental, social, and economic impacts of fast-moving consumer good production and disposal. These costs include the conservation impacts of virgin material production, including the significant contribution of virgin plastic production to the global carbon footprint, materials leakage into all environments through mismanaged disposal, disproportionate siting of landfills and under-regulated virgin plastic production facilities in historically underserved and marginalized communities, and imbalanced and incomplete access to recycling.

Underlying and enabling these impacts is a linear economy built on inefficient market signals that favor both overproduction and reliance on virgin materials over recycled content. A transition to a more circular economy would benefit job quality, environmental standards, and public health.

While the scope of current concerns is troubling, the necessary changes are relatively straightforward. There is growing consensus across sectors that these changes are both necessary to achieve stated objectives and actionable by affected industry. WWF and ABA would like to work with Congress and the Administration to build a consistent and flexible Federal framework to reduce the current materials footprint and to achieve circularity. Our groups believe that such a system should reduce truly unnecessary material use and replace that use, where appropriate, with sustainable alternatives; produce results that are in line with environmental justice and public health objectives; and establish the necessary incentives, standards, and public/private funding mechanisms to drive an efficient circular economy.

The recommendations below focus specifically on what our groups see as the linchpin for creating such a circular economy: Extended Producer Responsibility (EPR).

The Current Situation

Inadequate investment, tight municipal budgets, and a patchwork of solid waste management regulation across more than 20,000 local jurisdictions have led to inconsistent performance and lack of accountability. As a result, recycling programs in the U.S. range from very high-performing to very low-performing with low recycling rates overall. For instance, today, 13 percent of plastic packaging is recycled in the US, while globally eight percent of plastic packaging is recycled and only two percent achieves circularity. A focused effort to bring substandard programs up to a high-performance level nationally would dramatically increase material recovery; expand the recycling industry; and reduce environmental, social, and economic costs. WWF and ABA believe that EPR has a crucial role to play to realign incentives

to favor high quality recycled content production over virgin production and to finance the infrastructure to supply industry with material needed to fuel a circular economy.

Extended Producer Responsibility Systems
Based on our global observations and experience with holistic EPR systems, WWF and ABA have developed the following principles and parameters for EPR programs. A flexible EPR framework, sensitive to regional differences, would ideally be established at the Federal level. This framework would steer the transition from a linear to circular economy nationally and link policies to increase the quality and quantity of recyclables collected with goals for use of those materials in new products. This means establishing material-specific, numeric targets for recyclability, recovery, and use of recycled content. The EPR framework should optimize the performance of recovery systems and promote coordination with related initiatives such as tipping fee surcharges, deposit return systems, and new infrastructure financing programs.

The overarching principles for a successful system are:

- Generate strong environmental, social, and economic outcomes in an efficient and accountable manner
- Provide convenient service to consumers
- Create a financially sustainable model
- Offer producers access to recovered material for closed loop recycling
- Support environmental justice objectives in recycling systems

Program Parameters

- **Clear scope of products affected and programs funded**

  - Products include all types of consumer goods packaging and printed paper with products labeled clearly, simply, and consistently for consumers to indicate recyclability and the appropriate manner for disposal and recycling. The list of materials that can be recycled is consistent across the jurisdiction.

  - The program funds 100 percent of the net cost (net of scrap value) for residential recycling of packaging and printed paper including both single- and multi-family dwellings and including education and outreach programs. Excludes costs for industrial, commercial, and institutional waste management and for disposal of residential material.

  - Legislation states overall program performance objectives, with initial recovery targets for packaging and printed paper of 50 to 60 percent depending on the region and ramping up over time, recyclability goals to both eliminate package components that hinder recycling and encourage design for recycling, and recycled content requirements that complement program objectives.

- **Centralized program management**

  - A single, non-profit Producer Responsibility Organization (PRO) – composed of the responsible parties that create any covered product for commercial use, sale or distribution – manages the funding system for the entire jurisdiction, with professional staff answerable to a producer-led board of directors. Complementary systems such as

deposit return programs could have their own PRO and should work together to maximize overall system performance.

- The PRO develops and implements a plan to achieve the program goals stated in legislation, developed in consultation with other stakeholders and usually mapped out over five to seven years. The legislation spells out timeframes and parameters for regular plan updates and review.

- After plan approval, the PRO sets fees for producers following the cost principles below, implements needed recycling system changes, coordinates infrastructure financing sources to modernize systems, establishes funding and reimbursement arrangements with recyclers, evaluates and reports on performance, and markets recycled materials. Obligated producers have right of first refusal to their share of recovered material at market terms.

- The PRO does not typically operate recovery vehicles and facilities, but contracts for those services either directly or through reimbursement of private sector or municipal costs to provide the services.

- **Transparent cost principles**

  - The PRO sets producer fees by material type (*e.g.,* PET, aluminum, corrugated cardboard) based on the cost to recycle the material minus its value in the scrap market. Because costs and commodity values change over time, fees are reset typically once per year.

  - Producers pay fees based on these net costs with fees assessed based on the weight of various materials sold, with a *de minimis* threshold set to relieve the smallest producers of obligation. Producers typically update sales annually and the data is treated confidentially.

  - The PRO modifies fees based on environmental and social factors (*i.e.,* eco-modulation) to incentivize product design decisions. Fee reductions might be considered, for instance, for products that are the most recyclable, contain recycled content, or have a low carbon footprint. Surcharges (disruptor fees) may apply to difficult to recycle materials with the highest fees charged to materials that cannot be recycled.

  - The overhead costs of running the PRO and the government's cost of rulemaking, oversight, and enforcement are also embedded in the producer fees.

- **Defined role for government**

  - Enabling legislation sets the scope of the program and its goals to assure a level playing field among producers of consumer goods packaging and printed paper. The legislation also specifies the role for government and how those activities are funded.

  - The designated government agency evaluates and approves the PRO's plan for achieving program goals, monitors program progress, and provides enforcement.

- Government agency costs for rulemaking, plan approval, oversight, and enforcement activities are reimbursed by the PRO, with those costs embedded in the producer fees. No additional government funds are drawn from the producer organization, other than reimbursements to local and regional governments for recycling services as noted above. The amount of government reimbursement is publicly available as is the way government funds are allocated.

Senate Committee on Environment and Public Works
Hearing Entitled, *"The Circular Economy as a Concept for Creating a More Sustainable Future"*
September 22, 2021
Questions for the Record for Roberta Elias

Senator Carper:

1. The American Beverage Association and others within the plastics industry have been supportive of the policy you discussed that would create an Extended Producer Responsibility program at the national level. While these policies are gaining traction, and we have even seen the adoption of such policies at the state level in Maine and Oregon, there doesn't seem to be a consensus with respect to the role of the federal government in creating and financing such a program

   Do you believe that companies should shoulder their fair share of costs associated with creating an Extended Producer Responsibility program?

Roberta Elias:

Companies, including the American Beverage Association and the members of the OneSource Coalition, support investing private dollars in the nation's recycling system, through a federally established extended producer responsibility (EPR) framework. WWF agrees with this position.

The Federal government should establish a flexible framework that can be implemented across all 50 states to address what is a national problem and opportunity. This framework should direct private investments, tied to systems to ensure success, to all 50 states in amounts and for purposes that will work for those places.

Federal legislation and/or regulations should detail methods to phase out truly unnecessary and problematic materials and products and establish an EPR system. EPR should include clear objectives for recyclability, recovery, and recycled content and durable mechanisms for public-private funding, accountability, oversight, and participation. These objectives should be linked to a fee structure, supplied by private industry and reviewed and approved by relevant entities, in such a way to incentivize a transition from high impact and difficult to recycle materials to lower impact and easier to recycle ones and to spur investments in improved collection and recycling methods. These emerging and innovative methods must comply with environmental and public health standards before moving forward, including ones prescribed specifically before those improved methods potentially enter the marketplace.

EPR itself should include a national "bottle bill" or deposit return system (DRS). The national DRS element must ensure dedicated funding for purposes related to reduction, reuse, and recycling and equity for companies impacted both by DRS and other aspects of EPR. Additionally, Congress should address the potential budget impacts of a national DRS on states that already have a state level DRS in place that allows unredeemed deposits to be directed to purposes outside the scope of this issue set (i.e. to schools, roads etc). DRS provides unparalleled incentives for individuals and business to return materials to the system and,

therefore, must be included in an overall package.

It is unrealistic to think that there will ever be sufficient Federal dollars to support establishment and maintenance of a circular economy. Reduction and reuse models must be part of the puzzle to reduce the volume of materials entering that circle. Private dollars, recognizing private responsibility for the problem and private needs to recoup high quality recycled content, must be part of the solution. Right now, virgin materials are artificially inexpensive, in large part because of existing publicly funded subsidies. Arguments for following market signals, raised during the hearing itself, cannot be pursued until market distortions are addressed, including through aligning standards and implementing systems for ecomodulation. This vision is the best way to achieve a durable materials base for producers and to meet the needs of all citizens, from Alaska to West Virginia and Delaware, and everywhere in between.

2. As you know, many companies are moving towards the use of recycled plastics, but virgin resin used to create new plastics is still the predominant material used in making packaging. As we work to promote products made from recycled materials, we need to find ways to make recycled plastic feedstock accessible and cost-effective for manufacturers and the general public. Additionally, the production of plastic generates greenhouse gas, significantly contributing to our ever-growing climate crisis, so the reduction of virgin resin is of the utmost importance.

   What other measures could be taken to ensure that recycled plastic, as opposed to virgin resin, is a more cost-effective choice for companies who rely on plastic packaging?

Roberta Elias:

WWF agrees with statements included in the first part of this question. We alluded to many of the necessary components of a solution in our response to question one. The existing marketplace for virgin materials production and use has been manipulated by infusions of public capital, including through oil subsidies. Recycled plastics retain the value of natural resources already extracted and perform significantly better than virgin materials in terms of both production inputs and environmental and public health impacts. Existing distortions to the plastics marketplace should be addressed to improve efficiencies, ensure a durable materials base for the creation of products going forward, and improve conservation and public health outcomes. Potential solutions include virgin plastic fees, such as those articulated in Senator Whitehouse's REDUCE Act, tax credits for recycled content production and use, and a Federal EPR system tied to standards, ecomodulation goals, and private investments.

3. There are barriers to accessing adequate recycling services that many minority, low-income, and rural communities face. You shared with us that one in seven homes do not have any access to the recycling system and one in three homes face serious challenges to accessing curbside or other easily accessible recycling programs.

Given that the transition to a truly circular economy would require participation by everyone in our society, how can we work together to ensure that individuals of every income level have access to recycling services?

Roberta Elias:

Again, I think this comes down to available financial resources and the sidebars that would generally govern allowable uses for that funding. Senator Sullivan brought up the needs of certain communities in Alaska during the hearing itself. We have heard expressions of similar concerns from other members and have heard frustrations from the public itself. WWF is not the appropriate entity to say exactly what will work across our country. We do know that no matter what, recycling needs to be easy. That means four basic goals must be achieved: the amount of single use stuff entering people's home must go down, recycling methods must be logical, consistent, and user friendly, collection must be easily accessible for everyone, and the public must have confidence that the products entering the recycling system will in fact be recycled and achieve circularity. These goals can be achieved by a Federal framework for reduction, reuse, and refill and a flexible EPR system that will direct sufficient resources to all communities tied to standards to produce results.

Senator CARPER. Thank you for your testimony. Thanks very much for your efforts and those of those you represent here today.

Next, we are going to hear from Brian Hawkinson.

Brian, please proceed. Thank you.

STATEMENT OF BRIAN HAWKINSON, EXECUTIVE DIRECTOR, RECOVERED FIBER, AMERICAN FOREST AND PAPER ASSOCIATION

Mr. HAWKINSON. Chairman Carper, Ranking Member Capito, distinguished members of the Committee, thank you very much for the opportunity to talk with you about this important issue today.

I am pleased to share some thoughts on the pulp paper and paper packaging industry's commitment to sustainable practices and share an example of an innovative technology that is increasing the use of recovered paper in manufacturing new products.

To provide some context for my remarks, I would like to tell you a little bit about the U.S. paper pulp and wood products industry. In the U.S., the industry employs approximately 950,000 men and women, operates 335 paper and paper board mills, more than 4,000 converting facilities, more than a hundred recycling facilities, manufactures nearly $300 billion in products annually, and represents approximately 4 percent of the total U.S. GDP.

We have long been responsible stewards of our planet's resources. AF&PA's sustainability initiative, Better Practices, Better Planet 2030, comprises one of the most extensive, quantifiable sets of sustainability goals for a U.S. manufacturing industry, and is the latest example of our members' proactive commitment to the long term success of our industry, our communities, and the environment.

Sustainable practices and innovative technologies are in the industry's DNA. Chairman Carper, I appreciate your recognition that about two-thirds of all the paper used in the U.S. is recycled annually. That turned out to be about 47 million tons in 2020. That is recycled to make new, sustainable paper and paper based packaging products people use every day.

The industry aims to advance a circular value chain and continue to improve the sustainability of our products to meet evolving customer needs. This includes innovating manufacturing processes, products, and packaging and increasing utilization of recovered fiber and wood residuals in manufacturing across the industry to 50 percent by 2030.

The industry has announced approximately $500 billion in manufacturing infrastructure investments by 2023 to continue the best use of recovered fiber in manufacturing products. That is about $2.5 million per day, and those investments are going to enable the industry to use approximately 8 million additional tons of recovered fiber in manufacturing throughout that period and going forward.

This morning, I would like to share an example of an innovative technology. Ranking Member Capito, thanks for pointing that out. It is called Juno, from one of our members, Georgia-Pacific, and it enables them to recover paper that would otherwise go to landfills and use it to manufacture new products.

More than 10 years ago, a team at GP considered the paper that ends up in U.S. landfills and started looking for a way to capture more of that for use. The initial focus was on paper cups, which have traditionally been harder to recycle because of the poly lining that keeps the contents from leaking. The team was able to successfully recover paper fiber from those cups but realized there are some supply chain challenges to collecting only paper cups.

So, they expanded the scope of the project to collect more paper based waste from fast food restaurants and amusement parks, other facilities, things like cups, napkins, food wrappers, et cetera. A pilot plant was built in Savannah, Georgia, in 2013. That plant has successfully processed waste generated in all those facilities: Fast food restaurants, airports, et cetera.

From there, the team designed and engineered a commercial skill unit and secured permits to build the first processing unit in Toledo, Oregon. The Toledo facility began startup operations this past May and is currently processing waste from the region.

The Juno technology process starts with collecting waste from those kinds of commercial resources that typically have the highest concentration of paper based material. It is important to note that the material collected for this doesn't pull recycling away from other streams. This is waste that would otherwise be destined to a landfill or an incinerator.

The material is baled and transported and fed into the Juno processing unit. The unit is an autoclave that uses steam and pressure to sanitize the material. It is essentially the same kind of technology that is commonly used in the medical industry. The proprietary Juno process sanitizes the waste and separates the paper fiber.

The fiber recovered through the Juno process is currently being used to make paper for corrugated boxes in GP's Toledo containerboard mill and has also been made to use napkins and paper towels in other company facilities. Other recyclable materials processed are able to go back into their respective recycling markets. Anything that cannot be recycled then goes to the landfill. Based on the work so far, GP expects about 90 percent of what is processed can be diverted from landfills.

As you would expect with a new technology, the team has planned a slow start to allow for adjustments from operating a small pilot plant to a large commercial unit that will process about 100,000 tons per year. Early in the phased start up, the diversion rate, and this is from July this year, for locally sourced waste tripled from about 18 percent to 54 percent. These results are early estimates. They are going to be audited, but it gives you a sense for the ability for this to scale up and perform better.

This first commercial scale unit in Toledo is expected to be fully operational by the end of the year. Conversations are underway for licensing other units in the U.S. and globally.

Georgia-Pacific and the industry are excited about the new technology's ability to recover more paper from the waste stream and use it in manufacturing new paper and paper based products.

Thank you very much, and I look forward to the discussion.

[The prepared statement of Mr. Hawkinson follows:]

American Forest & Paper Association

Written Testimony of Brian Hawkinson
Executive Director, Recovered Fiber, American Forest & Paper Association
Before the United States Senate
Committee on Environment and Public Works
Hearing on "The Circular Economy as a Concept for Creating a More Sustainable Future"
September 22, 2021

Chairman Carper, Ranking Member Capito and distinguished members of the Committee, thank you for the opportunity to speak today. I am pleased to share some thoughts on the pulp, paper and paper packaging industry's commitment to sustainable practices and share an example of an innovative technology that is increasing the use of recovered paper in manufacturing new products.

My name is Brian Hawkinson, and I serve as Executive Director, Recovered Fiber, at the American Forest & Paper Association (AF&PA). AF&PA serves to advance U.S. paper and wood products manufacturers through fact-based public policy and marketplace advocacy.

The forest products industry is circular by nature. AF&PA member companies make essential products from renewable and recycle resources, generate renewable bioenergy and are committed to continuous improvement through the industry's sustainability initiative — *Better Practices, Better Planet 2030: Sustainable Products for a Sustainable Future.*

The forest products industry is a major economic force for U.S. manufacturing. Employing approximately 950,000 people, the industry is among the top 10 manufacturing sector employers in 45 states, supporting family-wage jobs and manufacturing nearly $300 billion in products annually.

AF&PA's Sustainability Initiative
AF&PA's sustainability initiative — *Better Practices, Better Planet 2030: Sustainable Products for a Sustainable Future* — comprises one of the most extensive quantifiable sets of sustainability goals for a U.S. manufacturing industry. It is the latest example of our members' proactive commitment to the long-term success of our industry, our communities and our environment.

We have long been responsible stewards of our planet's resources. AF&PA members met or surpassed many of the goals outlined in our previous sustainability initiative, *Better Practices, Better Planet 2020*, including a 23.2 percent reduction in GHG emissions; 13.3 percent improvement in purchased energy efficiency; 38.4 percent reduction in workplace injuries; and 12 percentage point increase in wood fiber procurement from certified forestlands.

Our Industry is Essential and Circular

Paper – and recycled paper – are made from a renewable resource and used in a wide range of products with endless everyday applications in homes, schools, and businesses, from newspapers to note pads, tissues to paper towels, coffee cups to milk cartons, and diapers to cardboard boxes.

The paper and wood products industry maximizes the use of our renewable resources by using every part of the tree to develop products and support the industry's manufacturing processes.

- Various parts of the tree are used to make everything from wood used for building lumber, flooring and furniture to paper products like writing paper, paper bags, cardboard boxes and paper towels.
- Leftover materials, like tree bark and liquid bioenergy extracted during the pulping process, are used to generate renewable bioenergy that powers our mills. [1]

Paper Recycling Works

Paper products are easily recyclable via curbside recycling bins or drop-off programs.

Thanks to improved consumer education and the widespread availability of curbside recycling for paper products, the paper and wood products industry recycles nearly twice as much paper today as it did 35 years ago[2].

- Nearly 66 percent of paper used in the U.S. was recycled in 2020, including nearly 89 percent of all cardboard boxes and corrugated containers. [3]
- Two-thirds of the paper used in the U.S., about 47 million tons each year, is recycled[4] and used to make new sustainable paper products people use every day.
- Recycled paper and packaging fibers can be reused five to seven times to make new products[5].
- Approximately 80 percent of U.S. paper mills use some recycled paper fiber to make products like packaging, office paper, newspaper, toilet paper, napkins and paper towels.[6]

The industry aims to advance a circular value chain and continue to improve the sustainability of our products to meet evolving consumer needs. This includes innovating manufacturing processes, products and packaging. And increasing the utilization of recycled fiber and wood residuals in manufacturing across the industry to 50 percent by 2030.

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[1] The sustainable use of residual, leftover material from the manufacturing process as renewable bioenergy to power paper mills prevents about 181 million metric tons of carbon dioxide equivalent annually from entering the atmosphere – the same as removing 35 million cars from the road.

[2] AF&PA

[3] More paper is recycled by weight from municipal waste streams than plastic, glass, steel and aluminum combined.

[4] AF&PA Annual Statistical Summary of Recovered paper Utilization, 35th Edition, June 2021.

[5] TAPPI, How is Paper Recycled? (Paper U, Earth Answers: 2001). https://tappi.org

[6] Currently, the use of recycled paper fiber already prevents 20 million metric tons of additional greenhouse gas emissions.

It also means continuing to make investments. The industry has announced approximately $5 billion in manufacturing infrastructure investments by 2023 to continue the best use of recycled paper in our products. That is nearly $2.5 million per day. Those investments will enable the industry to use an additional 8 million tons of recovered fiber in manufacturing annually.

Georgia-Pacific Juno Overview
Today, I will share an example of an innovative new technology, called Juno, that enables one of our members – Georgia-Pacific – to recover paper that would otherwise go to landfills and use it to manufacture new products.

More than 10 years ago, a team at paper products producer Georgia-Pacific found that approximately 25 million tons/year of paper ends up in U.S. landfills. The team started looking for a way to capture some of that fiber for reuse.

The initial focus was on paper cups, which have traditionally been harder to recycle because of the poly lining that keeps them from leaking. The team was able to successfully recover paper fiber from the used paper cups but realized there are supply chain challenges to collecting only paper cups.

The scope of the project expanded to all waste from fast food restaurants and amusement parks – cups, napkins, food wrappers, etc. – and found a viable solution. A pilot plant was built in Savannah, Georgia in 2013. That plant has successfully processed waste generated in fast food restaurants, airports, office buildings, as well as amusement parks. From there, the team designed and engineered a commercial scale unit and secured permits to build the first processing unit in Toledo, Oregon. The Toledo facility began start-up operations this past May and is currently processing waste from the region.

How the Juno Technology Works
The Juno technology process starts with collecting waste from the kinds of commercial sources that typically have the highest concentration of paper-based material – fast-food restaurants, airports, office buildings, etc. It is important to note that no current recycling is diverted. Juno takes material from waste streams that is otherwise destined for landfills or incinerators.

The material is baled for transport and fed into the Juno processing unit. The unit is an autoclave that uses steam and pressure to sanitize material. It is the same technology that is commonly used in the medical industry. The proprietary Juno process sanitizes the waste and separates the paper fiber.

The fiber recovered through the Juno process is currently used to make paper for corrugated boxes at Georgia-Pacific's Toledo containerboard mill and has been used in manufacturing paper towels and napkins. Other recyclable materials processed can go back into their respective recycling markets. Anything that cannot be recycled then goes to the landfill. Based

on work so far, Georgia-Pacific expects about 90 percent of what is processed can be diverted from landfills.

Initial Results and Path Forward
As you would expect with a new technology, the team has planned a slow start-up to allow for adjustments from operating a small pilot plant to a large commercial unit that will process 100,000 tons/year. Early in the phased start-up, the diversion rate (in July 2021) for locally sourced waste tripled – from 18 percent to 54 percent. These results are early estimates and are in the process of being audited.

The first commercial-scale unit in Toledo is expected to be fully operational by the end of the year. Conversations are underway for licensing other units in the U.S. and globally.

Georgia-Pacific and the industry are excited about this new technology's ability to recover more paper from waste streams for use in manufacturing new paper and paper-based packaging.

AF&PA Members Believe

- Free markets unleash the forces of innovation that drive improvements in sustainable manufacturing processes, products and packaging and are best positioned to ensure that recovered paper is put to its highest value end use.
- Consumer education is a critical tool to increasing the quantity and quality of paper in the recycling stream. AF&PA supports the RECYCLE Act which authorizes a new grant program at the Environmental Protection Agency to provide recycling education to consumers and we applaud its inclusion in the Senate-passed bipartisan infrastructure package.
- For recovered paper, where end markets are mature and recycling is driven by robust private sector investment, recycled content mandates and extended producer responsibility are not only unnecessary, but they could also have unintended negative consequences on our current recycling successes.
- Government incentives or directives should not be used to divert commonly recycled paper away from reuse in manufacturing products.

Thank you again for the opportunity to share AF&PA's perspectives with the committee. I look forward to the discussion.

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Hearing Entitled, *"The Circular Economy as a Concept for Creating a More Sustainable Future"*
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Questions for the Record for Brian Hawkinson

Senator Inhofe:

1. Mr. Hawkinson, the coronavirus pandemic underscored how important paper and plastic single-use products are for everyday life. Last year, a number of grocery stores prevented customers from bringing in re-usable bags – instead directing them to utilize single-use paper and plastic bags in an effort to avoid possible COVID-infection transmission. Some states and localities have imposed restrictions, or outright bans, on single-use paper and plastic bags while some others have imposed taxes for each individual bag used. You said in your testimony that recycled content mandates are both unnecessary and could have unintended negative consequences on current recycling successes. What are those unintended negative consequences that would result from bans on single-use paper products and recycled content mandates?

Answer:

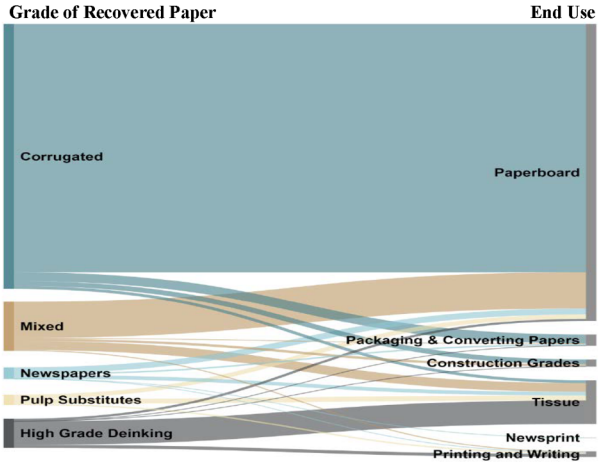
Recycled content mandates arose as a way to stimulate demand for recyclable materials in manufacturing new products. They may work for products that do not have an established collection infrastructure or have low recycling rates, but neither of those conditions apply to paper and paper-based packaging.

Paper is a recycling success. The paper recycling rate has grown over the decades, and remains consistently high, meeting or exceeding 63 percent since 2009.[1] The paper recovery rate in the U.S. was 66.2 percent in 2019 and has met or exceeded 63 percent every year since 2009. Paper recycling success is the result of consumer education, the wide availability of recycling programs, and the efforts of millions of Americans who recycle at home, work, and school every day. In 2020 – an unprecedented year of shutdowns, business changes, and temporary recycling halts – the recovery rate only decreased half a point to 65.7 percent. This speaks to the strength and resilience of the paper and paper-based packaging recovery while technological innovations in product design and recycling processes are continuously allowing our industry to access and recycle more paper-based products.

With such a high recycling rate, higher recycled content mandates will not appreciably increase paper recycling. However, the mandates will interfere with the efficient market-based allocation of recovered paper, forcing it away from the products where it is best used. The graph below depicts the allocation of the five major grades of recovered fiber in 2020 to their respective end uses in manufacturing different types of paper and paper-based packaging.

[1] https://www.paperrecycles.org/media/news/2020/05/12/u.s.-paper-industry-achieves-consistently-high-recycling-rate

2020 U.S. Recovered Fiber Consumption by End Use



Source: AF&PA Statistics

For example, copy paper is often cited as a place to impose increased recycled content mandates. However, copy paper competes with tissue for the same kind of recovered paper (High Grade Deinking, shown in gray in the graph above) as a feedstock. If increased recycled content mandates were to push more recovered paper into copy paper (one component of the Printing and Writing end use shown above), then tissue manufacturers would have to find other fiber to make up the difference – largely with virgin market pulp.

Copy paper manufacturers would incur higher costs to source and transport the recovered paper they would be required to use in their products. In addition, they would have to increase the amount of processing the fiber undergoes to make it suitable for use in copy paper. This would create both negative economic and environmental impacts.

The system-wide consequences of replacing virgin fiber with recycled fiber in printing papers were examined in a case study using the *Dynamic Fiber Flows Model*, developed by researchers at MIT. The case study concludes that increasing recycled content is printing paper would shift fiber away from the tissue sector, which shares the same recovered paper sources, forcing more virgin fiber in tissue products and increasing the fossil fuel GHG emissions.

AF&PA advocates against bans on single-use paper products and paper bag taxes. Paper and recycled paper products are essential to modern life. Paper – and recycled paper – are made from renewable resources and used in a wide range of products with endless everyday applications in homes, schools, and businesses, from newspapers to note pads, tissues to paper towels, coffee cups to milk cartons, and diapers to cardboard boxes.

As we continue to respond to the COVID pandemic, it is critically important that hygiene opportunities are easy to access. Consumers need a safe packaging option to protect their essential purchases from damage and contamination. Paper bags are a clean, hygienic, and convenient choice to meet those needs. Paper bags should be excluded from measures to tax retail bags because they wrongfully penalize our product—a commodity that is reusable, recyclable, compostable, and made of recycled material. Taxes and fees on paper bags burden hard working citizens, increasing the cost of basic necessities for all citizens and disproportionately impacting those who are low-income.

Senator CARPER. Thank you. Thanks for a very encouraging presentation. Thank you.

Next, we are going to hear from Mr. Billy Johnson.

Billy, you are recognized, please.

STATEMENT OF WILLIAM "BILLY" JOHNSON, CHIEF LOBBYIST, INSTITUTE OF SCRAP RECYCLING INDUSTRIES

Mr. JOHNSON. Thank you very much.

Good morning, Chairman Carper and Ranking Member Capito and members of the Committee.

My name is Billy Johnson, and I am the Chief Lobbyist for the Institute of Scrap Recycling Industries, or ISRI, as we are better known around Washington.

It is an honor to be before you today to discuss the important role of recycling, since recycling is an essential solution to supply our domestic and global supply chains with sustainable raw material feedstocks that help combat climate change, conserve our natural resources, and save energy, while employing hundreds of thousands of American workers.

ISRI is the voice of the recycling industry. We promote safe, economically sustainable, and environmentally responsible recycling, with over 1,300 members domestically as well as internationally, with over 4,000 facilities in the United States. We are referred to sometimes, we could be thought of as we are the ants at the picnic. We are everywhere.

Recycling in the United States is an important economic engine and job creator. The recycling industry directly employs more than 164,000 Americans while generating over $110 billion in economic activity. These numbers tell the story of a strong U.S. recycling industry, but not one without challenges in key segments. To understand these challenges, it is important to first understand what makes for successful recycling.

First, successful recycling requires market demand. If there is no end market to utilize recyclable materials that are collected, they will not be recycled and used again in manufacturing, regardless of the volume of material collected. Collection without market consumption is just not recycling.

Second, successful recycling requires minimal contamination, as recyclables are products sold by specification grade with a corresponding value and marketability directly related to quality.

Recycling in the U.S. involves far more than what is placed in the blue bin or cart at the end of the driveway. The recycling infrastructure in the U.S. touches almost every part of our economy, from retail stores, office complexes, residential neighborhoods, schools, factories, and even military bases.

The vast majority of the recycled material that flows through the recycling infrastructure does so without any problems and is transformed by recyclers into clean, high quality, commodity grade product used throughout the world as a substitute for virgin materials.

Specifically, what makes the residential stream so different is that while it is subject to the same demand driven end markets, it is saddled with an ever changing mix of materials on the supply side, and that material flows into the stream, whether there is a market for it or not. This sets the residential recycling infrastruc-

ture apart from commercial and industrial recycling in the U.S., and that is why it demands a unique approach.

Because of the visibility of the challenges being experienced in the residential recycling infrastructure, we have seen a growing loss of confidence in recycling on the part of the general public, which is of great concern to all of us in the recycling and manufacturing industries. I think everyone here would agree.

So, in any given year, our country's recycling infrastructure processes more than 130 million metric tons of recyclables; however, residential recycling represents only about 20 percent of the material that works its way through that infrastructure. The other 80 percent comes from recycling of commercial and industrial materials, that tends to be cleaner.

Second, there is no one, singular solution to the challenges we are experiencing in the residential recycling infrastructure. The residential recycling chain and associated infrastructure in the U.S. is a complex system, which is driven by market demand, but saddled with a supply chain that is generally not linked to the current market conditions.

We think of it as four major pressure points in the current residential recycling infrastructure, and the first one is right before the material enters the recycling stream, when the decision is made whether to put the item in the bin and in what condition to do so. That is where education efforts can play an important role, like the RECYCLE Act.

The second pressure point is between the municipality and the materials recovery facility or MRF, where there is a need for contracting policies and procedures that provide flexibility for market fluctuations.

The third pressure point is processing, where, despite investments that are already being made, there is a need for additional upgrading of equipment and facilities.

The fourth pressure point is the point following the processing, when the recyclables enter the end market. That is where market development is needed.

At ISRI, we believe that all stakeholders must come together to develop a common understanding of the weaknesses affecting the residential recycling stream and then work together to develop a menu of solutions that need to be put into place.

Thank you for this opportunity to illustrate the complexities of the recycling systems, and I look forward to taking some of your questions.

[The prepared statement of Mr. Johnson follows:]

STATEMENT OF

WILLIAM H. JOHNSON
CHIEF LOBBYIST
INSTITUTE OF SCRAP RECYCLING INDUSTRIES

BEFORE THE UNITED STATES SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE

THE CIRCULAR ECONOMY AS A CONCEPT FOR CREATING A MORE SUSTAINABLE FUTURE

SEPTEMBER 22, 2021

Good morning Chairman Carper and Ranking Member Capito and Members of the United States Senate Environment and Public Works Committee.

My name is Billy Johnson, and I am the Chief Lobbyist for the Institute of Scrap Recycling Industries, Inc. (ISRI). It is an honor to be before you today to discuss – from the recycler's perspective - the important role of recycling as well as some of the challenges the industry faces.

Recycling is essential to the U.S. economy, the global manufacturing supply chain, and a vital solution to help combat climate change and build environmental equity. Recycling helps fight climate change by providing alternative materials used by manufacturers as a replacement for "virgin" material, thereby lowering energy consumption and CO_2 emissions. Recycled commodities annually save the equivalent of nearly 400 million tons of carbon dioxide -- equal to the energy use of 48 million homes for one year. Plus, recycled metals, paper, plastics, and other recyclable commodities feed U.S. manufacturing operations that produce the rebar, wiring, tubing, packaging, and other key materials that are needed for everything from construction of roads and bridges to new hospitals.

I want to also recognize Senator John Boozman, who along with Chairman Carper serve as the Senate Recycling Caucus co-chairs. Last fall, during ISRI's "State of Recycling" Congressional briefing, Senators Carper and Boozman along with industry representatives reflected on the important role of recycling during the COVID-19 pandemic when the recycling industry was quickly deemed *essential* to the U.S. and global manufacturing supply chain, supplying commodity-grade recyclable metals, paper, plastics, glass and rubber as feedstock for the production of new materials and goods. The recycling industry was proud to process and return over 138 million metric tons of materials back into commerce where these materials were used to make new products - rather than disposed into landfills. Keeping the recycling industry open meant keeping America's manufacturers open to produce the critical products required for the COVID-19 response and post-pandemic economic recovery.

Background

ISRI is the Voice of the Recycling Industry, with 1,300 member companies operating at more than 4000 locations in the U.S. and across the globe. Our members are present throughout the manufacturing recycling chain including companies that process, broker and consume metals, paper, plastics, glass, textiles, rubber and electronics, whether sourced from commercial, residential, or industrial operations. Our membership also includes companies that manufacture and distribute the optical and infrared scanners, balers, shredders, conveyors and other machinery and transportation equipment that are used in all parts of the recycling supply chain.

Recycling in the United States is an important economic engine and job creator. The recycling industry employs 531,510 Americans in jobs averaging $73,000 in wages and benefits annually, while generating $110 billion in economic activity and $12.9 billion in federal, state and local tax revenue all while making the old new again.

Worldwide, more than 800 million metric tons of recyclable materials are consumed each year by manufacturers. And just like coffee, crude oil, and other commodities, the movement of

recyclables is driven by the demand needs of consumers in the United States and around the globe with the United States playing a major role in this global market, selling $20 billion worth of specification-grade commodities to manufactrers in more than 150 countries.

Whether called “scrap, “recyclable materials”, “recyclables” or “secondary materials,” these are valuable commodities sold and sought after in the global marketplace by industrial consumers – including steel mills, metal refiners, foundries, paper mills, plastic formulators and others – for the manufacture of new consumer and industrial products. The Bureau of International Recycling (BIR) estimates that more than 40% of manufacturers’ raw material needs around the world are met through the recycling of obsolete, off-spec, and end-of-life products and materials.

Sucessful Recycling

While these impressive numbers tell the story of a strong and resilent U.S. recycling industry, it is not one without challenges in key segments of the industry. To understand those challenges, it is important to first understand the interwoven segments of the recycling industry and what makes for successful recycling:

First – Regardless of whether it is residential, industrial or commercial, successful recycling requires market demand. If there is no end market to utilize or consume the recyclable materials that are collected and processed, those materials will not be used again in manufacturing to make new products, despite the volume of material collected. And collection without market consumption is simply not recycling. Therefore, growing sustainable markets is critical for there to be sucessful recycling.

Second – Successful recycling requires minimal contamination as recyclables are products sold by specification grade, with their corresponding value and marketability directly related to their quality. These specifications are are derived from many sectors of the recycling industry

including materials recovery facilities, metals, paper stock, plastics, glass, and electronics industries and are constructed to represent the quality or composition of the materials bought and sold in the industry. The ISRI specifications are internationally accepted and are used throughout the world to trade the various commodities.

Third - Recycling in the U.S. involves far more than what is placed in the blue bin, or cart, at the end of the driveway. The recycling infrastructure in the U.S. touches almost every part of our economy – from retail stores, office complexes, residential neighborhoods, and schools to factories, construction and demolition sites, and even military bases. And the vast majority of the recyable material that flows through this recycling infrastructure does so without any problems, and is transformed by recyclers into clean, high quality, commodity grade product used throughout the world as a sustainable and cost-effective substitute for virgin materials.

Fourth – Products must be designed to be recycled at its useful end-of-life for successful recycling to easily take place. Whether the product is an electronic device, a consumer product packaging, an appliance or vehicle, it is imperative the product and its packaging be designed for recycling. By doing so, recycling is more productive which means more material is recycled and less material goes to landfills.

Recycling Challenges – New products and materials often pose challenges for recyclers. For example, electric vehicles pose both market and safety challenges. Currently, electric vehicle lithium-ion batteries do not yet have viable secondary or end-use markets. This situation is partly a result of different battery chemistries. We urge research and development to find new markets for these batteries. Viable and sustainable markets are necessary for these batteries as more electric vehicles enter the marketplace and ultimately the recycling stream.

Another challenge for recyclers is that even while an electric vehicle battery is fully discharged, it can still have sufficient levels of stored electricity to severly shock or electricude workers. As

a result, the recycling industry is proactively warning recyclers and providing safety training to to prevent such injuries and deaths.

Whats more, small and larger lithium-ion batteries that power onboard auto systems pose signficiant fire challenges at auto dismantling and scrap yards. Small lithium-ion batteries have been responsible for fires at electronics recycling and are being reported more often at material recycling facilities or MRFs. Additional awarness is needed to prevent these batteries from entering the residential recycling streams.

Residential Recycling – What makes the residential stream so challenging is that while it is subject to the same demand driven end markets as commercial and industrial recycling, it is saddled with an ever changing and heterogeneous mix of materials on the supply side and that collected material flows into the stream whether there is a market for it or not. However, if there is no ready market demand for these materials, these materials are often landfilled, incinerated or combusted for energy.

Specifically, the residential recycling plastics stream includes containers from food, beverages and household products. When recycled, these plastics provide enormous enviromental benefits compared with their virgin counterparts. For example, composite lumber made from recycled plastic bags conserves trees and reduces the need for hazardous wood-treatment chemicals. Using recycled plastics in manufacturing also saves up to 88% of the energy needed to produce plastics from virgin materials. This sets the residential recycling infrastructure apart from commercial and industrial recycling in the U.S., and that is why it demands a unique approach.

However, because of the visibility of the challenges being experienced in the residential recycling sector, we have seen a growing loss of confidence in recycling on the part of the general public, which is of great concern to all of us in the recycling industry – not just for our

operations here but for our particpation in the global marketplace and our leadership in reducing greenhouse emissions.

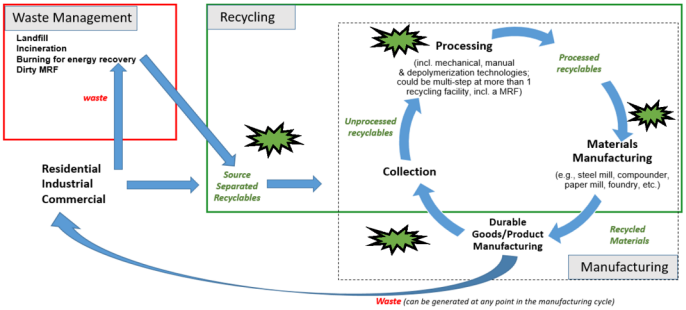
First – Recycling Does Work . . . although it is not without challenges. Our country's recycling infrastructure processes more than 130 million tons of recyables annually, representing $110 billion annually in economic activity within the U.S.

The blue bin, or cart, at the end of the driveway is the most visible part of America's recycling infrastructure, however, it represents only 20 percent of the material that works its way through that infrastructure. The other 80% comes from the recycling of commercial and industrial materials that tends to be cleaner, and therefore can be processed to higher grades with greater marketability. As a result of this visibility, we are seeing a growing loss of confidence in recycling on the part of the general public, which is of great concern to all of us in the recycling industry.

Second – There is no one, singular, solution to the challenegs we are experiencing in the residential recycling infrastructure. The residential recycling chain and associated infrastructure in the U.S. is a complex system, through which a highly diverse and heterogeneous mix of materials flow, and which is driven by market demand but saddled with a supply chain that is generally not linked to current market conditions – the material flows into the stream whether there is a merket for it or not. This sets the residential recycling infrastructure apart from commercial and industrial recycling in the U.S., and that is why it demands a unique approach.

Accordngly, we have identified four pressure in the residential recycling stream:

The 4 "Pressure Points (✸)" in the Recycling System



The ***first pressure point*** is right before before the material enters the residential recycling stream, when the decision is made whether to put an item in the bin and in what condition to do so, and where education efforts can play an important role.

The ***second pressure point*** is between the municipality and the MRF, where there is a need for contracting policies and procedures that provide flexibility for market fluctuations so as to minimize material flow disruptions.

The ***third pressure point*** is processing, where – despite investments that are already being made - there is a need for additional upgrading of equipment and facilities, and for workforce development initiatives.

The ***fourth pressure point*** is at the point following processing, when the recyclables enter the endmarket. We need market development efforts that will create new and expanded uses for

the specific materials that are found in the residential stream, which will lead to more stable and balanced markets.

Therefore, it is critical that all stakeholders work together to develop a common understanding of the weaknesses affecting the residential stream, and then work together to develop a menu of solutions since many challenges stem from products that were not designed for recycling such as those made from multiple polymers or incompatible manufacturing methods and the consumer is not aware or confident in whether their recycling decisions are correct.

Policy Solutions

Strengthening Domestic Recycling and Market Development – ISRI supports initiatives and incentives designed to strengthen domestic residnetial recycling and markets utilizing policies such as :

- Affirmative Government Procurement policies demanding increased recycled content;
- Commitments to use recycled materials in state and local transportation and infrastructure projects including the **Highway bill** and the president's **American Jobs Plan**;
- Tax credits, tax exemptions, depreciation allowances, loans, grants, and bonds for investment in recycling facilities;
- Dedicated recycling business development assistance;
- Minimum recycled content mandates tied to increased public education, collection and supply; and
- Encouraging policies that incentivizes manufacturers to design their products for recycling, and to use greater amounts of recycled content in manufacturing.

Design for Recycling – More than 30 years ago, ISRI started the Design for Recycling® initiative to encourage manufacturers to consider the ultimate destiny of their products during the design-stage of a product's development. This concept continues to be highly relevant today, as stakeholders throughout the recycling supply chain in the U.S. and around the globe are

working hard to better manage material flow amidst ever changing supply and demand for recycled commodities.

Why is Design for Recycling important? Because products that are designed with recyclability in mind:

- Are easily recycled through current or newly designed recycling processes and procedures;
- Are cost effective to recycle;
- Are free of toxics and other materials that could impede the recycling process;
- Maximize the use of recycled materials during manufacture and in the product itself; and
- Help move us towards a true circular economy.

Recycling Data Collection – Accurate data is crucial towards making informed decisions. ISRI strongly supports the bi-partisan legislation from Senators Carper and Boozman to collect data on recycling and composting in the United States and clarify the nominclature used to describe recycling and recyclables. We would suggest this data be collected annually rather than just once. Additionally, we would suggest the definitions be incorporated into RCRA.

Education Funding for Recycling – Consumer packaging is becoming increasingly complex as brand owners are under pressure to develop innovative designs that fulfill their sustainability goals. As these new packaging designs are released to the public, there is a need to ensure the materials can be collected, sorted and recycled properly as well as markets for those materials exist.

ISRI supports addressing the education vacuum as a multi-prong and multi-stakeholder responsibility. There are numerous public-private partnerships that have successfully raised the bar for consumer awareness and these should be encouraged and expanded by exploring new and effective means for connecting to consumers who are the primary source of the residential

reyccling stream. Accordingly, we support the bi-partisan "**RECYCLE**" Act recently introduced in the United States Senate and House of Representatives that would provide EPA with the resources to direct a grant-based program leveraging the many organizations that help educate citizens and improve residential recycling efforts.

Encouraging Recycling Activities – ISRI supports policies that will encourage the collection, processing and end-market development for recyclable mateirals. As long as there is a partity for public and private recyclers, ISRI supports recovery and recycling through policies such as:

- Business financial assistance programs;
- Recycling-specific technical and financial assistance; and
- Grants, loans, and tax incentives for new innovation.

Extended Producer Responsibility –We recognize there are certain materials and consumer products entering the residential recycling stream for which commodity markets do not currently exist, or the markets may be regional in nature and not be economically viable at the point of collection. There are also some packaging materials for which no technological process has been developed to process them. Furthermore, there are a number of recycling programs driven by government mandates or sustainability goals that are not supported solely by market values, and certain materials that were previously economical to recycle may no longer have viable end markets due to major changes in global commodity markets. These conditions often result or create items that are difficult to recycle.

While ISRI acknowledges that the concept of extended producer responsibility is being considered at the federal and state governmental levels, we do not support those product stewardship policies that disrupt the current recycling infrastructure that either target, include, or disrupt the recycling of materials or products that are being successfully recycled and consumed in existing markets.

Instead, ISRI strongly urges product manufacturers to design their products and packaging for cost effective recycling. Many products manufacturers have worked with our members to design and manufacture their products to be easily recycled. We continue to offer our member's expertise to anyone interested in improving our nation's residential recycling programs.

Conclusion

Thank you for this opportunity to speak to you today about how recycling is a significant climate solution helping us protect the environment, conseve natural resources for future generations, save energy and put Americans to work in good paying jobs. ISRI and our member companies look forward to working with Congress to find effective solutions to help foster policies to encourage and promote recycling as well as develop new and grow existing markets for these commodities.

###

ISRI Institute of Scrap Recycling Industries, Inc.
Voice of the Recycling Industry™



RECYCLING IS ESSENTIAL FOR THE ENVIRONMENT

The recycling industry is essential for environmental protection, resource conservation and sustainability.

TRANSFORMING OBSOLETE MATERIALS INTO NEW PRODUCTS

U.S. recyclers transformed **138 million metric tons** of material from outdated or obsolete products into valuable manufacturing inputs in 2018.

FIGHTING CLIMATE CHANGE

The scrap commodities recycled annually save the equivalent of **nearly 400 million tons of carbon dioxide -- equal to the energy use of 48 million homes for one year.**

PRESERVING VALUABLE RESOURCES

Those scrap commodities **reduce the need to mine for ore, cut down trees for paper, extract fossil fuels to produce plastic** and otherwise deplete our natural resources.

REPAIRING THE WORLD

Recycling **reduces the amount of material sent to landfills,** preserving that land for better uses.

Recycling Saves Energy and the Earth

	Saves the Energy Equivalent of (Gasoline)	Reduces Greenhouse Gas Emission by (CO_2 Equivalent)
ONE CAR	**450** GAL.	**8,811** LBS.
ONE REFRIGERATOR	**29** GAL.	**566** LBS.
ONE COMPUTER & CRT MONITOR	**21** GAL.	**404** LBS.
ONE WASHING MACHINE	**20** GAL.	**397** LBS.
FOUR TIRES	**17** GAL.	**323** LBS.
ONE TELEVISION	**4** GAL.	**81** LBS.
10 LBS. OF ALUMINUM CANS 10	**2** GAL.	**40** LBS.
1 TON OF WATER BOTTLES	**173** GAL.	**3380** LBS.

TO LEARN MORE, VISIT US AT: WWW.ISRI.ORG/ESSENTIAL

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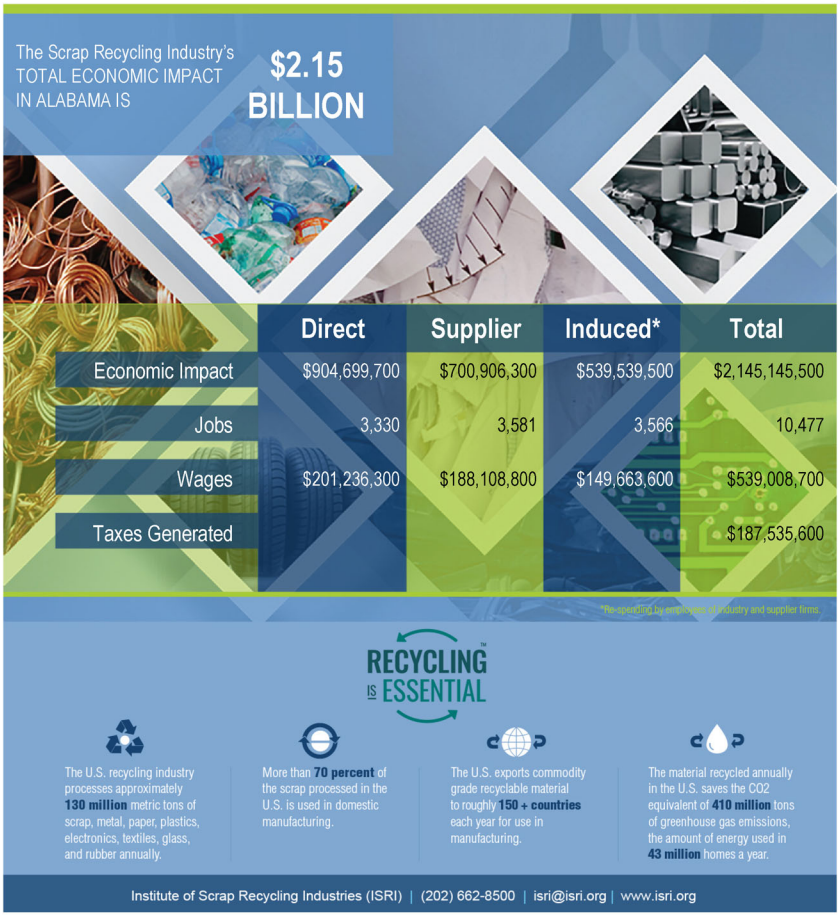
RECYCLING IS ESSENTIAL

ISRI
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The Economic Impact of the Scrap Recycling Industry in the United States

ALABAMA

RECYCLING IS ESSENTIAL



	Direct	Supplier	Induced*	Total
Economic Impact	$904,699,700	$700,906,300	$539,539,500	$2,145,145,500
Jobs	3,330	3,581	3,566	10,477
Wages	$201,236,300	$188,108,800	$149,663,600	$539,008,700
Taxes Generated				$187,535,600

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

The U.S. exports commodity grade recyclable material to roughly **150 + countries** each year for use in manufacturing.

The material recycled annually in the U.S. saves the CO_2 equivalent of **410 million** tons of greenhouse gas emissions, the amount of energy used in **43 million** homes a year.

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The Economic Impact of the Scrap Recycling Industry in the United States

ALABAMA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	3,213	$192,947,600	$879,420,800
Brokers	117	$8,288,700	$25,278,900
TOTAL DIRECT IMPACTS	3,330	$201,236,300	$904,699,700

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	180	$5,349,400	$12,180,200
Mining	32	$1,590,200	$18,716,100
Construction	51	$2,455,600	$6,859,400
Manufacturing	507	$37,541,300	$249,829,800
Transportation & Communication	346	$22,625,200	$92,139,200
Wholesaling	256	$18,328,400	$55,543,500
Retailing	25	$839,600	$2,165,500
Finance, Insurance, & Real Estate	286	$13,717,700	$64,829,400
Travel & Entertainment	254	$4,991,600	$15,056,300
Business & Personal Services	1,576	$75,517,000	$168,594,700
Government	68	$5,152,800	$14,992,200
TOTAL SUPPLIER IMPACTS	3,581	$188,108,800	$700,906,300

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	61	$2,436,200	$7,672,600
Mining	6	$438,500	$3,451,900
Construction	42	$2,065,300	$5,943,100
Manufacturing	190	$11,980,200	$98,856,800
Transportation & Communication	179	$11,307,900	$56,146,900
Wholesaling	99	$7,024,700	$21,383,100
Retailing	498	$14,194,900	$40,379,400
Finance, Insurance, & Real Estate	418	$17,703,000	$132,613,800
Travel & Entertainment	535	$10,557,900	$32,388,100
Business & Personal Services	1,390	$65,881,200	$124,300,300
Government	53	$3,737,200	$13,501,200
Other	95	$2,336,600	$2,902,300
TOTAL SUPPLIER IMPACTS	3,566	$149,663,600	$539,539,500

TOTAL IMPACTS	10,477	$539,008,700	$2,145,145,500

Taxes	Federal	State	Total Taxes
Business Taxes	$127,912,300	$59,623,300	$187,535,600

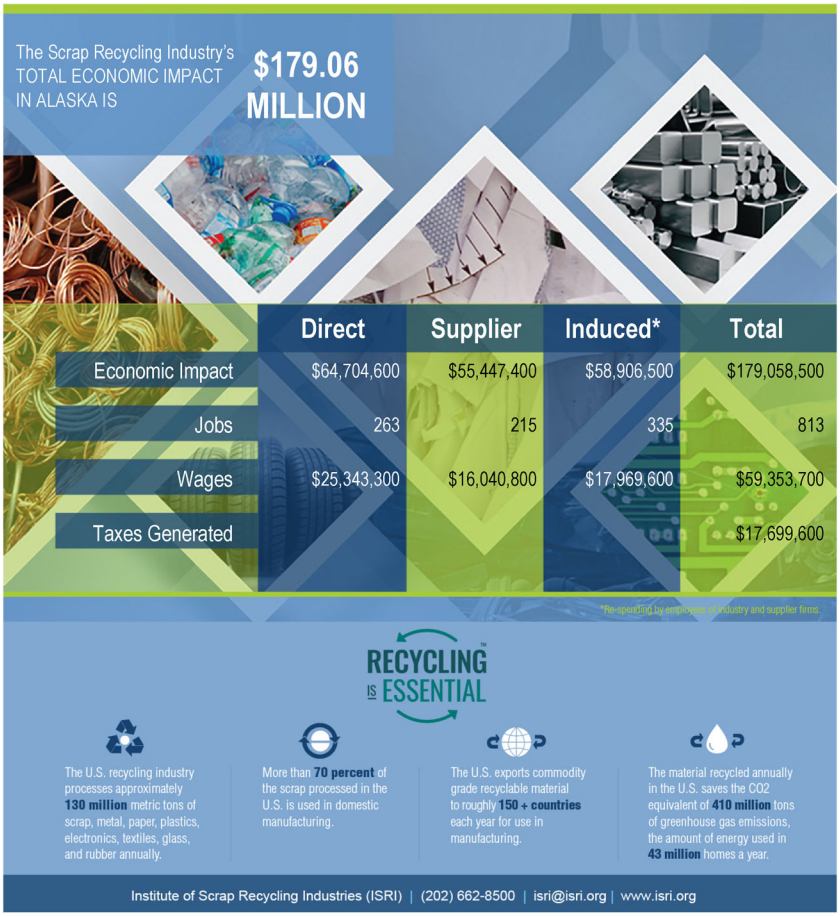
Some details may not add up due to rounding.

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The Economic Impact of the Scrap Recycling Industry in the United States

ALASKA

RECYCLING IS ESSENTIAL



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The Economic Impact of the Scrap Recycling Industry in the United States

ALASKA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	263	$25,343,300	$64,704,600
Brokers	0	$0	$0
TOTAL DIRECT IMPACTS	263	$25,343,300	$64,704,600

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	7	$593,500	$727,400
Mining	27	$3,550,400	$17,540,900
Construction	2	$192,500	$398,200
Manufacturing	7	$484,000	$5,134,700
Transportation & Communication	21	$1,657,800	$7,074,500
Wholesaling	10	$631,200	$2,447,500
Retailing	2	$61,600	$128,900
Finance, Insurance, & Real Estate	19	$902,700	$5,056,000
Travel & Entertainment	18	$486,300	$1,232,100
Business & Personal Services	99	$7,177,100	$15,109,500
Government	3	$303,700	$597,700
TOTAL SUPPLIER IMPACTS	215	$16,040,800	$55,447,400

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	6	$249,700	$760,100
Mining	7	$1,248,200	$5,741,700
Construction	4	$309,200	$660,400
Manufacturing	16	$918,400	$6,661,500
Transportation & Communication	19	$1,472,600	$6,836,600
Wholesaling	8	$533,800	$2,085,700
Retailing	47	$1,731,400	$3,937,400
Finance, Insurance, & Real Estate	36	$1,834,700	$13,948,800
Travel & Entertainment	51	$1,415,600	$3,741,300
Business & Personal Services	129	$7,538,700	$13,434,500
Government	4	$354,600	$956,000
Other	8	$362,700	$142,500
TOTAL SUPPLIER IMPACTS	335	$17,969,600	$58,906,500

TOTAL IMPACTS	813	$59,353,700	$179,058,500

Taxes	Federal	State	Total Taxes
Business Taxes	$12,907,700	$4,791,900	$17,699,600

Some details may not add up due to rounding.

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The Economic Impact of the Scrap Recycling Industry in the United States

ARIZONA

RECYCLING IS ESSENTIAL

The Scrap Recycling Industry's TOTAL ECONOMIC IMPACT IN ARIZONA IS **$1.81 BILLION**



	Direct	Supplier	Induced*	Total
Economic Impact	$717,984,300	$486,452,500	$608,591,600	$1,813,028,400
Jobs	2,936	2,666	4,113	9,715
Wages	$254,500,800	$159,519,900	$193,766,200	$607,786,900
Taxes Generated				$210,177,800

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

The U.S. exports commodity grade recyclable material to roughly **150 + countries** each year for use in manufacturing.

The material recycled annually in the U.S. saves the CO_2 equivalent of **410 million** tons of greenhouse gas emissions, the amount of energy used in **43 million** homes a year.

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The Economic Impact of the Scrap Recycling Industry in the United States

ARIZONA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	2,676	$233,052,500	$656,557,300
Brokers	260	$21,448,300	$61,427,000
TOTAL DIRECT IMPACTS	2,936	$254,500,800	$717,984,300

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	27	$645,600	$1,669,000
Mining	68	$6,339,900	$31,835,200
Construction	28	$1,351,000	$4,144,700
Manufacturing	189	$14,385,400	$69,775,700
Transportation & Communication	266	$18,631,800	$72,738,400
Wholesaling	132	$11,155,000	$31,694,900
Retailing	18	$743,500	$1,671,900
Finance, Insurance, & Real Estate	356	$18,877,300	$85,625,800
Travel & Entertainment	218	$5,739,600	$14,976,500
Business & Personal Services	1,318	$77,803,500	$162,807,900
Government	46	$3,847,300	$9,512,500
TOTAL SUPPLIER IMPACTS	2,666	$159,519,900	$486,452,500

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	56	$2,141,300	$6,231,800
Mining	14	$831,700	$4,481,600
Construction	46	$2,300,600	$7,219,600
Manufacturing	117	$7,806,600	$47,267,100
Transportation & Communication	229	$15,639,900	$73,242,800
Wholesaling	124	$10,163,200	$29,040,800
Retailing	561	$19,915,600	$50,007,700
Finance, Insurance, & Real Estate	555	$25,391,800	$170,634,400
Travel & Entertainment	612	$15,448,300	$43,039,600
Business & Personal Services	1,654	$86,194,800	$160,035,000
Government	52	$4,301,800	$14,569,500
Other	93	$3,630,600	$2,821,700
TOTAL SUPPLIER IMPACTS	4,113	$193,766,200	$608,591,600

TOTAL IMPACTS	9,715	$607,786,900	$1,813,028,400

Taxes	Federal	State	Total Taxes
Business Taxes	$138,584,000	$71,593,800	$210,177,800

Some details may not add up due to rounding.

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The Economic Impact of the Scrap Recycling Industry in the United States

ARKANSAS

RECYCLING IS ESSENTIAL

The Scrap Recycling Industry's TOTAL ECONOMIC IMPACT IN ARKANSAS IS **$708.03 MILLION**



	Direct	Supplier	Induced*	Total
Economic Impact	$262,580,300	$247,919,300	$197,532,300	$708,031,900
Jobs	1,252	1,198	1,181	3,631
Wages	$62,657,900	$61,833,000	$48,971,500	$173,462,400
Taxes Generated				$68,734,500

*Re-spending by employees of industry and supplier firms.

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The Economic Impact of the Scrap Recycling Industry in the United States

ARKANSAS

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	1,242	$61,951,200	$260,219,000
Brokers	10	$706,700	$2,361,300
TOTAL DIRECT IMPACTS	1,252	$62,657,900	$262,580,300

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	63	$2,732,400	$6,077,500
Mining	18	$628,100	$4,180,300
Construction	12	$514,400	$1,599,400
Manufacturing	227	$14,987,900	$104,157,900
Transportation & Communication	96	$6,122,100	$26,687,000
Wholesaling	53	$4,055,300	$13,441,000
Retailing	9	$291,300	$739,700
Finance, Insurance, & Real Estate	92	$4,121,600	$21,189,200
Travel & Entertainment	87	$1,601,300	$5,165,700
Business & Personal Services	522	$25,346,500	$61,358,200
Government	19	$1,432,100	$3,323,400
TOTAL SUPPLIER IMPACTS	1,198	$61,833,000	$247,919,300

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	62	$2,400,300	$9,801,700
Mining	8	$271,200	$1,627,700
Construction	12	$547,900	$1,757,900
Manufacturing	130	$7,196,600	$57,309,400
Transportation & Communication	54	$3,371,700	$18,305,700
Wholesaling	29	$2,200,500	$7,339,400
Retailing	146	$4,173,200	$11,586,500
Finance, Insurance, & Real Estate	119	$4,818,400	$38,257,300
Travel & Entertainment	155	$2,917,900	$9,496,200
Business & Personal Services	426	$19,242,100	$37,957,500
Government	13	$1,004,000	$3,286,100
Other	27	$827,700	$806,900
TOTAL SUPPLIER IMPACTS	1,181	$48,971,500	$197,532,300

TOTAL IMPACTS	3,631	$173,462,400	$708,031,900

Taxes	Federal	State	Total Taxes
Business Taxes	$38,071,500	$30,663,000	$68,734,500

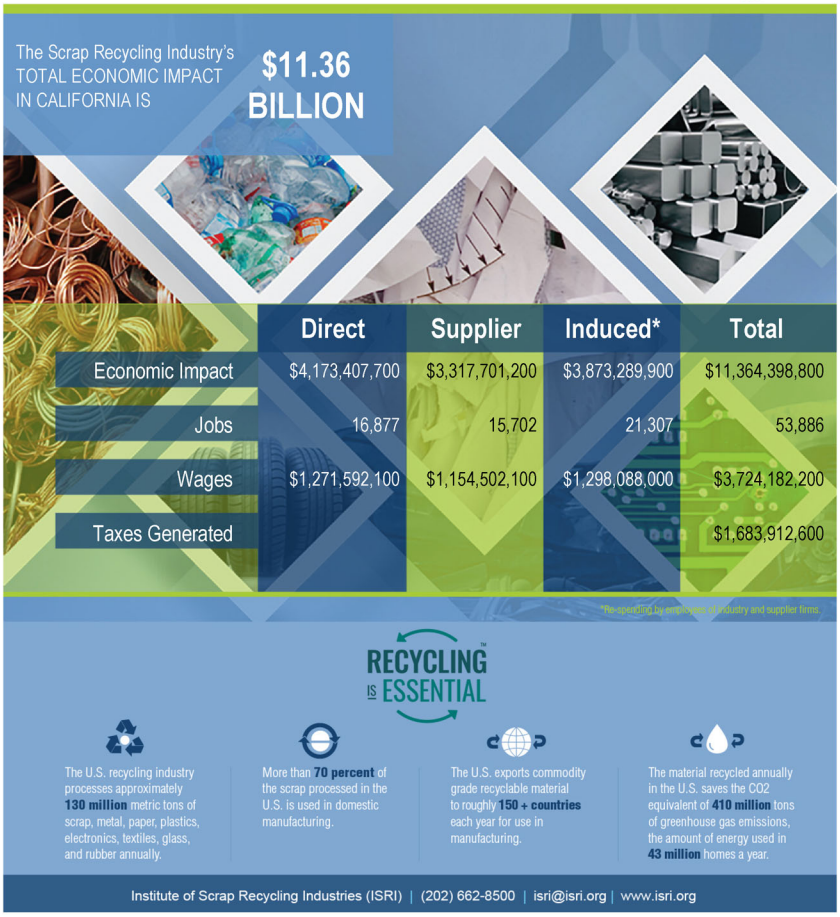
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The Economic Impact of the Scrap Recycling Industry in the United States

CALIFORNIA

RECYCLING IS ESSENTIAL



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CALIFORNIA

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Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	16,323	$1,225,102,500	$4,033,558,000
Brokers	554	$46,489,600	$139,849,700
TOTAL DIRECT IMPACTS	16,877	$1,271,592,100	$4,173,407,700

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	271	$10,593,800	$20,845,600
Mining	107	$9,458,900	$31,367,900
Construction	174	$11,712,900	$30,053,700
Manufacturing	1,652	$137,682,700	$734,830,400
Transportation & Communication	1,622	$164,921,300	$503,816,700
Wholesaling	919	$78,363,200	$234,064,100
Retailing	107	$5,066,200	$11,084,800
Finance, Insurance, & Real Estate	1,605	$120,425,000	$495,652,800
Travel & Entertainment	1,279	$46,327,800	$103,043,500
Business & Personal Services	7,704	$541,640,200	$1,099,336,300
Government	262	$28,310,100	$53,605,400
TOTAL SUPPLIER IMPACTS	15,702	$1,154,502,100	$3,317,701,200

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	543	$28,849,200	$65,571,600
Mining	44	$3,921,200	$11,313,600
Construction	234	$15,555,000	$40,923,500
Manufacturing	1,182	$104,847,600	$647,961,400
Transportation & Communication	1,213	$126,582,400	$451,009,400
Wholesaling	662	$55,669,000	$167,121,600
Retailing	2,692	$113,145,300	$271,632,200
Finance, Insurance, & Real Estate	2,413	$178,660,100	$976,688,800
Travel & Entertainment	3,095	$105,234,800	$254,677,200
Business & Personal Services	8,424	$513,176,700	$900,803,200
Government	272	$30,163,100	$71,623,900
Other	533	$22,283,600	$13,963,500
TOTAL SUPPLIER IMPACTS	21,307	$1,298,088,000	$3,873,289,900

TOTAL IMPACTS	53,886	$3,724,182,200	$11,364,398,800

Taxes	Federal	State	Total Taxes
Business Taxes	$929,512,100	$754,400,500	$1,683,912,600

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DELAWARE

RECYCLING IS ESSENTIAL

The Scrap Recycling Industry's TOTAL ECONOMIC IMPACT IN DELAWARE IS **$181.63 MILLION**



	Direct	Supplier	Induced*	Total
Economic Impact	$60,109,100	$60,160,300	$61,356,000	$181,625,400
Jobs	281	232	302	815
Wages	$19,701,900	$17,148,300	$16,532,600	$53,382,800
Taxes Generated				$16,461,200

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

The U.S. exports commodity grade recyclable material to roughly **150 + countries** each year for use in manufacturing.

The material recycled annually in the U.S. saves the CO_2 equivalent of **410 million** tons of greenhouse gas emissions, the amount of energy used in **43 million** homes a year.

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DELAWARE

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	274	$19,059,300	$58,367,600
Brokers	7	$642,600	$1,741,500
TOTAL DIRECT IMPACTS	281	$19,701,900	$60,109,100

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	1	$57,400	$182,300
Mining	0	-$11,800	$29,800
Construction	2	$133,500	$368,200
Manufacturing	26	$2,323,400	$15,862,200
Transportation & Communication	19	$1,530,200	$5,148,400
Wholesaling	10	$989,600	$2,656,500
Retailing	1	$62,700	$131,800
Finance, Insurance, & Real Estate	33	$3,254,300	$17,263,000
Travel & Entertainment	21	$486,900	$1,309,500
Business & Personal Services	116	$7,997,500	$16,603,300
Government	3	$324,600	$605,300
TOTAL SUPPLIER IMPACTS	232	$17,148,300	$60,160,300

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	4	$448,500	$1,540,000
Mining	0	-$5,200	$14,600
Construction	3	$201,200	$570,300
Manufacturing	23	$1,528,900	$11,283,900
Transportation & Communication	14	$1,143,600	$4,694,300
Wholesaling	8	$760,300	$2,056,100
Retailing	43	$1,441,100	$3,371,200
Finance, Insurance, & Real Estate	33	$2,143,700	$21,003,400
Travel & Entertainment	45	$1,150,500	$3,208,400
Business & Personal Services	121	$7,179,000	$12,632,100
Government	3	$287,500	$748,400
Other	5	$253,500	$233,300
TOTAL SUPPLIER IMPACTS	302	$16,532,600	$61,356,000

TOTAL IMPACTS	815	$53,382,800	$181,625,400

Taxes	Federal	State	Total Taxes
Business Taxes	$11,117,300	$5,343,900	$16,461,200

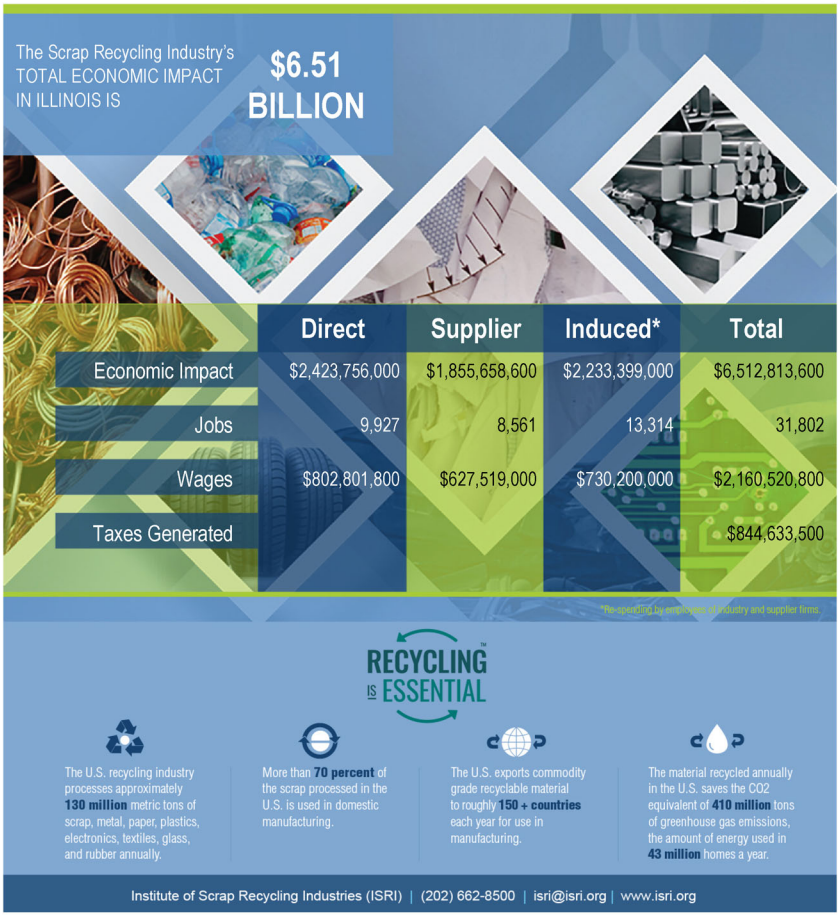
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ILLINOIS

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ILLINOIS

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	9,206	$734,035,900	$2,231,426,400
Brokers	721	$68,765,900	$192,329,600
TOTAL DIRECT IMPACTS	9,927	$802,801,800	$2,423,756,000

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	54	$584,400	$5,949,200
Mining	50	$2,270,000	$12,421,600
Construction	91	$5,897,600	$15,480,200
Manufacturing	928	$85,511,700	$475,339,200
Transportation & Communication	950	$79,833,100	$274,438,200
Wholesaling	470	$45,506,100	$126,327,900
Retailing	61	$2,383,100	$5,393,400
Finance, Insurance, & Real Estate	795	$59,989,500	$256,554,600
Travel & Entertainment	728	$23,083,400	$57,027,100
Business & Personal Services	4,298	$309,680,900	$608,615,500
Government	136	$12,779,200	$18,111,700
TOTAL SUPPLIER IMPACTS	8,561	$627,519,000	$1,855,658,600

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	95	$1,210,800	$16,265,800
Mining	21	$951,000	$4,558,900
Construction	141	$8,961,400	$24,088,400
Manufacturing	485	$41,776,200	$277,128,300
Transportation & Communication	776	$63,315,100	$261,662,900
Wholesaling	386	$36,875,900	$102,968,600
Retailing	1,798	$61,190,300	$154,043,600
Finance, Insurance, & Real Estate	1,571	$106,456,500	$627,204,700
Travel & Entertainment	1,989	$60,050,200	$158,891,700
Business & Personal Services	5,539	$321,982,600	$575,630,300
Government	129	$13,111,000	$22,824,400
Other	384	$14,319,000	$8,131,400
TOTAL SUPPLIER IMPACTS	13,314	$730,200,000	$2,233,399,000

TOTAL IMPACTS	31,802	$2,160,520,800	$6,512,813,600

Taxes	Federal	State	Total Taxes
Business Taxes	$539,228,100	$305,405,400	$844,633,500

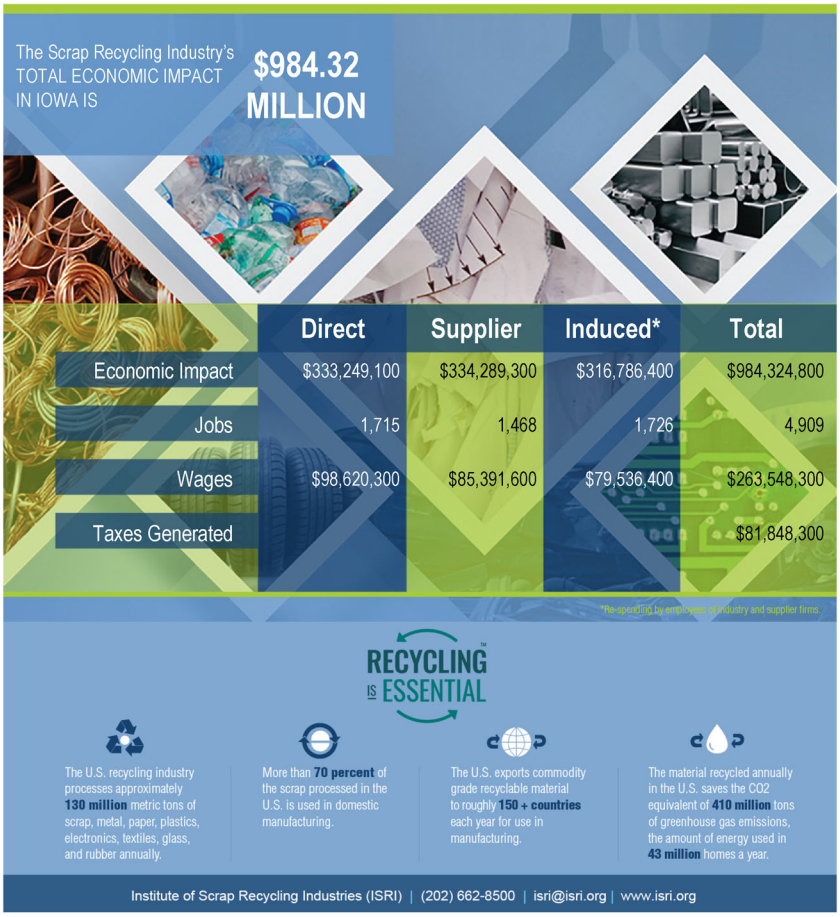
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IOWA

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IOWA

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Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	1,515	$83,539,400	$289,068,300
Brokers	200	$15,080,900	$44,180,800
TOTAL DIRECT IMPACTS	1,715	$98,620,300	$333,249,100

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	29	$1,490,000	$6,282,800
Mining	4	$61,700	$474,500
Construction	14	$853,000	$2,188,700
Manufacturing	277	$22,222,600	$145,349,900
Transportation & Communication	134	$8,739,000	$35,174,300
Wholesaling	65	$5,077,900	$14,749,500
Retailing	9	$339,600	$813,300
Finance, Insurance, & Real Estate	149	$8,464,800	$41,850,000
Travel & Entertainment	114	$2,272,700	$6,980,700
Business & Personal Services	648	$34,025,500	$76,521,200
Government	25	$1,844,800	$3,904,400
TOTAL SUPPLIER IMPACTS	1,468	$85,391,600	$334,289,300

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	112	$6,943,500	$27,749,000
Mining	2	$65,400	$375,400
Construction	18	$1,067,700	$2,818,800
Manufacturing	156	$11,532,400	$93,512,700
Transportation & Communication	83	$5,310,300	$25,994,100
Wholesaling	43	$3,258,300	$9,533,500
Retailing	231	$6,373,300	$17,105,800
Finance, Insurance, & Real Estate	179	$8,529,500	$63,574,800
Travel & Entertainment	231	$4,607,900	$14,893,400
Business & Personal Services	615	$29,321,300	$56,271,400
Government	16	$1,279,700	$3,903,300
Other	40	$1,247,100	$1,054,200
TOTAL SUPPLIER IMPACTS	1,726	$79,536,400	$316,786,400

TOTAL IMPACTS	4,909	$263,548,300	$984,324,800

Taxes	Federal	State	Total Taxes
Business Taxes	$51,369,000	$30,479,300	$81,848,300

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The Economic Impact of the Scrap Recycling Industry in the United States

MARYLAND

RECYCLING IS ESSENTIAL

The Scrap Recycling Industry's TOTAL ECONOMIC IMPACT IN MARYLAND IS **$1.13 BILLION**



	Direct	Supplier	Induced*	Total
Economic Impact	$441,106,000	$322,765,400	$363,490,000	$1,127,361,400
Jobs	2,048	1,670	2,229	5,947
Wages	$149,548,500	$112,902,900	$121,601,300	$384,052,700
Taxes Generated				$140,468,100

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

The U.S. exports commodity grade recyclable material to roughly **150 + countries** each year for use in manufacturing.

The material recycled annually in the U.S. saves the CO_2 equivalent of **410 million** tons of greenhouse gas emissions, the amount of energy used in **43 million** homes a year.

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MARYLAND

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	1,942	$140,373,200	$415,146,800
Brokers	106	$9,175,300	$25,959,200
TOTAL DIRECT IMPACTS	2,048	$149,548,500	$441,106,000

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	15	$489,800	$1,132,400
Mining	4	$81,200	$1,258,700
Construction	18	$1,124,400	$2,894,900
Manufacturing	104	$7,805,200	$44,809,600
Transportation & Communication	172	$14,838,600	$50,956,100
Wholesaling	87	$7,709,400	$21,637,100
Retailing	11	$461,500	$1,042,000
Finance, Insurance, & Real Estate	198	$14,285,800	$59,964,400
Travel & Entertainment	141	$4,232,700	$10,541,100
Business & Personal Services	895	$59,291,300	$125,312,500
Government	25	$2,583,000	$3,216,600
TOTAL SUPPLIER IMPACTS	1,670	$112,902,900	$322,765,400

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	23	$555,000	$2,727,500
Mining	2	$47,000	$626,100
Construction	26	$1,567,400	$4,150,600
Manufacturing	82	$5,740,000	$37,864,800
Transportation & Communication	122	$11,202,000	$44,476,700
Wholesaling	65	$5,675,400	$16,032,100
Retailing	299	$10,346,800	$26,039,500
Finance, Insurance, & Real Estate	256	$18,349,100	$103,465,800
Travel & Entertainment	336	$9,669,300	$26,048,100
Business & Personal Services	935	$53,345,600	$96,540,800
Government	22	$2,322,000	$3,618,500
Other	61	$2,781,700	$1,899,500
TOTAL SUPPLIER IMPACTS	2,229	$121,601,300	$363,490,000

TOTAL IMPACTS	5,947	$384,052,700	$1,127,361,400

Taxes	Federal	State	Total Taxes
Business Taxes	$88,760,500	$51,707,600	$140,468,100

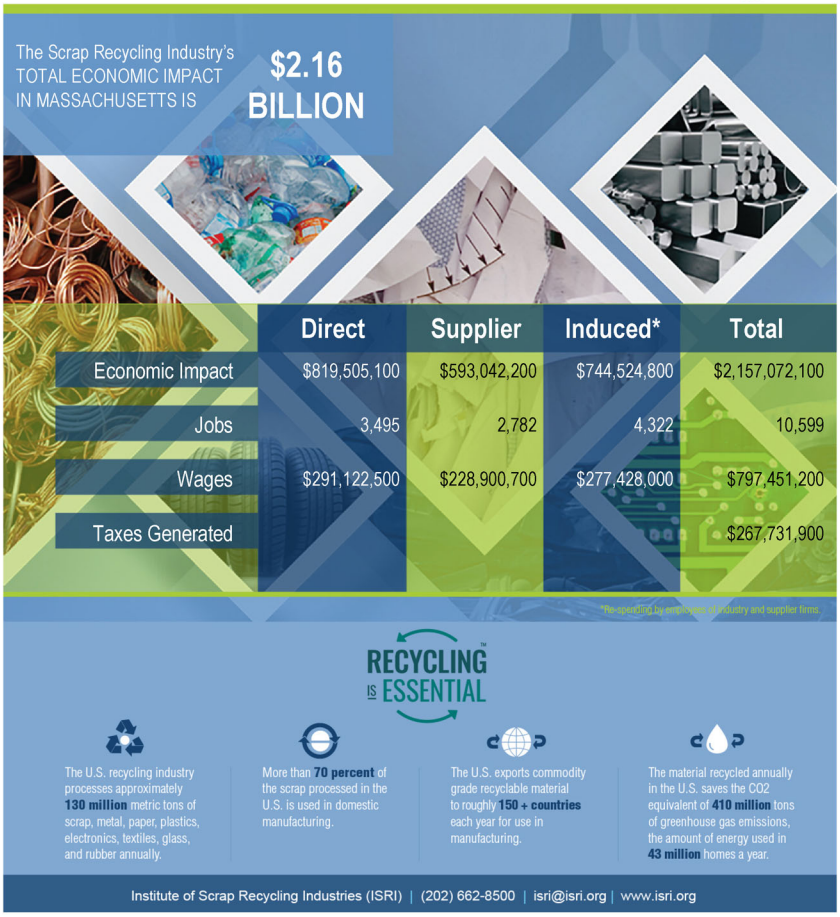
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MASSACHUSETTS

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MASSACHUSETTS

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Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	3,357	$276,279,300	$782,736,300
Brokers	138	$14,843,200	$36,768,800
TOTAL DIRECT IMPACTS	3,495	$291,122,500	$819,505,100

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	15	$1,338,900	$1,865,500
Mining	2	$593,000	$956,600
Construction	30	$2,163,800	$4,815,400
Manufacturing	261	$25,083,600	$101,116,500
Transportation & Communication	282	$24,632,300	$83,525,300
Wholesaling	152	$16,655,900	$40,936,600
Retailing	19	$862,900	$1,670,100
Finance, Insurance, & Real Estate	311	$26,534,500	$102,896,400
Travel & Entertainment	244	$9,090,600	$20,425,600
Business & Personal Services	1,423	$117,554,100	$228,263,600
Government	43	$4,391,100	$6,570,600
TOTAL SUPPLIER IMPACTS	2,782	$228,900,700	$593,042,200

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	26	$702,900	$1,243,200
Mining	2	$337,400	$657,200
Construction	48	$3,540,900	$8,118,200
Manufacturing	182	$17,012,400	$85,607,800
Transportation & Communication	240	$21,232,100	$83,903,500
Wholesaling	133	$14,132,600	$34,952,300
Retailing	571	$22,321,300	$48,069,200
Finance, Insurance, & Real Estate	497	$43,381,200	$212,189,900
Travel & Entertainment	632	$21,540,200	$52,494,600
Business & Personal Services	1,837	$124,214,600	$206,285,000
Government	44	$4,599,000	$8,524,700
Other	110	$4,413,400	$2,479,200
TOTAL SUPPLIER IMPACTS	4,322	$277,428,000	$744,524,800

TOTAL IMPACTS	10,599	$797,451,200	$2,157,072,100

Taxes	Federal	State	Total Taxes
Business Taxes	$186,274,700	$81,457,200	$267,731,900

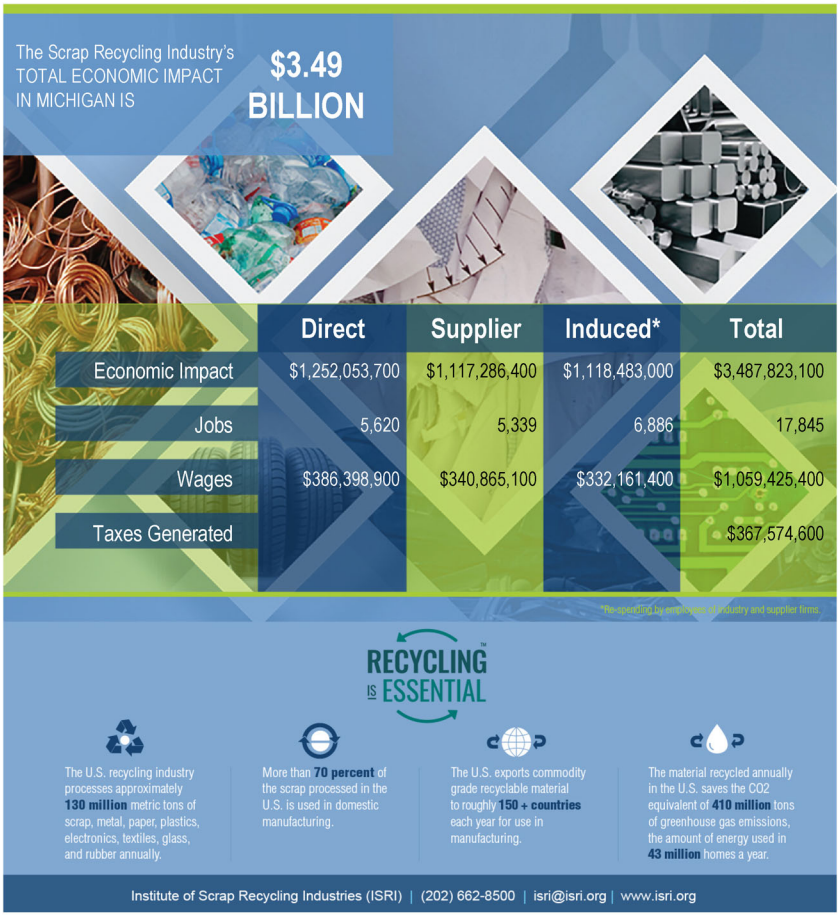
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MICHIGAN

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Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	5,156	$346,336,500	$1,138,392,400
Brokers	464	$40,062,400	$113,661,300
TOTAL DIRECT IMPACTS	5,620	$386,398,900	$1,252,053,700

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	74	$2,048,300	$5,481,400
Mining	36	$2,177,400	$9,319,400
Construction	52	$2,983,900	$8,334,600
Manufacturing	896	$74,708,500	$399,785,700
Transportation & Communication	468	$35,004,600	$128,655,300
Wholesaling	259	$22,796,200	$64,202,900
Retailing	38	$1,359,600	$3,300,000
Finance, Insurance, & Real Estate	498	$27,660,700	$130,748,900
Travel & Entertainment	406	$9,515,600	$27,595,400
Business & Personal Services	2,535	$156,428,700	$328,309,500
Government	77	$6,181,600	$11,553,300
TOTAL SUPPLIER IMPACTS	5,339	$340,865,100	$1,117,286,400

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	111	$2,798,700	$10,439,200
Mining	15	$749,000	$2,648,700
Construction	73	$4,166,600	$11,937,300
Manufacturing	414	$33,269,700	$230,566,500
Transportation & Communication	351	$26,142,000	$115,151,300
Wholesaling	190	$16,412,600	$46,495,800
Retailing	912	$28,622,500	$77,831,900
Finance, Insurance, & Real Estate	808	$40,585,100	$271,491,100
Travel & Entertainment	996	$22,279,300	$66,756,800
Business & Personal Services	2,769	$145,886,500	$267,323,300
Government	70	$4,831,700	$13,234,500
Other	177	$6,417,700	$4,606,600
TOTAL SUPPLIER IMPACTS	6,886	$332,161,400	$1,118,483,000

TOTAL IMPACTS	17,845	$1,059,425,400	$3,487,823,100

Taxes	Federal	State	Total Taxes
Business Taxes	$243,778,100	$123,796,500	$367,574,600

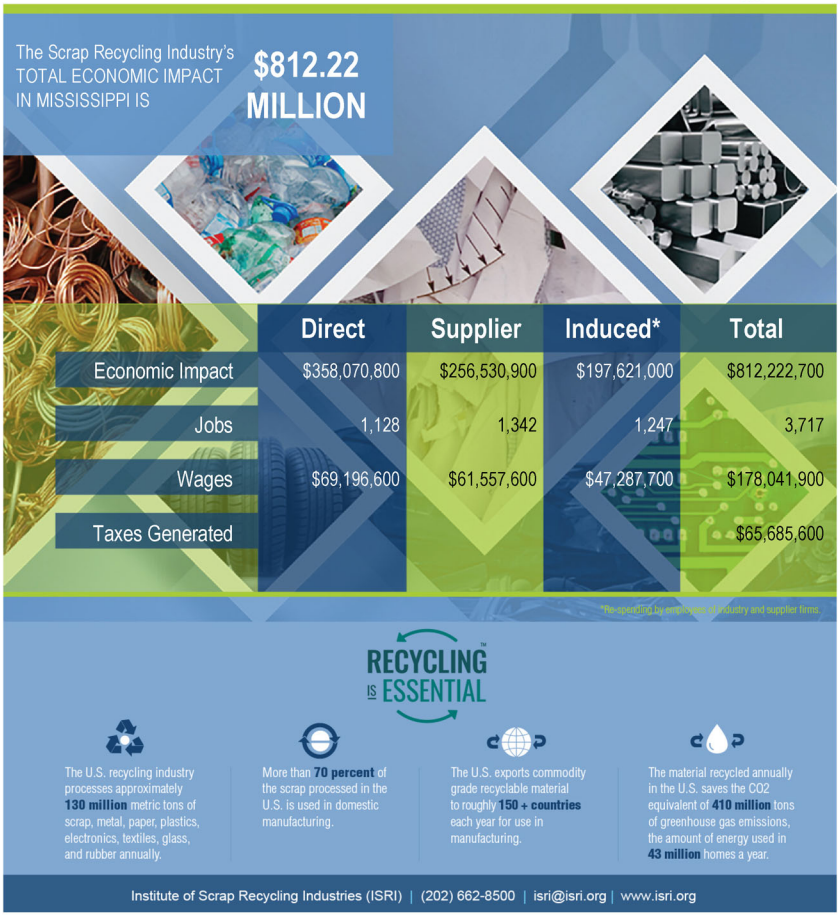
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MISSISSIPPI

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MISSISSIPPI

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	1,065	$65,333,200	$344,545,600
Brokers	63	$3,863,400	$13,525,200
TOTAL DIRECT IMPACTS	1,128	$69,196,600	$358,070,800

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	159	$5,052,800	$11,587,000
Mining	20	$1,702,400	$4,132,000
Construction	22	$928,500	$2,796,800
Manufacturing	218	$13,608,800	$106,089,100
Transportation & Communication	122	$7,121,600	$34,107,400
Wholesaling	67	$4,201,900	$14,610,600
Retailing	7	$286,200	$741,100
Finance, Insurance, & Real Estate	95	$3,772,200	$20,591,600
Travel & Entertainment	85	$1,604,600	$5,143,300
Business & Personal Services	527	$21,909,800	$52,831,700
Government	20	$1,368,800	$3,900,300
TOTAL SUPPLIER IMPACTS	1,342	$61,557,600	$256,530,900

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	51	$1,644,000	$6,625,600
Mining	7	$699,600	$1,648,200
Construction	14	$610,400	$1,897,200
Manufacturing	114	$6,009,100	$53,818,200
Transportation & Communication	61	$3,190,700	$18,882,700
Wholesaling	30	$1,896,500	$6,629,700
Retailing	162	$4,604,700	$13,137,200
Finance, Insurance, & Real Estate	128	$4,492,700	$41,308,900
Travel & Entertainment	176	$3,268,500	$10,946,400
Business & Personal Services	463	$19,236,700	$38,619,400
Government	14	$917,100	$3,278,900
Other	27	$717,700	$828,600
TOTAL SUPPLIER IMPACTS	1,247	$47,287,700	$197,621,000

TOTAL IMPACTS	3,717	$178,041,900	$812,222,700

Taxes	Federal	State	Total Taxes
Business Taxes	$40,897,100	$24,788,500	$65,685,600

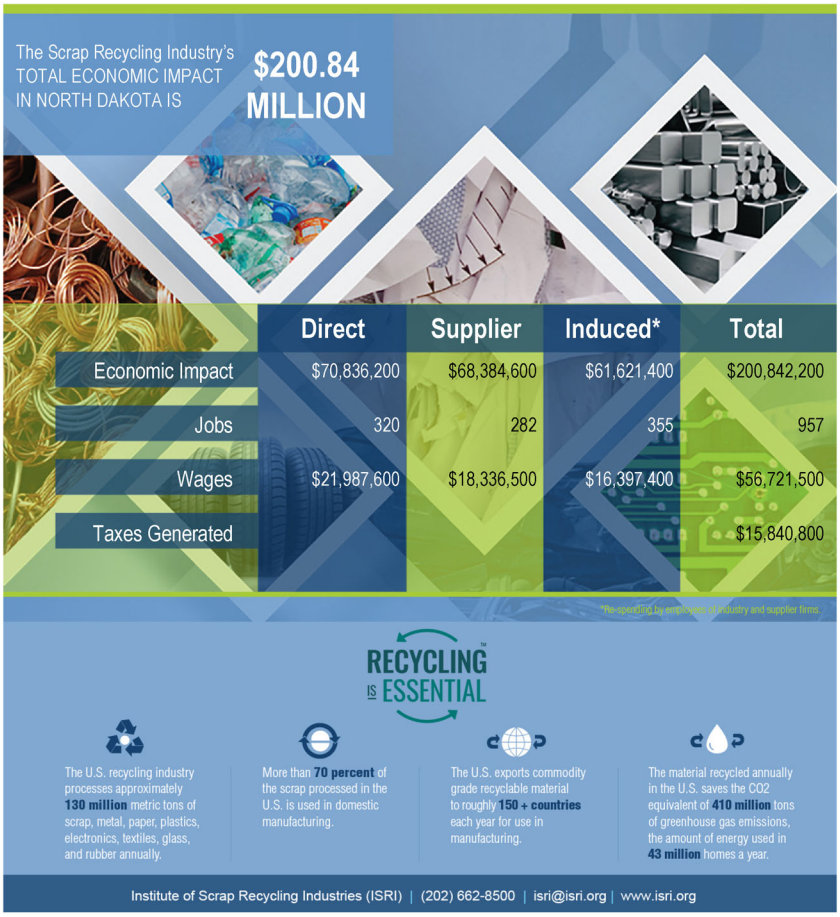
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The Economic Impact of the Scrap Recycling Industry in the United States

NORTH DAKOTA

RECYCLING IS ESSENTIAL



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NORTH DAKOTA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	310	$21,187,000	$68,384,900
Brokers	10	$800,600	$2,451,300
TOTAL DIRECT IMPACTS	320	$21,987,600	$70,836,200

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	10	$169,900	$2,225,400
Mining	26	$2,856,100	$9,998,300
Construction	3	$219,100	$542,600
Manufacturing	32	$2,260,000	$19,573,000
Transportation & Communication	26	$1,991,900	$7,127,300
Wholesaling	16	$1,408,400	$4,279,100
Retailing	2	$83,300	$178,100
Finance, Insurance, & Real Estate	32	$1,839,400	$7,653,400
Travel & Entertainment	20	$428,500	$1,273,700
Business & Personal Services	111	$6,756,800	$14,683,600
Government	4	$323,100	$850,100
TOTAL SUPPLIER IMPACTS	282	$18,336,500	$68,384,600

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	35	$578,500	$7,885,100
Mining	12	$1,193,700	$4,007,700
Construction	4	$268,200	$681,200
Manufacturing	17	$1,140,400	$9,449,000
Transportation & Communication	15	$1,237,900	$5,347,900
Wholesaling	9	$806,400	$2,464,500
Retailing	44	$1,523,800	$3,711,300
Finance, Insurance, & Real Estate	37	$1,737,400	$12,124,600
Travel & Entertainment	47	$979,200	$2,998,600
Business & Personal Services	124	$6,403,000	$11,773,700
Government	4	$295,200	$1,041,300
Other	7	$233,700	$136,500
TOTAL SUPPLIER IMPACTS	355	$16,397,400	$61,621,400

TOTAL IMPACTS	957	$56,721,500	$200,842,200

Taxes	Federal	State	Total Taxes
Business Taxes	$10,976,600	$4,864,200	$15,840,800

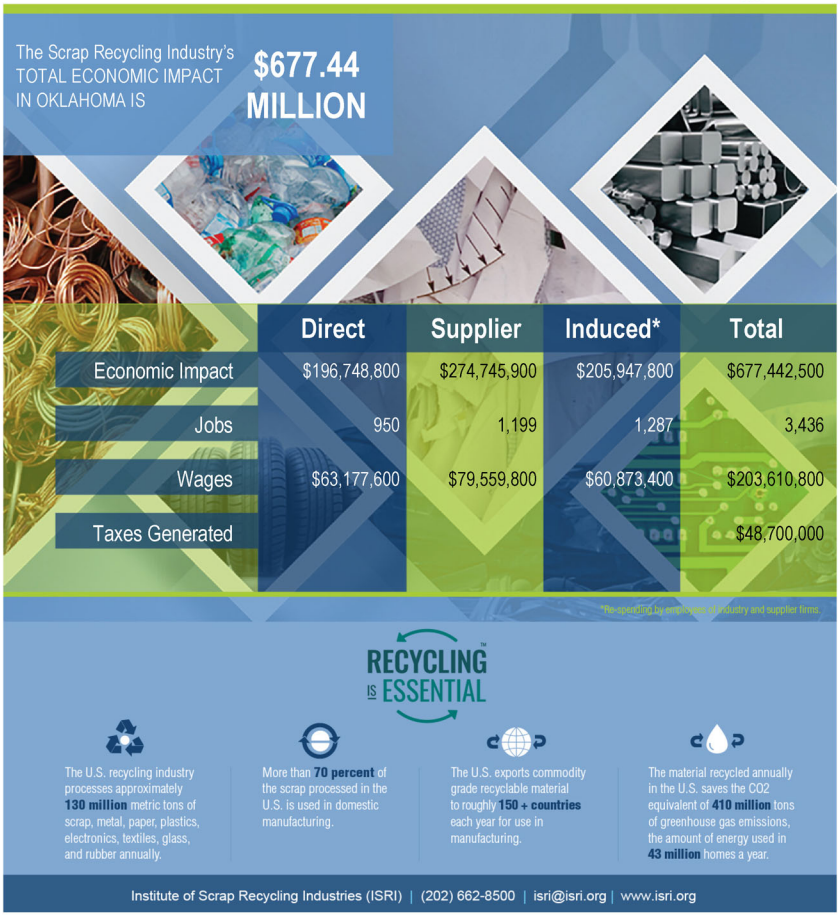
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OKLAHOMA

RECYCLING IS ESSENTIAL



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OKLAHOMA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	937	$62,243,400	$193,641,300
Brokers	13	$934,200	$3,107,500
TOTAL DIRECT IMPACTS	950	$63,177,600	$196,748,800

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	35	$579,200	$1,891,600
Mining	154	$16,784,800	$35,925,000
Construction	7	$439,400	$1,145,900
Manufacturing	283	$21,810,700	$123,070,700
Transportation & Communication	73	$7,340,200	$21,048,300
Wholesaling	40	$2,889,800	$9,539,500
Retailing	6	$206,400	$488,300
Finance, Insurance, & Real Estate	107	$4,941,500	$24,979,200
Travel & Entertainment	71	$1,635,900	$4,445,100
Business & Personal Services	407	$21,717,900	$48,768,700
Government	16	$1,214,000	$3,443,600
TOTAL SUPPLIER IMPACTS	1,199	$79,559,800	$274,745,900

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	94	$2,391,300	$7,820,700
Mining	73	$7,636,500	$16,715,900
Construction	13	$693,000	$1,864,600
Manufacturing	84	$5,244,600	$42,122,200
Transportation & Communication	61	$5,415,400	$20,192,600
Wholesaling	32	$2,310,700	$7,674,600
Retailing	151	$4,574,000	$11,852,800
Finance, Insurance, & Real Estate	135	$5,181,500	$40,300,000
Travel & Entertainment	164	$3,939,000	$11,019,400
Business & Personal Services	436	$21,549,700	$41,032,200
Government	16	$1,199,600	$4,525,000
Other	28	$738,100	$827,800
TOTAL SUPPLIER IMPACTS	1,287	$60,873,400	$205,947,800

TOTAL IMPACTS	3,436	$203,610,800	$677,442,500

Taxes	Federal	State	Total Taxes
Business Taxes	$32,617,900	$16,082,100	$48,700,000

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The Economic Impact of the Scrap Recycling Industry in the United States

OREGON

RECYCLING IS ESSENTIAL

The Scrap Recycling Industry's TOTAL ECONOMIC IMPACT IN OREGON IS **$2.52 BILLION**



	Direct	Supplier	Induced*	Total
Economic Impact	$1,048,311,800	$762,487,800	$712,954,700	$2,523,754,300
Jobs	3,519	4,164	4,884	12,567
Wages	$258,981,700	$253,418,900	$233,032,300	$745,432,900
Taxes Generated				$296,832,200

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

The U.S. exports commodity grade recyclable material to roughly **150 + countries** each year for use in manufacturing.

The material recycled annually in the U.S. saves the CO_2 equivalent of **410 million** tons of greenhouse gas emissions, the amount of energy used in **43 million** homes a year.

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The Economic Impact of the Scrap Recycling Industry in the United States

OREGON

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	3,489	$256,633,000	$1,041,699,300
Brokers	30	$2,348,700	$6,612,500
TOTAL DIRECT IMPACTS	3,519	$258,981,700	$1,048,311,800

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	345	$15,567,700	$29,415,800
Mining	20	$185,200	$2,322,900
Construction	73	$4,336,300	$11,303,200
Manufacturing	459	$33,254,900	$177,594,700
Transportation & Communication	410	$32,586,900	$123,994,900
Wholesaling	277	$22,022,900	$61,633,600
Retailing	31	$1,163,100	$2,337,300
Finance, Insurance, & Real Estate	305	$15,108,800	$77,938,800
Travel & Entertainment	332	$8,244,400	$21,363,800
Business & Personal Services	1,839	$114,762,100	$236,853,900
Government	73	$6,186,600	$17,728,900
TOTAL SUPPLIER IMPACTS	4,164	$253,418,900	$762,487,800

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	101	$3,659,100	$8,382,600
Mining	4	$82,000	$639,300
Construction	57	$3,367,800	$9,025,600
Manufacturing	169	$11,282,800	$74,918,900
Transportation & Communication	251	$18,379,600	$80,678,500
Wholesaling	141	$11,198,200	$31,472,200
Retailing	707	$24,016,600	$52,821,200
Finance, Insurance, & Real Estate	552	$25,667,700	$190,303,100
Travel & Entertainment	755	$19,072,300	$51,198,600
Business & Personal Services	1,926	$106,068,000	$193,273,100
Government	62	$5,386,900	$16,783,200
Other	159	$4,851,300	$3,458,400
TOTAL SUPPLIER IMPACTS	4,884	$233,032,300	$712,954,700

TOTAL IMPACTS	12,567	$745,432,900	$2,523,754,300

Taxes	Federal	State	Total Taxes
Business Taxes	$192,131,300	$104,700,900	$296,832,200

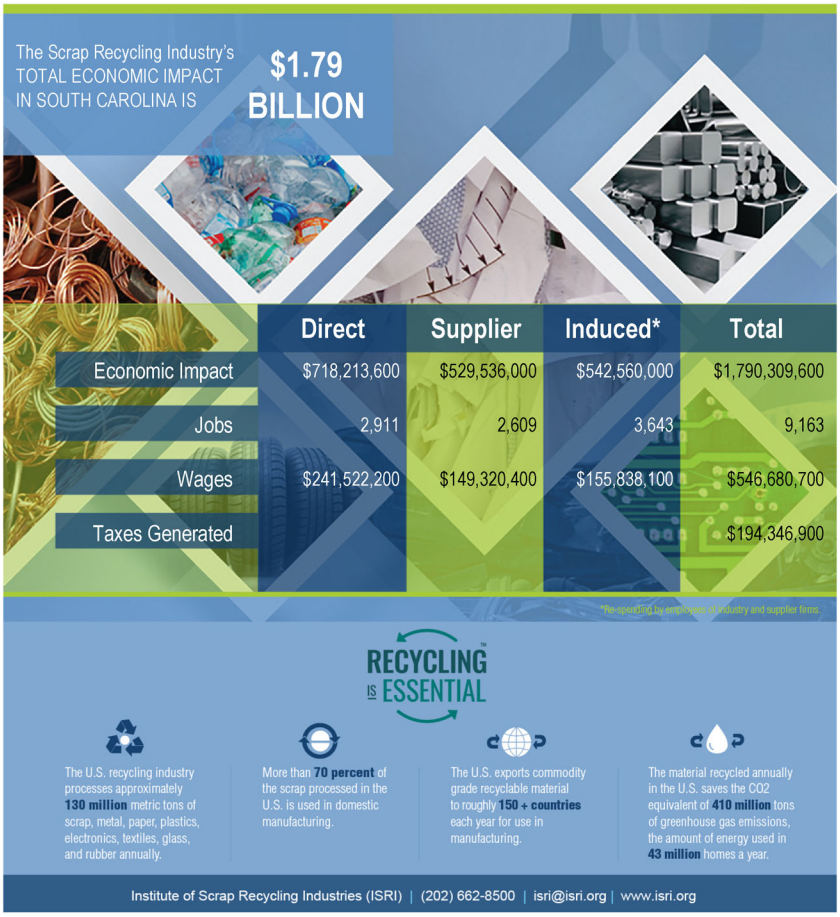
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SOUTH CAROLINA

RECYCLING IS ESSENTIAL



	Direct	Supplier	Induced*	Total
Economic Impact	$718,213,600	$529,536,000	$542,560,000	$1,790,309,600
Jobs	2,911	2,609	3,643	9,163
Wages	$241,522,200	$149,320,400	$155,838,100	$546,680,700
Taxes Generated				$194,346,900

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

The U.S. exports commodity grade recyclable material to roughly **150 + countries** each year for use in manufacturing.

The material recycled annually in the U.S. saves the CO_2 equivalent of **410 million** tons of greenhouse gas emissions, the amount of energy used in **43 million** homes a year.

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SOUTH CAROLINA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	2,812	$234,431,200	$695,718,800
Brokers	99	$7,091,000	$22,494,800
TOTAL DIRECT IMPACTS	2,911	$241,522,200	$718,213,600

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	93	$2,772,300	$6,431,600
Mining	6	$141,800	$967,000
Construction	34	$1,661,400	$5,175,400
Manufacturing	406	$30,771,500	$199,663,800
Transportation & Communication	240	$15,130,000	$61,263,500
Wholesaling	147	$10,839,300	$33,912,200
Retailing	21	$752,600	$1,840,200
Finance, Insurance, & Real Estate	231	$11,675,600	$52,831,800
Travel & Entertainment	206	$4,876,600	$13,980,000
Business & Personal Services	1,187	$67,382,900	$145,173,000
Government	38	$3,316,400	$8,297,500
TOTAL SUPPLIER IMPACTS	2,609	$149,320,400	$529,536,000

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	43	$578,200	$3,760,600
Mining	2	$62,100	$490,100
Construction	43	$2,134,900	$6,834,900
Manufacturing	178	$12,477,400	$89,173,200
Transportation & Communication	191	$11,764,800	$58,276,700
Wholesaling	101	$7,348,600	$23,131,800
Retailing	531	$15,621,900	$42,015,300
Finance, Insurance, & Real Estate	430	$19,472,100	$136,311,900
Travel & Entertainment	575	$13,166,200	$39,102,700
Business & Personal Services	1,405	$66,578,800	$129,055,100
Government	42	$3,523,000	$11,675,600
Other	102	$3,110,100	$2,732,100
TOTAL SUPPLIER IMPACTS	3,643	$155,838,100	$542,560,000

TOTAL IMPACTS	9,163	$546,680,700	$1,790,309,600

Taxes	Federal	State	Total Taxes
Business Taxes	$128,288,500	$66,058,400	$194,346,900

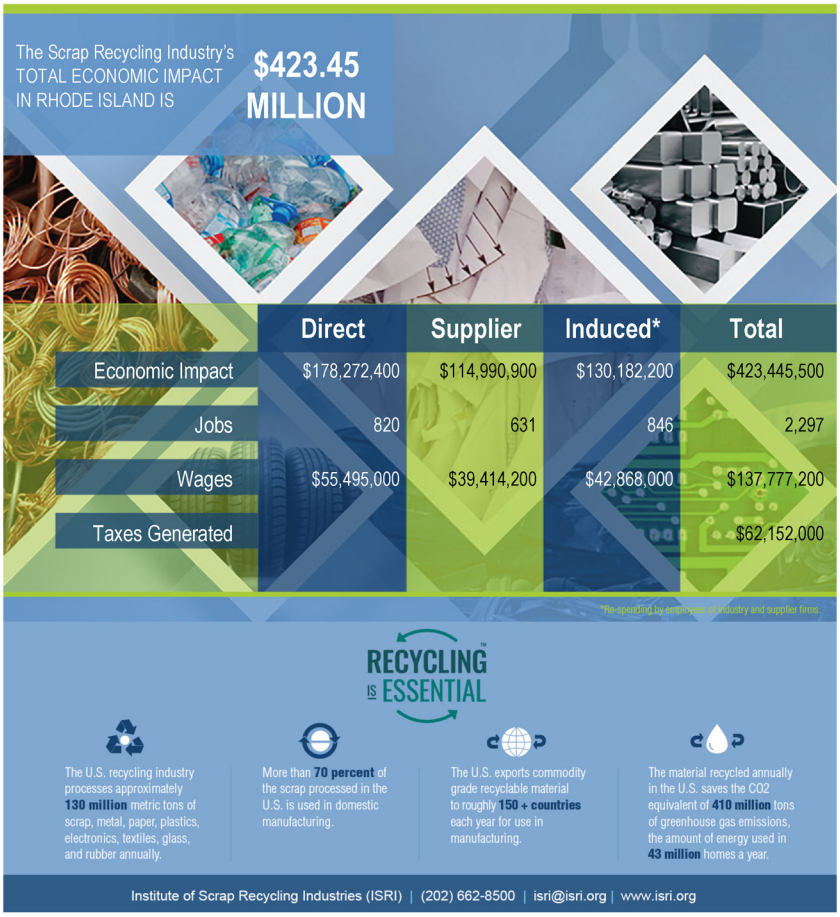
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RHODE ISLAND

RECYCLING IS ESSENTIAL



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RHODE ISLAND

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	756	$49,784,200	$161,937,600
Brokers	64	$5,710,800	$16,334,800
TOTAL DIRECT IMPACTS	820	$55,495,000	$178,272,400

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	1	$25,200	$74,400
Mining	0	$11,800	$71,200
Construction	7	$414,400	$1,080,300
Manufacturing	42	$3,011,600	$15,318,800
Transportation & Communication	60	$4,323,600	$16,367,800
Wholesaling	34	$3,086,400	$8,744,500
Retailing	4	$194,700	$393,500
Finance, Insurance, & Real Estate	69	$4,264,300	$20,074,800
Travel & Entertainment	60	$1,652,800	$4,346,500
Business & Personal Services	343	$21,477,900	$46,941,000
Government	11	$951,500	$1,578,100
TOTAL SUPPLIER IMPACTS	631	$39,414,200	$114,990,900

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	3	$65,900	$171,200
Mining	0	$10,500	$68,600
Construction	9	$572,700	$1,536,100
Manufacturing	28	$1,872,000	$10,920,500
Transportation & Communication	44	$2,999,600	$14,000,000
Wholesaling	26	$2,221,800	$6,339,900
Retailing	111	$4,360,900	$9,683,900
Finance, Insurance, & Real Estate	105	$6,198,500	$39,244,300
Travel & Entertainment	130	$3,489,000	$9,945,600
Business & Personal Services	364	$19,674,900	$36,201,500
Government	9	$727,200	$1,729,100
Other	17	$675,000	$341,500
TOTAL SUPPLIER IMPACTS	846	$42,868,000	$130,182,200

TOTAL IMPACTS	2,297	$137,777,200	$423,445,500

Taxes	Federal	State	Total Taxes
Business Taxes	$35,609,500	$26,542,500	$62,152,000

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The Economic Impact of the Scrap Recycling Industry in the United States

VERMONT

RECYCLING IS ESSENTIAL

The Scrap Recycling Industry's TOTAL ECONOMIC IMPACT IN VERMONT IS **$269.62 MILLION**



	Direct	Supplier	Induced*	Total
Economic Impact	$117,679,700	$75,262,700	$76,680,400	$269,622,800
Jobs	580	453	517	1,550
Wages	$31,914,600	$23,815,200	$22,974,300	$78,704,100
Taxes Generated				$40,052,400

*Re-spending by employees of industry and supplier firms.

RECYCLING™ IS ESSENTIAL

The U.S. recycling industry processes approximately **130 million** metric tons of scrap, metal, paper, plastics, electronics, textiles, glass, and rubber annually.

More than **70 percent** of the scrap processed in the U.S. is used in domestic manufacturing.

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VERMONT

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	580	$31,914,600	$117,679,700
Brokers	0	$0	$0
TOTAL DIRECT IMPACTS	580	$31,914,600	$117,679,700

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	22	$539,600	$1,319,300
Mining	0	$31,000	$220,200
Construction	5	$272,900	$667,000
Manufacturing	30	$1,942,600	$10,206,000
Transportation & Communication	42	$2,641,900	$10,243,900
Wholesaling	22	$1,625,500	$5,257,000
Retailing	3	$134,100	$295,700
Finance, Insurance, & Real Estate	36	$1,594,600	$10,339,800
Travel & Entertainment	44	$1,074,400	$2,965,000
Business & Personal Services	240	$13,256,900	$32,506,300
Government	9	$701,700	$1,242,500
TOTAL SUPPLIER IMPACTS	453	$23,815,200	$75,262,700

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	15	$242,600	$1,147,200
Mining	0	$21,300	$175,300
Construction	6	$325,900	$828,100
Manufacturing	25	$1,463,600	$10,848,200
Transportation & Communication	26	$1,599,000	$7,406,900
Wholesaling	13	$952,300	$3,102,100
Retailing	70	$2,363,200	$5,764,100
Finance, Insurance, & Real Estate	55	$2,435,500	$20,368,400
Travel & Entertainment	76	$1,807,000	$5,454,100
Business & Personal Services	214	$10,897,600	$20,191,600
Government	5	$501,600	$1,195,400
Other	12	$364,700	$199,000
TOTAL SUPPLIER IMPACTS	517	$22,974,300	$76,680,400

TOTAL IMPACTS	1,550	$78,704,100	$269,622,800

Taxes	Federal	State	Total Taxes
Business Taxes	$19,957,500	$20,094,900	$40,052,400

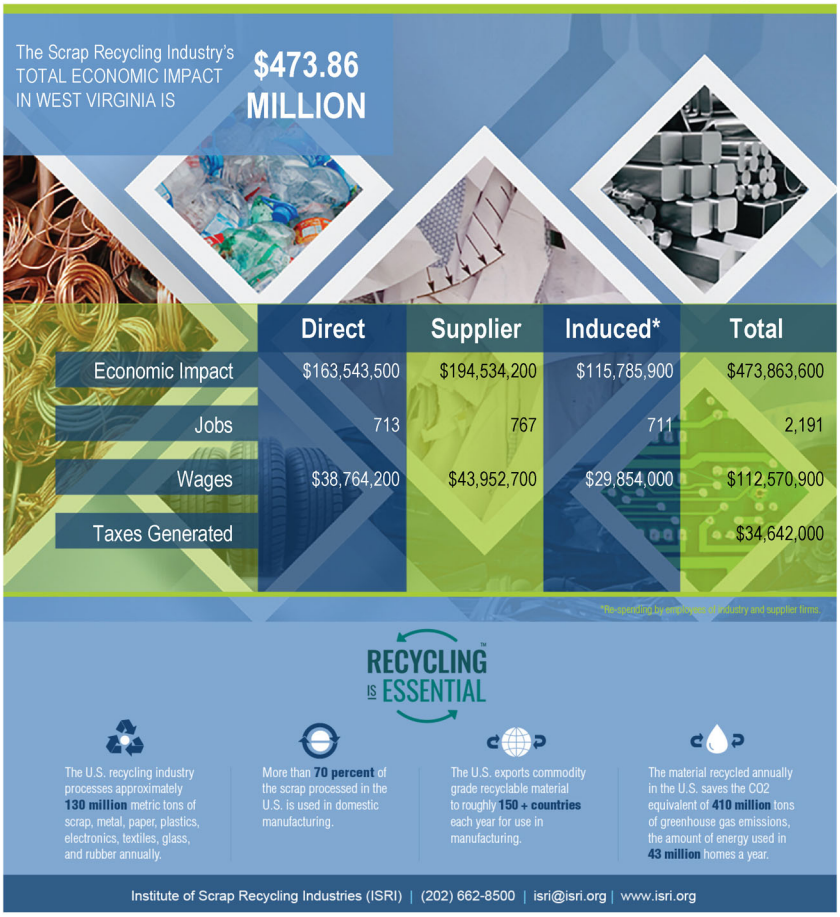
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WEST VIRGINIA

RECYCLING IS ESSENTIAL



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WEST VIRGINIA

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	713	$38,764,200	$163,543,500
Brokers	0	$0	$0
TOTAL DIRECT IMPACTS	713	$38,764,200	$163,543,500

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	43	$2,245,800	$3,426,200
Mining	69	$5,564,400	$39,072,800
Construction	8	$504,000	$1,475,800
Manufacturing	116	$8,256,600	$70,311,400
Transportation & Communication	63	$4,455,800	$17,610,600
Wholesaling	37	$2,461,100	$8,354,800
Retailing	4	$153,900	$389,000
Finance, Insurance, & Real Estate	45	$2,013,400	$11,060,800
Travel & Entertainment	52	$1,160,800	$3,369,100
Business & Personal Services	317	$16,234,400	$37,135,300
Government	13	$902,500	$2,328,400
TOTAL SUPPLIER IMPACTS	767	$43,952,700	$194,534,200

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	26	$71,400	$1,038,000
Mining	23	$1,709,400	$11,451,200
Construction	7	$407,700	$1,228,600
Manufacturing	33	$2,265,600	$20,853,900
Transportation & Communication	35	$2,248,100	$10,350,600
Wholesaling	18	$1,225,100	$4,183,900
Retailing	97	$2,731,400	$7,574,700
Finance, Insurance, & Real Estate	69	$2,761,900	$25,223,600
Travel & Entertainment	102	$2,210,900	$6,739,900
Business & Personal Services	276	$13,108,900	$24,665,200
Government	9	$634,400	$2,167,600
Other	16	$479,200	$308,700
TOTAL SUPPLIER IMPACTS	711	$29,854,000	$115,785,900

TOTAL IMPACTS	2,191	$112,570,900	$473,863,600

Taxes	Federal	State	Total Taxes
Business Taxes	$22,754,800	$11,887,200	$34,642,000

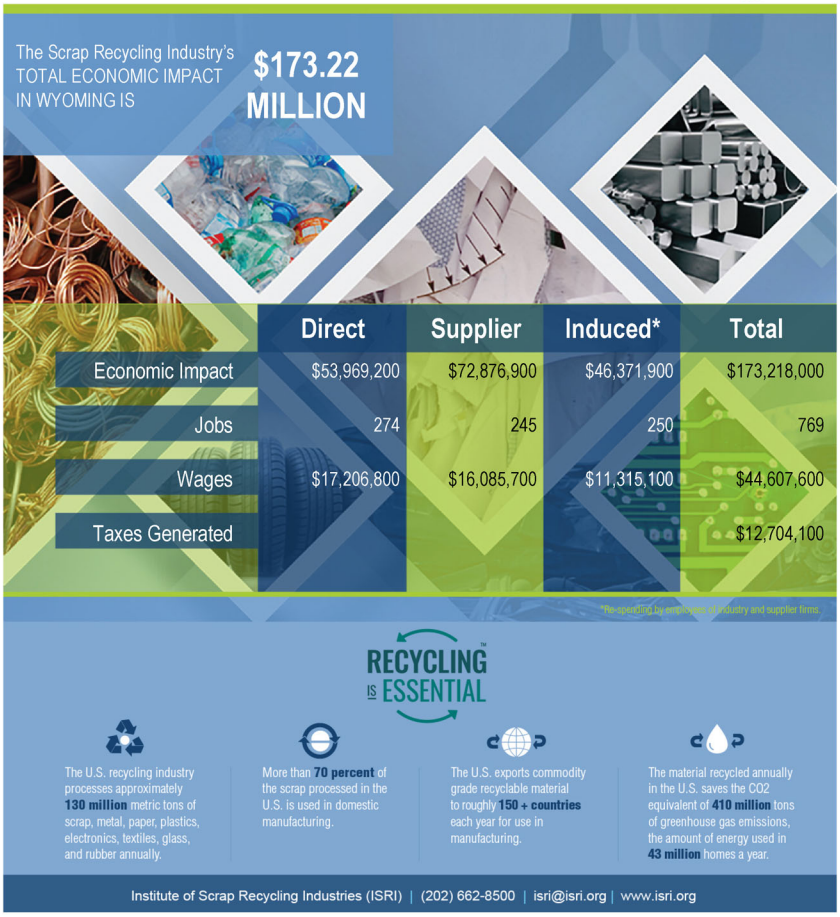
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WYOMING

RECYCLING IS ESSENTIAL



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WYOMING

RECYCLING IS ESSENTIAL

Direct Impacts	Jobs	Wages	Economic Impact
Recyclers	274	$17,206,800	$53,969,200
Brokers	0	$0	$0
TOTAL DIRECT IMPACTS	274	$17,206,800	$53,969,200

Supplier Impacts	Jobs	Wages	Economic Impact
Agriculture	8	$312,300	$621,600
Mining	44	$4,651,700	$26,313,600
Construction	2	$131,000	$358,300
Manufacturing	21	$1,941,400	$18,084,600
Transportation & Communication	19	$1,494,900	$5,626,000
Wholesaling	10	$971,700	$2,564,300
Retailing	2	$53,400	$137,500
Finance, Insurance, & Real Estate	23	$929,600	$5,298,000
Travel & Entertainment	18	$404,700	$1,210,800
Business & Personal Services	95	$4,904,400	$11,963,000
Government	3	$290,600	$699,200
TOTAL SUPPLIER IMPACTS	245	$16,085,700	$72,876,900

Induced Impacts	Jobs	Wages	Economic Impact
Agriculture	17	$360,300	$1,650,000
Mining	16	$1,652,800	$8,624,500
Construction	3	$157,900	$445,400
Manufacturing	6	$570,700	$7,507,400
Transportation & Communication	12	$868,900	$3,994,000
Wholesaling	6	$604,300	$1,607,800
Retailing	31	$955,400	$2,699,300
Finance, Insurance, & Real Estate	29	$943,600	$8,677,700
Travel & Entertainment	36	$746,500	$2,439,600
Business & Personal Services	86	$4,038,200	$7,808,100
Government	3	$244,700	$773,500
Other	5	$171,800	$144,600
TOTAL SUPPLIER IMPACTS	250	$11,315,100	$46,371,900

TOTAL IMPACTS	769	$44,607,600	$173,218,000

Taxes	Federal	State	Total Taxes
Business Taxes	$8,818,600	$3,885,500	$12,704,100

Some details may not add up due to rounding.

Senator CARPER. We look forward to asking those questions. Thank you for that statement.

Senator Inhofe has another obligation that requires his attention. He has asked to go first. I am happy to do that. He will be followed by Senator Whitehouse, and then I think Senator Capito, and then onto Senator Merkley and Senator Stabenow. I will go late in the game.

Senator Inhofe, thank you.

Senator INHOFE. Thank you, Senator Carper and Senator Capito, for your courtesy.

My first question references the article I have already made part of the record by Andrew Wheeler, and it goes to Mr. Johnson.

Mr. Johnson, I continue to be concerned about the challenges associated with recycling renewable technologies like solar panels and wind turbines. I am reminded of a Bloomberg article from last year titled Wind Turbine Blades Can't Be Recycled, So They're Piling Up in Landfills. Mr. Johnson, are you aware of any technologies that exist today that can reliably recycle solar panels or wind turbines, particularly the wind turbine blades?

Mr. JOHNSON. Well, first let me compliment Andy Wheeler, who was a phenomenal spokesperson for the recycling industry. He spoke at our meetings, as well as many of our friends' meetings. What a terrific advocate for that, as well as his public service announcements for getting the cardboard back during the COVID crisis. He deserves a lot of credit.

Senator INHOFE. And he endured working for me for 14 years.

Mr. JOHNSON. I was going to get to that, but not quite the same way.

[Laughter.]

Mr. JOHNSON. But to your question, at this point, those are terrific challenges. Right now, we are not able to recycle those materials.

Senator INHOFE. What is out there? How optimistic are you that something is going to work?

Mr. JOHNSON. Well, as I mentioned, market demand. If there is a market demand, my members figure out how to do it. We are businesspeople, and if there is a way, we will figure it out. Right now, we haven't quite figured it out. Let us just say that.

Senator INHOFE. OK. The second question is also for Mr. Johnson. The electric vehicle batteries face similar recycling challenges. While conventional lead acid car batteries are highly recyclable, lithium-ion batteries used for EVs are very difficult to recycle.

Mr. Johnson, are you concerned that if we don't adequately plan for and prepare for the disposal of spent electric vehicle batteries, solar panels, and wind turbines, that we are potentially creating a new Superfund site? Could you characterize it that way?

Mr. JOHNSON. The definition of Superfund site I might quibble with you, but yes, there is a very large concern with recycling electric vehicle batteries. I would first start with the safety issues. Even while fully discharged, they can be quite dangerous and harm, if not kill, the people trying to remove them from the cars.

After that, there is a number of problems with the fact that the electric vehicle batteries right now, there are four, five, six different chemistries that are not compatible with one another. So it

is sort of a VHS-Betamax situation, where we are waiting for the standard of one of those to sort of win out.

In the meantime, for actually processing or recycling the batteries themselves, there is a lot of investment going into it right now to try to take care of what is coming in at this point. Cars usually last around 12 years on average, so we are starting to see some of these electric vehicles come into our facilities now. So we are trying to respond to that.

There is a lot of investment going into it, but right now, I do not believe that we have the capacity to handle it, and it is going to have to ramp up very quickly, especially with the projections from the Administration to try to get many more electrical vehicles on the road.

Senator INHOFE. OK, Mr. Johnson. I appreciate that very much. You might separately send me a document as to where we quibble, OK?

[Laughter.]

Senator INHOFE. Thank you very much to the Chairman and the Ranking Member for giving me this time.

Senator CAPITO [presiding]. Thank you.

Senator Whitehouse.

Senator WHITEHOUSE. Thank you very much, Chairwoman.

Ms. Elias, I would like to talk about plastic waste recycling and where we are on that. We have put considerable effort into plastic waste recycling. A great many Americans have a blue bin that they fill with recyclables to take out there. There is a lot of noise and talk about recycling, and the industry loves to talk up recycling, I think, to help create the general apprehension or the general appearance that plastic gets recycled.

But the information that I have is that on the input side, when, particularly single use plastics are being manufactured, 98 percent or 99 percent of the input is virgin plastic, leaving less than 2 percent, maybe only 1 percent, one in a hundred, to be sourced as recycled plastic. I mean, that rounds basically to zero.

So, when the plastics industry is manufacturing plastics products, and in this case, particularly single use plastics, the disposable stuff, it is basically entirely new plastic going in. There is essentially no meaningful recycled contribution. So, to me, that is kind of a significant measurement.

Now, if you go to the take up side, the so called recycling side, the statistics I have are that less than 10 percent of what actually goes into that blue bin ever gets recycled. It may not be recyclable in the first place because there is not a very clear marking as to what plastics are and are not recyclable. It may very well just end up in a landfill, or end up on a container ship, smashed together and packed off to some place in Asia, where it ends up in a landfill there, and maybe after time, washed down creeks and into rivers, and ultimately into the sea.

And at the same time that we have essentially zero recycling input into plastics manufacturing and less than 10 percent of real recycling and what we consider to be our recycling stream, we are dumping, as a world, so much plastic into the ocean that we are headed for, as the Chairman suggested, if things don't change,

there is going to be more waste plastic floating around in the ocean than there are fish swimming around in the ocean, by mass.

And that is just a rotten thing to do to the planet, and it is a horrible legacy for our grandchildren. It is kind of on us to do something about that, I would think.

So I would like your comment on whether you think, first of all, my facts are right, that we are essentially zero on input, that we are under 10 percent on real recycling and the rest of it is kind of performance art to stand up a relatively fake narrative that recycling is real, and at the end of the day, most of this stuff ends up in regular waste streams, and some of that is very irresponsibly done in foreign countries and ends up in oceans.

Pretty fair description, and what should we do about it?

Ms. ELIAS. Yes, that is absolutely a fair description, and very much——

Senator WHITEHOUSE. Are you mic'd?

Ms. ELIAS. Am I mic'd now?

Senator WHITEHOUSE. There we go, yes. You are good to go.

Ms. ELIAS. Is that good?

Senator WHITEHOUSE. Yes.

Ms. ELIAS. Thank you. Technology is not my strong suit.

But your facts are absolutely right, and very much consistent with what we have heard in the past in conversations with various experts.

Again, to reiterate, thank you so much, you and Senator Sullivan, in so many ways, started this conversation in the Senate with Save Our Seas and Save Our Seas 2.0. Your staff has been absolutely amazing.

I think we are at a point now where we need to take that next step because of the performance art that you discussed. I think we really need a system like extended producer responsibility, as proposed in Senator Merkley's Break Free From Plastic Pollution Act.

You are right, there is so much stuff now coming into our homes, and the vast majority of it, 87 percent of our plastic packaging is either being landfilled, burned, or leaked into nature. And because of the artificially low prices on virgin plastic materials, we are just going back to the earth to create that next set of materials, and instead of having a circle, the life span is actually a line: Taking petrochemicals from the earth, turning it into some product, using it, and disposing of it.

While any number of these materials are absolutely essential, I think about our masks, I think about our medical equipment, I think about all of the important food grade plastics that address some of our food insecurity and food waste issues that Secretary Biser brought up, a lot of it is stuff that we don't want and we don't need, and that is being seen as a growth industry for some of our friends in the plastics industry.

We actually commissioned public opinion polling by a great firm, Corona Insights. What they heard in their conversations with people around the world, it was something like 86 percent of the public feel like there is just too much stuff coming into their lives, and it has become unavoidable. If you want to buy something, it is going to come in that packaging. You are going to put it in your

blue bin, hoping that it will be recycled, hoping that it will achieve circularity, and very much knowing that it will not.

What is good about the Break Free From Plastics Pollution Act, and I hope will become a discussion topic, this is why it is supported by the American Beverage Association, similar concepts, again, by Danone, Unilever, and Mars, a number of our other friends, is it sets real standards for recyclability, recovery, and use of recycled content. And then market signals through eco-modulation to shift production and use from materials that can't be recycled, that have a big impact on the environment and on public health to materials that can feasibly be recycled and really put dollars toward the kind of innovation we need to see to make recycling actually work.

I think it is a win-win. There is broad support for it. Industry, when ABA came to us and said we want every bottle back, we want old bottles to become new bottles, I think they really meant it, and industry is willing to put dollars into the system to have some assurances that they will have consistent, high quality access to recycled content going forward. So when you buy your beverage, you buy your snack, you feel good about what is inside of it and what is outside of it.

Thank you for the question, and thank you for your incredible leadership.

Senator WHITEHOUSE. My time has expired, but I would just add as a chemistry note, that this stuff doesn't break down back into natural things. It just lives on as plastic indefinitely. Natural stuff breaks down into natural things, and that is part of the cycle of life. Plastic is new to this world, and it doesn't break down in the way the good Lord set up the Earth to be able to cycle things.

Thank you.

Senator CARPER [presiding]. Thank you, Sheldon. Thanks for your leadership, and that of our colleague from Alaska, very, very much.

Senator Capito has graciously agreed to just yield to others that are here. I think Senator Merkley is next, followed by Senator Stabenow, and we will take it from there. Thank you.

Jeff, thank you.

Senator MERKLEY. Thank you very much, Mr. Chairman.

I was just looking at a chart put together by Eunomia to compare all 50 States and their recycling rates, and particularly looking at the plastic bottle challenge. There are four States, five actually, that have hit over 50 percent: Maine at 78 percent, Oregon at 69, Vermont 51, California and New York at 57 percent. Then, the vast bulk of States are under 20 percent.

Ms. Biser, I was wondering about North Carolina, because of the important work you are doing in many sectors, but in this category of PET bottles, plastic bottles, 8 percent on North Carolina. It is pretty far down there.

Has North Carolina considered how to really focus on this problem of plastic bottles? I know that the expression that was in the testimony of reduce, reuse, recycle. But with plastic bottles, the truth is, it is burned, buried, or borne out to sea, all three of which create significant environmental challenges.

As we wrestle with it State by State, Oregon was the first one to have a bottle bill. I am disappointed to see that Maine has a higher recycling rate than us, but at least we are hanging in there at second, hopefully to improve. But has North Carolina considered the possibility of doing something to boost themselves from the 8 percent level to the above 50 percent level through some sort of deposit strategy or other strategy?

Ms. BISER. Thank you for that question, Senator. There has not been any bottle deposit legislation introduced recently. North Carolina has focused on its return of PET bottles, though. We have some important industries and some market demand in the State that is important that we find the material to feed. Unifi, which is located in Yadkin County, a rural county in our State, is a good example of that where, when we were losing textile jobs back in the 2000s, they found a way to convert PET to polyester yarn. But we need to find a way to help folks like Unifi get those bottles.

We found significant, and I am not sure about the 8 percent number you referenced, but we have found success before and actually doubled our plastic bottle recycling rate about a decade ago. Again, not nearly where it needs to be, but by investing in curbside recycling programs, market development grants, and a lot of education for our residents, but we do have a long way to go.

Senator MERKLEY. Well, the thing that those States that are over 50 percent and up have in common is a deposit system. So, Ms. Elias, essentially, no State has succeeded in having a significant amount of bottles recycled without a deposit system. As we look to best examples, is that kind of the best example we have or the best strategy we have right now, is to encourage recycling through a deposit?

Ms. ELIAS. Yes, we absolutely think that a deposit return system needs to go hand in glove with an EPR system. We have absolutely seen that deposit return systems provide an incredible incentive for consumers to bring that product back, get it back into recycling system, have it pre-sorted so that products can become a product again.

PET obviously has incredible ability to become a new product time and time again. PET only represents 7 percent of what is in the blue bin. So we are really looking for something that gets that material back, but also addresses the other 93 percent and figures out a way for it to have continued value in the system. So we would like to see both.

Senator MERKLEY. Great. Extended producer responsibility, I appreciate your focusing on it and highlighting it, because there are many different forms it can come in, but I think that is essential.

Mr. Hawkinson, you noted kind of the growing skepticism of consumers. This weekend, I was up in Erie, Pennsylvania, and the hotel had paper plates, and the paper plates said recyclable and renewable in big print, and then they had asterisks, and they had little tiny print. I couldn't read the tiny print, so I took a picture of it and expanded it.

I just thought about that as you were speaking, and I went back just now, and transcribed what it says. It says "Recyclable and renewable" in big print. Then, it has a star by the recyclable, and it says "May be recycled if you have access to a recycler that accepts

paper products containing food residue. Such facilities may not exist in your area."

Then on renewable, it has two stars, two asterisks, and under the two asterisks it says, "Contains a 91 percent renewable material," and then it goes on to define renewable material as "new trees." So, it is not actually recycled content.

It is really confusing, right, because you see recyclable and renewable and you think, oh, this means they are using existing fiber that has been recycled from other products, and yay for that, and also this is going to get recycled. But then you read the details, and it is like, no, this is coming from trees, and if you have food on it, it is probably not going to get reused.

Do we need to really work at having terms or a system where people can kind of go, oh, well this product actually is recycled, or really is recyclable in most cases, and not kind of this kind of fine print, well, kind of pretend?

Mr. HAWKINSON. Thank you. First of all, paper products are made from a renewable resource. That is wood fiber from trees that are infinitely renewable, or recycled fiber that has been used once before and put into the plate. So, the paper plate that said it was made from renewable fiber is made from renewable fiber, whether that is new fiber or recycled fiber. It is recyclable, depending on the collection system in the jurisdiction that you are in.

The Federal Trade Commission establishes the definitions for what marketing claims can be made around the title of recyclability. The threshold for being widely recyclable is at least 60 percent of U.S. population has access to an established——

Senator MERKLEY. OK, I am going to cut you off there because my basic question is, aren't these terms confusing to people, and you are going into a long definition of yes, there are definition behind them. Great, but I have a better question for you, because my time is running out, and I want to ask a better question.

Mr. HAWKINSON. OK.

Senator MERKLEY. Can you come up with a paper lid to replace this plastic lid on a McDonald's cup? Because the world would bless you. And I see you have one right in front of you, so here is, how do we replace these single use plastics with something like paper, which is so much more decomposable and recyclable than this plastic?

Mr. HAWKINSON. Right. Senator, I think there are members who are working on that right now, looking for applications of innovations in manufacturing processes, different kinds of packaging that will solve some of the problems that we are faced with in other packaging substrates.

Senator MERKLEY. Thank you.

Mr. Chairman, I will just close by saying the problem with plastics has exploded. The plastics in the seas will soon be equal to the weight of all the fish.

The microplastics are a big problem. We are now each consuming, it is estimated, a credit card of plastic every week in our food and our air and water. That is very unhealthy, especially for our children. Of course, the chemicals that are embedded in the plastic are very unhealthy, and so we really have to focus on this plastics challenge.

Senator CARPER. Amen.

OK, I think Senator Stabenow is next.

Senator Stabenow, thanks for getting here early and staying late. Thanks.

Senator STABENOW. Thank you, Mr. Chairman and Ranking Member. I just want to first just add my voice to the choir in terms of addressing plastics. Plastics resins are in everything, and that is the challenge. It isn't a natural fiber, and so it is important. It has been important to our economy; it is important in many ways, but we have to get our arms around this recycling regimen.

I have to tell you, I am putting in a plug for a company. I wear shoes every day that are made from recycled plastics, Mr. Chairman. They are called Rothy's, and now I feel like I should be a salesman.

Senator CARPER. What are they called?

Senator STABENOW. Rothy's. R-O-T-H-Y, and I feel like I should be a salesperson, because I converted several women in the Senate now to be wearing them. I will be talking to our Ranking Member about this. But we just need to be serious and aggressive in terms of what needs to happen.

I did want to share one other thing, too, in talking earlier about EVs. I just wanted to let you know, there is really important work being done on recycling right now. A lot of industries, a lot of companies in Michigan are doing research and development, and now are actually recycling. There is more that needs to be done.

Ford is partnering with a battery recycling startup, Redwood Materials, to reuse the raw materials from EV battery packs. They just announced it a few, actually, a couple days ago. General Motors is doing a major effort to educate the public on removing and recycling battery packs, and Nissan is reusing old batteries for automated vehicles. I know Toyota is working with folks in Michigan on taking batteries that aren't used in automobiles anymore, but using them for golf carts.

There are all kinds of ways that we are looking at, and Volkswagen is doing the same thing on recycling and creating their first recycling plant in Germany. We would love to have it in the United States. That is another discussion, but the point is, there is a lot being done, and it needs to be done.

I want to actually ask Mr. Hawkinson a question, because you want to talk about a success story; you are the success story. I am very excited that a lot of that success actually happens in Michigan around paper recycling, and the work that is being done and more that needs to be done.

But when we are talking about a 2020 paper recycling rate of two-thirds, basically, with more than 47 million tons of paper recovered, that is very impressive. I wish we had the same in plastics and other materials. I know that there is more that we can do to support you, and I wanted you to respond.

There is a bill I have introduced called the Protect America's Paper for Recycling, the PAPR Act, and the Chairman is a co-sponsor, and Senator Boozman is a co-sponsor, and others. It has good bipartisan support.

But this would stop waste to energy facilities from earning a tax credit for burning recyclable paper. We don't want that burned. We

want to recycle it. We want to use it again. So could you talk more about what you are doing, but also how this legislation could help you build on that success? We have policies right now that are going against what you are trying to do, and we need to fix it.

Mr. HAWKINSON. Thank you, Senator Stabenow, and thanks very much for your leadership on this issue.

Paper and paper based packaging mills are looking for new fiber, sourcing all that they can to make new products. A big problem is government incentives or directives that might divert recovered paper for use in things other than manufacturing.

We appreciate the work that you are doing in leadership and making sure that that doesn't happen. So, for example, someone might divert commonly recycled paper for use in combustion to generate energy, that would not count as recycling.

We think it is very important to protect the recovered fiber stream for use in manufacturing. We support the legislation; we submitted a letter of support for that. I wholeheartedly thank you for the work that you are doing on that.

Senator STABENOW. Thank you. Well, hopefully, we can get this done.

Secretary Biser, thank you for the work you are doing in North Carolina. In our bipartisan infrastructure bill that we passed, a bill of mine with Senator Portman, the RECYCLE Act, was included, as you know. And when you are talking about educating individuals as well as working with local governments and States and so on, I think this is so important.

Could you talk a little bit more about assisting local governments in recycling education efforts, and how does improving these practices really reduce cross-contamination that lowers recycling rates? Right now, we have a problem if folks aren't doing it right. So could you speak a little bit more about that?

Ms. BISER. Sure, and Senator, let me first of all thank you for your leadership on the RECYCLE Act. That is an important source of funding for States like mine to carry that message to our residents, who, poll after poll shows, are confused about how to recycle right.

What those dollars could go to help support are programs like North Carolina recently completed, where we worked with material recovery facilities within the State and mapped out what was accepted by each of those programs.

Then there are 18, we called it a MRF Shed map. There are 18 MRF Sheds within the State. Our recycling program created customized education materials for each of those MRF Sheds and worked with local governments within each of those areas to do a targeted social media campaign, and social media, but also traditional education as well. So having additional funding to do that on a more recurring basis would be very useful.

There is a lot of great traditional education methods that could be used, but there is also some innovative methods, such as cart tagging, where folks get actual feedback on what is in their bins. It is a program that can be done, where folks walk ahead of the recycling truck, look in it, get a little tag that says, hey, oops, you may have included plastic bags, for example. We will come back and re-collect.

I kind of compare it to, if I tell my daughter not to leave her socks out, and have her do it, versus me kind of putting it back in for her. The more we can engage our residents and how they are recycling correctly, the less contamination, and that leads to lower cost for the local recycling programs in their MRF contracts, as well.

Senator STABENOW. Thank you very much.

Thank you, Mr. Chairman.

Senator CARPER. Senator Stabenow, thanks very much for your leadership on these issues. It is great. We share a friend who is passionate about these issues as well. We were discussing some of this over the weekend.

All right, thanks.

OK, Senator Capito, please.

Senator CAPITO. Thank you. Thank you, Mr. Chairman.

Mr. Johnson, I mentioned in my opening statement that China had changed its policy toward accepting materials from our country. I am wondering, has the market already responded to this? What are you seeing in terms of how this is making our system more resilient, or what kind of impacts does it have?

Mr. JOHNSON. Yes, thank you. Yes, I think some of the commodities have already made terrific adjustments, paper being really a fine example of that. The metals industry, which is a large portion of our membership, has also been able to improve their quality as well.

One of the things that, as it looks like, most people look at this situation, and they say that China closed the door to all this material. I think it is also a wake up call. It is a wake up call to say that we can do a lot better with processing our materials and recycling them and reusing them here in this country, as well as other places. So many of the commodities have already adjusted pretty well.

Senator CAPITO. Let me ask you another question. I am from a rural State, West Virginia. I live in the capital city. We have had recycling bins here and there, but it is unsustainable for the municipality. They just can't afford it. They don't have the manpower, but not just that, the funds to be able to transport and figure out what to do with this. I would imagine, in rural America, this is a huge problem.

What kind of solutions have you seen? Is it a hub and spoke kind of solution, or Mr. Johnson, what are your members seeing? I am talking more residential, but it could be small business, small manufacturing recycling, as well.

Mr. JOHNSON. Yes. In the traditional way that recycling works, with metals to all the other, the commercial, industrial, as well as residential, what we would turn them into more of the scrap side of the business as feeder yards. So, what you are doing is you are collecting in lots of places, and then based on the transportation costs, delivering it to more of a central location where you have the equipment, the machinery, the technology to be able to make it into a high grade commodity to then be reused again.

Senator CAPITO. Yes. When you talk about education, I am sure you run into this in North Carolina. It is just so stop and start. Then when I heard Ms. Elias talk about deposit, I thought about

when I was growing up, probably you too, Mr. Chairman, we had Coke bottles. You would have the empty ones, and you would take them back, they had value. It was just the way you did things. Then in the advent of plastics, that went by the wayside, so maybe that was a good technology. It was forward thinking.

Mr. Hawkinson, I understand there is a burning question that my staff wanted me to ask: Are pizza boxes recyclable?

Mr. HAWKINSON. Yes, and thank you for asking that question. I think this is one of the remaining sort of urban legends around paper recycling.

Pizza boxes are recyclable. We set out to put out an industry statement to try to raise awareness and eliminate confusion in the marketplace around this issue a couple of years ago. As we do with all of our issues, we gathered facts to make sure that we had the data right, and upon which to make the statement.

So, we went out to our member mills who consume the two grades most likely to have pizza boxes, old corrugated containers and mixed paper. What we found is that 93.6 percent of all of that fiber consumed at our member mills, of those grades that contained pizza boxes, are accepted for recycling in the mills. So, overwhelmingly accepted; they are widely accepted in community recycling programs. We hope that any other community recycling programs that don't currently accept them do so.

Senator CAPITO. Well, I think what we are going to see later this afternoon is a breaking news crawl: Pizza boxes are recyclable.

[Laughter.]

Senator CARPER. Would the Ranking Member yield? What if the pizza is still inside the pizza box?

[Laughter.]

Mr. HAWKINSON. I am glad you brought that up, because one of the questions we asked in the research was, are they any things that preclude your ability to use these in manufacturing, and as you might imagine, pizza was the top answer, so probably the best way to think about think or remember it is: Pizza boxes are recyclable; pizza is not. Pizza boxes, not pizza.

Senator CAPITO. Well, my pizza boxes are always empty.

OK, so let me ask one other serious question here. You have obviously had great success in the Forest and Paper Association with recycling with your Juno technologies and others. We have heard a lot about the plastics and the low numbers. What lessons learned from what you have been able to do, and hearing the testimony today and concerns from the members, would you say could be correlated to a more efficient and successful plastics recycling?

Mr. HAWKINSON. As you recognized, the paper recycling rate reached 65.7 percent in 2020. That is about double what it was in 1990, and it didn't get there by accident. It is the result of the industry's recognition that we wanted to recycle more of our products, made investments in collection infrastructure, made a commitment to recycle more. We are doing a lot of education for consumers about what is recyclable and how to recycle properly.

And importantly, we are making investments in manufacturing technology to enable us to use more recycled fiber. I mentioned a number earlier, about $5 billion in manufacturing infrastructure to use recovered fiber that is going to come online. It began in 2018

and will come online through 2023. That sort of private sector investment is enabling us to use more fiber and increase the recycling rates for our products.

Senator CAPITO. Yes, and I would imagine, too, it also increases, as you do that, it increases your end rate, your user rate at the other end of the recycling life. There is somebody there to buy your product, and use it, and have it be efficient and all that, and I think that is an issue.

Thank you, Mr. Chairman.

Senator CARPER. Thank you, Senator Capito.

Now, while we know there is a whole suite of policy options that are available to us on this front, could each of you share, this is for the entire panel, could each of you share with us maybe the top one or two legislative actions that Congress could take, should take within the next year or so to really move the needle and help us move toward a more circular economy?

I am going to ask Ms. Biser to go first, please. Just one or two that we just got to do items.

Ms. BISER. Thank you. One of those items, Senator, I will have to thank the Committee for its work in working on infrastructure and education investment that can go down to States. Without the help of the Federal Government, we don't have the dollars available at the State level to sufficiently invest the level that we need to.

Water and wastewater infrastructure is a great example of the money that is coming to the State that we are going to be able to deploy to communities. Similarly, recycling could benefit from that investment as well.

The second thing I would say is grants and technical assistance to help grow State programs. States really have an important role to play in helping local governments and connecting with on the ground action, and the stronger the State program, the more regional and localized solutions we can develop to help support those communities who may not have the resources to address those issues otherwise.

Senator CARPER. Thank you.

Ms. Elias, same question.

Ms. ELIAS. Thank you. You know, this issue is so teed up at this point, and there is such a broad consensus for really making significant action across communities by industry, by the public, from Tennessee to Maine, California to Alaska. So I would go for the whole thing at this point and kind of see how far we can get.

My two things would be real policy signals to reduce truly unnecessary and problematic materials. Any system is not going to be able to handle the sheer volume of materials that are being used. The public doesn't want as many materials coming into their homes and into their lives.

The second piece is really to get the conversation going on extended producer responsibility, including a national bottle bill to get the market signals to really deliver the results that people and industry want to see and to ensure equity and parity between industries like paper that have really been leading the charge, and other industries and really lift all boats.

It is a big job, but I really appreciate you having the conversation and continuing to move the ball forward.

Senator CARPER. Thank you for being a part of that conversation.

Mr. Hawkinson.

Mr. HAWKINSON. AF&PA supports the RECYCLE Act. We think that the funding, especially, that goes to EPA is important. There are a number of things that it can do. We think the most important thing is the funding that will go to States, Indian Tribes, and communities that will do things like enable them to conduct community needs assessments to understand gaps in their programs so that they can fill that, so that they can understand and adapt effective practices in the work that they are doing.

Also funding to States so that they can provide technical assistance to the communities. We think that by being able to leverage those resources, communities are going to be able to make lasting improvements in their recycling programs.

The second thing that the Government can do is to stay out of the supply chains for paper manufacturing. Things like EPR, which are well intentioned, are in place in the U.S. for things that are hard to recycle: Mattresses, batteries, paint, those sorts of things.

For products like paper and paper based packaging, the collection system is well established and well participated in. We have a very high recycling rate. EPR is not going to appreciably increase the recycling rate for our products. It is, however, a tax on packaging, which will cause manufacturers to divert funds to paying that tax that could otherwise go to making investments in manufacturing. And that tax is going to disproportionately affect lower income Americans who spend a larger percentage of their funds on food and other necessities that come in paper based packaging.

So not adopting EPR at the national level would be a great thing to do. Another great thing to do would be to not adopt higher recycled content mandates for products. Every time a paper mill makes a product, it balances the source of fiber it uses based on availability, cost, performance on the paper machine, and the finished product characteristics. Recycled content mandates force fiber from products where it is most efficiently used into products where it is less efficiently used, creating both economic and environmental negative impacts.

Senator CARPER. Great. That is a lot to digest. That is good, thanks. Thanks so much.

Mr. Johnson, please. Same question, and then I am going to yield to our colleague from Alaska.

Welcome, Dan.

Senator SULLIVAN. Thanks, Tom.

Senator CARPER. Go ahead, please.

Mr. JOHNSON. Well, Brian stole all my stuff.

[Laughter.]

Senator CARPER. Repetition is a good thing. Actually, it is. Somebody told me the other day, we don't really absorb an idea until we have heard it about 15 times, so it is still early.

Mr. JOHNSON. I agree with both of his, but they shouldn't count against mine, so I get to add some.

The first is, and I will add into it, is policies that would encourage market development. Market development is the demand side.

That is going to pull everything through the system. That is how the market works; that is why people pay in the recycling system.

The other would be to encourage recycled content, but not mandates. We would want encouragement. It could come through all types of forms, from tax incentives, as well as just explaining to the people through the RECYCLE Act why it is so important. I would actually take you back to the World War II efforts, when we brought all of our old metal and things like that to the scrapyard to go back into being used in the war effort.

The second one would be promoting design. You need to design the products at the very, very beginning of the system in order to make it easier to recycle, to get the better yield back out of those products, and that makes recycling much more efficient and effective.

Since you gave me the option for three, I am going to throw one more in, and that is to actually change the nomenclature and actually the regulations in treating recyclables and recycling as a solid waste and a solid waste management system. We are—I think we both said this before, that recyclables are valuable commodities. They are being used in manufacturing. This is what manufacturers have done for a long time. By treating them as solid waste, it imposes a number of burdens and costs, as well as we talk about recyclables as waste, as trash, and it is certainly just the opposite of that.

So, I would encourage the Committee to look at legislation to have EPA reform the RCRA for recycling. It is an act that was written a long time ago. Making those changes, I think, would make both an appearance as well as a technical and a legal pathway toward recycling being much more efficient.

Senator CARPER. Well, collectively, you have provided a great to do list for our colleagues, and we are grateful.

Senator Sullivan, your name has been used not in vain earlier today.

Senator SULLIVAN. Oh, good.

Senator CARPER. With some of the good work that you have done with Senator Whitehouse and others. Please proceed.

Senator SULLIVAN. Thank you, Mr. Chairman, and I appreciate the witnesses here.

I do want to talk just briefly about the Save Our Seas Act and the Save Our Seas 2.0. I think that is an example of Senator Whitehouse, and all of us really, working together where you get key stakeholders, a lot of you guys were critical and important in getting this over the goal line, and working on both the executive branch, the Congress, industry, key conservation and environmental groups all worked together on this. You don't get everything you want. That is just the nature of getting things done here, right?

So, I think this issue, though, is really a unifying issue. You can get Democrats and Republicans and industry and environmental groups all on board, and I think we want to keep the momentum.

Let me ask Ms. Elias and Mr. Johnson, you may have seen in the infrastructure bill, there were significant funds on the implementation of Save Our Seas 2.0 that has got a domestic, international component. What would you see as important steps that

we can take, kind of on the implementation side of that legislation to make sure we continue this momentum?

Ms. ELIAS. Thanks, Senator Sullivan, and thank you again for your leadership on Save Our Seas and Save Our Seas 2.0. I was in the room; you had a great event with Senator Whitehouse on the Alliance to End Plastic Waste that was about to be reintroduced. Those are fantastic bills, obviously. Thank you to Mary Eileen.

There are any number of important pieces in that. I was on the phone with you a couple weeks ago with ABA and the CRS study, was it, that said the most comprehensive plastics legislation or materials legislation ever. I am not going to remember every provision that is in both of those bills, but we are very happy to see funding and full implementation going, and we will continue to keep an eye on that.

Senator SULLIVAN. Good, thank you.

Mr. Johnson, do you have a view at all, and maybe I am being too—I don't want to put you guys on the spot for quizzes on different sections, but just next steps in general on that? Because again, there is good momentum, and people want to see that, right? Who doesn't want to protect our oceans, clean up our oceans, keep sustainable oceans, sustainable fisheries?

These are huge issues for my State. Over 60 percent of all the seafood harvested in America comes from Alaska. We have more coastline that the rest of the lower 48 combined. So these are big issues for my constituents, but I think they are big issues for all Americans.

Mr. JOHNSON. Yes sir, and we fully support Save Our Seas 1.0 and 2.0, and thank you very much for doing all of that.

I completely agree with you. I would almost repeat some of the things I said to Senator Carper just now: Encouraging ways for my industry to be able to recycle all that plastic, to get that plastic out of the seas, and to find uses for it. That would be a great thing.

Our members—when we get it, it is a contaminated source. So some of the improvements to technology could be great, research and development for that, as well as the markets for that material, that there is something, so instead of just pulling it out of the seas and burying it or burning it, to find some uses for it, even if they are low level uses. That would be great.

Senator SULLIVAN. Good.

Let me ask, this is really for all the witnesses. In my State, it is estimated that nearly 70 percent of households do not have access to curbside recycling. And any transition to a circular economy that leaves rural America out I think is going to fail.

So, what do you recommend on how to address this issue? I have met many, many smaller communities throughout Alaska that are remote and have a difficult time accessing any of these programs. What are the best tools to increase access for recycling, particularly in remote communities?

Maybe we will start with you, Ms. Biser.

Ms. BISER. First of all, Senator Sullivan, thank you for your leadership on these issues.

Rural recycling does present challenges. We have a fair amount of rural communities in North Carolina as well; particular challenges in Alaska.

One of the things that you have to pay attention to is looking at how to make the economics of recycling work in rural communities, and one of the ways to do that is through hub and spoke systems. That is providing the central locations, where it may not be economical for small towns to have their own contracts for recycling pick up, but they can centralize their collection at a central place. Then it makes the economics work much better to have those types of accessibility.

There is also—I know Alaska does not have a material recovery facility in this State, which adds to the challenges, but having processing close by is also helpful. And again, with the market demand of creating the industries or attracting industries that can use that material as feedstock.

Last, I would say investing in curbside—after you take care of those first two, it is also just investing in the ability to bring carts to communities, making sure that they have the right education on how to use those carts in the right way, and to help create that circular economy in rural America.

Senator SULLIVAN. Good, that is a really good answer.

Anyone else wants to address this topic?

Ms. ELIAS. Yes, please. I will also answer your previous question in some more detail. WWF supports and celebrates Alaska's fisheries. They are some of the absolute best managed in the world.

As follow up, we would love to see further action on the Ghost Pier issues that represent such an amazing threat to well managed fisheries around the world. So that, and also U.S. accession, really having the U.S. have a seat at the table at the Basel Convention, so both really international issues.

On your second question, WWF supports a Federal, flexible framework to kind of lift up all regions of the country in the recycling space, but that system is not going to work for different areas. It needs to be flexible enough that it can be implemented where people work and live, and really bring private dollars to the table to make that collection work.

It is unrealistic to think that there will ever be enough Federal dollars, and it is not, at the end of the day, necessarily a Federal responsibility to make recycling work. But the good news is that the private industry really does want to invest.

We would like to see all the 20,000 municipalities that are in charge of recycling right now have some sort of additional financial support, and real goal posts for what that system should look like. Hopefully some of those dollars would make it to the right place in Alaska and elsewhere.

Senator SULLIVAN. Good, great answer. Thanks.

Anyone else?

Mr. HAWKINSON. At AF&PA, we are big fans of public-private partnerships. We are an inaugural funder of the Recycling Partnership, which channels private funding and technical expertise into communities to help build out collection infrastructure, education, and the ability to help improve, start or improve recycling programs in those communities to put up matching funds. We think that is a great model that could be used in Alaska to improve recycling there.

Senator SULLIVAN. Great, thank you.

Last word.

Mr. JOHNSON. Yes, so the hub and spoke is probably a very good way. For Alaska, and some of the other large States like that, recycling is a local activity. So I think Alaska is going to need to think about how it works best for Alaska, versus how it would be best in another State. So I think it is going to be up to Alaska to figure that out for themselves in that.

One of the things I would suggest though, with the hub and spoke, is making, with the education through the RECYCLE Act, is to have people understand with the recycling to get a better quality, and as that quality raises up, the value of the material increases. And when the value of the material increases, the costs for running the program, as well as the transportation, then can be included in the product. That may help make the program work a lot better.

Senator SULLIVAN. Right, right. Thank you very much.

Thank you, Mr. Chairman.

Senator CARPER. Senator Sullivan, thanks for joining us today. Thanks very much for partnering with our friend Senator Whitehouse in a great effort.

Senator SULLIVAN. Yes. We are the Senate odd couple, but we get a lot done.

Senator CARPER. We need more odd couples. I understand, over your left shoulder is Mary Eileen Manning?

Senator SULLIVAN. Yes, she has worked very hard on it.

Senator CARPER. For the record, I just want to say I can barely see her lips move when you spoke, and I want to thank her for her good work on this, as well. Thank you.

Senator SULLIVAN. She does great work.

Senator CARPER. I have one last question, and then we are going to wrap and go vote and go to other hearings and so forth that are taking place.

Quick question for Ms. Biser if I may. I think you mentioned that some 30, 40 percent of our Nation's food supply is wasted, while nearly 14 million Americans, a lot of whom are kids, experience food insecurity. What actions has the State of North Carolina taken to incentivize composting and food waste reduction efforts?

Ms. BISER. Thank you for that question, Senator Carper. This is an important issue, and one that we have a ways to go.

Where we have started in North Carolina is to help support local community programs who are doing drop offs for food waste donation. What we are seeing is that there has been great response from the residents in those communities when that option is made available. So we are currently exploring the opportunity to expand that within the State.

If I may, Senator, I may, as we are looking at how we can expand this, I might make some suggestions for how you all can help support that effort, as well. Thinking about the EPA food waste hierarchy, the No. 1 thing to do is to prevent food waste from occurring in the first place.

Having assistance, whether it is through grants to States, for example, for providing technical assistance to large generators of food waste would be very helpful. Programs like the Environmental

Stewardship Initiative could be expanded to help provide that technical assistance and reduce it to start with.

Second of all in that food hierarchy is feeding hungry people. As you mentioned, nearly 14 million households that are food insecure. There are items that could help States, especially like mine that have a lot of agriculture, such as transitioning from a food donation tax deduction to a tax credit. For those who don't have a lot of margin on their income, that could be a much more effective way to incentivize food donation, and further clarifying the food donation liability through the Emerson Act.

Then last, organics recycling is a nascent recycling compared to things like aluminum cans or bottles or paper. So the more infrastructure and education help we can get to help support those markets, the more the Federal Government can help by supporting the purchasing of compost, for example, to help strengthen that market, all of those things would be hugely helpful as the States are looking at their approach to this important issue. Thank you.

Senator CARPER. Thank you.

As we prepare to close out, I just want to thank Senator Capito myself, and everyone on this Committee, the staffs as well who work really hard on this stuff. We want to thank you for really excellent testimony today. Excellent testimony, very helpful. You helped us appreciate that our waste and related climate challenges are vast, but not insurmountable.

I am passionate, as you know, a lot of us are passionate about the promise of a circular economy to meet these challenges and allow us to have a more sustainable future. My hope, our hope, is that today's hearing will inspire and guide us all to strive together to achieve that more promising future.

I love the issue of recycling. I have loved it forever. I know you do, too. It is part of my DNA, and I know I speak for Senator Capito and Senator Boozman, who provide great leadership on these issues, along with Sheldon and Dan Sullivan and others.

But we are in a situation where we got a lot of people who are still looking for jobs. We will get a jobs report for labor, in about 10 days we will get one for the month of September. It will show how many people have found jobs, hopefully a lot, and also show how many people are still looking for work, and it will be a lot.

And this is just a great way, these industries, this is a great way to put people to work, including people whose skills, they don't have Master's degrees, or Ph.D.s, in most cases. They may not even have gone to college. But they can work; they want to work, and we can put a lot of people to work here. We can strike a blow on behalf of climate change and help us address that.

We can address blight. My wife and I took a road trip. Senator Capito knows that. When we had our week off back in the recess, we just drove around about four or five States, and too much blight, too much in Delaware and other places, as well. North Carolina looked pretty darn good if you will let me say that. But this is a great opportunity here for us just to knock the ball out of the park in so many different ways.

You have helped us, I think, move the needle and inspired us with what can actually be done here. My staff says, and my wife says that I quote Albert Einstein way too much. Two things that

Einstein said, I only know two quotes. One was the definition of insanity, you do the same thing over and over again and expect a different result, but the one I really love is, "In adversity, lies opportunity."

There is huge adversity here, huge adversity here. We see it every day as we travel through our neighborhoods and our States. We see it in our rivers and what is in our oceans. Great adversity, real opportunity, too. Opportunity to strike a blow for our planet and opportunity to put a lot of people to work, and to leave this Earth a better place for our kids and grandchildren.

That is our challenge; that is our opportunity. Thank you for helping us to realize that opportunity.

With that, I think I need to say, some housekeeping. I would ask unanimous consent to submit for the record a variety of materials that include letters from stakeholders and other materials that relate to today's hearing.

Is there objection? I don't hear any.

[The referenced information follows:]

The Association of Plastic Recyclers

October 5, 2021

The Hon. Tom Carper
Chair
Senate Environment and Public Works Committee
2410 Dirksen Senate Office Building
Washington, DC 20510

Dear Chair Carper:

The Association of Plastic Recyclers (APR), the international trade organization that serves as the *Voice of Plastics Recycling®*, appreciates the opportunity to provide comments to supplement the record of the September 22, 2021, Senate Environment and Public Works Committee hearing, "The Circular Economy as a Concept for Creating a More Sustainable Future." APR is committed to working in cooperation with the Committee to ensure that any legislation and policy achieves the goals of increasing the supply of quality material, enhancing our recycling infrastructure, and expanding markets for recycled material to promote the circular economy.

APR is the only organization that is focused exclusively on growing and sustaining the plastics recycling industry. We are the sole provider of technical and engineering solutions to ensure that plastic packaging is sustainable, recyclable, and can play a role in the circular economy.

APR's membership includes independent recycling companies of all sizes that are processing numerous resins, as well as consumer product companies, equipment manufacturers, testing laboratories, organizations, and others committed to the success of plastics recycling. APR works to enhance quality and increase supply through technical resources, testing programs, design solutions, corporate training, regulatory leadership, and education programs. The APR Design® Guide for Plastics Recyclability is recognized across the globe as the solution to the design challenges facing plastics packaging.

APR members are the recycling industry. APR is intimately familiar with every aspect of this business as our members exist at every link along the chain of recycling. Consumers start the chain by putting their recyclable products in the bin, and companies at the end of the chain buy and use that recycled material for new products. It is that end-of-chain demand that drives the entire system. Recycling breaks down when there is no waiting destination for the paper, plastic, glass, and metal that consumers want to recycle.

The following key points outline how every link of the recycling chain could be strengthened in order to tangibly support and grow recycling in this country.

1. **Improve consumer education and participation in recycling programs by better defining and labeling recyclable materials.**

   - In recognition of the business realities of recycling, any definition of "recyclable" must contain a market demand component. The APR definition is comprehensive and is provided below as a reference for the Committee as it discusses synchronization of what it means for an item to be "recyclable." APR's definition is also referenced as part of the Global Plastics Commitment of the Ellen MacArthur Foundation.

     - *An item is "recyclable per APR definition" when the following three conditions are met:*
       1) *At least 60% of consumers or communities have access to a collection system that accepts the item.*
       2) *The item is most likely sorted correctly into a market-ready bale of a particular plastic meeting industry standard specifications through commonly used material recovery systems, including single-stream and dual-stream MRFs, PRF's, systems that handle deposit system containers, grocery store rigid plastic and film collection systems.*
       3) *The item can be further processed cost effectively through a typical recycling process into a postconsumer plastic feedstock suitable for use in identifiable new products.*

   APR is eager to work with the Committee to develop a labeling system for products deemed to be recyclable. A better labeling system can provide a needed level of consistency for recycling programs across the country. The current overwhelming differentiation in how packaging is labeled - and what packaging materials are accepted - is a major contributor to the system's lack of collection and proper sortation.

2. **Enhance infrastructure to grow collection and improve sortation.**

   - Specific goals for recycling rates should be matched with adequate collection and sortation infrastructure development. Otherwise, we are setting ourselves up to fail.

3. **Increase demand for recycled content by creating content minimums and other strategies.**

   - The issue of recycled content supply, and the alleged lack thereof, is a primary narrative used by some consumer brands to justify their inability to incorporate more recycled content in their packages. However, in many instances, there is an ample supply of material available. APR's membership includes the nation's recyclers. As a result, we know what recycled material we have available to market. The fact is that some consumer brands balk at paying the market price for this material. The lack of supply is an incomplete argument; the reality appears to be there is not enough supply at the price that consumer brands are willing to pay.

The Association of Plastic Recyclers

- Consumer product companies must design their packaging so that it is easier to recycle in today's mechanical systems and recognize that they are their own raw material suppliers in a circular economy. It is difficult for recyclers to manufacture a clean supply of recycled resin if the stream of material they receive is contaminated with non-recyclable packaging.

- Recycled content requirements can increase – and, just as important, stabilize – the market for recycled material. Expanded and stable markets will also have a positive impact on the pricing of recycled material.

- Plastic bags with recycled content should be permitted under requirements similar to California SB 270, which essentially has become a national standard for the bag industry.

Again, APR appreciates the opportunity to provide clarity on the recycling of plastic packaging and its role in achieving a circular economy. We look forward to continuing to work with the Senate Environment and Public Works Committee. Please contact me if you have any questions.

Sincerely,

Steve Alexander
APR President & CEO

The RealReal

October 18, 2021

The Honorable Thomas Carper
Chairman, Committee on Environment and Public Works
United States Senate
Washington, D.C., 20510

The Honorable Shelly Moore Capito
Ranking Member, Committee on Environment and Public Works
United States Senate
Washington, D.C., 20510

Dear Chairman Carper, Ranking Member Capito, and Members of the Committee:

On behalf of The RealReal and its more than 23 million members worldwide, I would like to thank the committee for holding an important hearing on "The Circular Economy as a Concept for Creating a More Sustainable Future." We are encouraged by the Committee's bipartisan commitment to receiving input from a wide range of stakeholders as well as its series of roundtables, which The RealReal was honored to participate in. We are so pleased to have the opportunity to build on those conversations and share our viewpoint and policy recommendations on these issues as part of the hearing record.

Since I founded The RealReal 10 years ago, we have grown to become the world's largest online marketplace for authenticated, luxury resale. Our goal is to empower consignors and buyers to extend the life of well-made goods and contribute to a more sustainable future for fashion. The RealReal has kept more than 19 million items in circulation, diverting them from landfills and incinerators, and decreasing the need for new items to be produced.

Fashion's Exploding Negative Environmental Impact:

The fashion industry is one of the top polluting industries in the world, emitting more carbon than the aviation and maritime shipping industries combined. According to the United Nations Climate Change and Air Transport Action Group, the fashion industry contributes 10% of the world's total carbon footprint. By comparison, the entire aviation industry contributes 2%. If the fashion industry continues on its current trajectory, its share of the world's carbon footprint could jump to 26% by 2050, according to the Ellen MacArthur Foundation.

The fashion industry manufactures 80 billion garments a year, the production of which creates the vast majority (more than 70%) of the industry's emissions. According to the Ellen McArthur Foundation, clothing production has approximately doubled in the last 15 years. Global "fast fashion" brands like H&M and Zara produce up to 50 collections per year — a massive increase over fashion's standard two spring and fall collections.

As fashion production has increased, so has consumption and so has waste — both wasteful overproduction and the treatment of fashion as disposable. Consumers buy 60% more clothing and keep items 50% less time versus 15 years ago. According to the Ellen MacArthur Foundation, more than half of fast-fashion items are disposed of in less than one year. **The ultimate result is that a garbage truck's worth of textiles is landfilled or burned every single second**. It is a staggering statistic, especially when you consider that 95% of trashed clothing could be reworn, recycled, or reused. Clothing, particularly synthetic fabrics like polyester commonly used in fast fashion, can take up to hundreds of years to decompose in landfills and through the decomposition process releases methane, a harmful greenhouse gas.

Creating a Circular Economy in Fashion:

On its current trajectory, the fashion industry will miss by more than 50% the 1.5-degree pathway laid out by the Paris Climate Accord. However, recirculating just 20% of items would help achieve that goal, according to McKinsey & Company and Global Fashion Agenda's Fashion on Climate report.

This is why driving consumer participation in the circular economy is critical. Not only can it help the industry stay on track with the Paris Climate Accord, but each individual item kept in circulation has a positive impact. Through data from The RealReal's Sustainability Calculator, we know apparel kept in circulation through our marketplace alone has saved 20,200 metric tons of carbon and 976 million liters of water.

Unlike disposable fast fashion, well-made luxury items are designed to last a lifetime. The RealReal is empowering our tens of millions of members to contribute to a more sustainable future for fashion by keeping luxury fashion in circulation and minimizing the environmental impact per wear. We're also helping consumers monetize the assets in their closets and their homes. In the past two years alone, we've paid out more than $1 billion in commissions to our U.S. consignors. That's money back in their pockets to support the American economy, all from selling items they don't wear or use anymore.

We have also found that a commitment to circular fashion can create well-paying, green jobs in America. This month, we officially opened our newest authentication center in Phoenix, Arizona, an approximately 600,000 square foot facility that will create 1,500 local jobs over the next five years, ranging from entry-level positions to highly skilled roles. According to a Tellus Institute Study, recycling creates more jobs at higher incomes than landfilling or waste incineration.

UK and EU Environmental Legislation Could Have a Negative Impact in the US Without Comparable Bills Here:

We're beginning to see legislation emerge in Europe, where many fashion brands are based, to hold companies accountable for their environmental impact. In 2020, France passed a law that prohibits the landfilling and incineration of unsold fashion items, which is unfortunately a common dirty practice in the industry. This law requires companies to donate or recycle unsold items including clothing, shoes and other household goods. In the United Kingdom, the country's Environmental Audit Committee has called on the government to press brands to take greater responsibility for the waste that they create. And the European Commission has announced what many have hailed as the world's most ambitious set of anti-waste laws as part of their Environment and Climate Action programs to help enhance private sector sustainability efforts with the goal of cutting member states' waste production in half by 2030.

The US Can Take Simple Policy Steps with Significant Positive Environmental Impact:

As new regulations go into effect in other countries to reduce local impacts and pollution, we risk America becoming a dumping ground for surplus fashion.

There are several ways to better create, encourage, and promote a circular economy in fashion and apparel, and to curb the unsustainable rate of emissions from the fashion industry. We would recommend five potential solutions for consideration:

1. **Encouraging the purchase of resold or consigned goods through new monetary incentives for individuals such as a consumer-facing rebate at the point of sale or an individual tax deduction at the end of the year**.
2. **Mandating that the Environmental Protection Agency focus on the emissions and impacts from the fashion and apparel sector, and appointing a "fashion czar" to oversee government-wide efforts to reduce emissions from the fashion industry.**
3. **Instituting new penalties on harmful practices such as burning or landfilling unsold products while promoting incentives for companies to achieve circularity.**
4. **Rewarding supply chain innovations that invest in regenerative materials and production.**
5. **Limiting through regulation and taxation the proliferation of the ability for fast fashion businesses overseas, that wastefully overproduce with harm to the shared planet, to import and sell to American consumers.**

The RealReal

Conclusion

We cannot talk about addressing climate change without addressing fashion's role as a leading contributor. We know that extending the life of items that already exist is a critical component of reducing both waste and the harmful emissions from fashion and many other industries, and are encouraged by the Committee's hearing and stakeholder roundtables.

Thank you for your leadership on efforts supporting the circular economy.

Sincerely,



Julie Wainwright
Founder and CEO
The RealReal

SWANA
SOLID WASTE ASSOCIATION OF NORTH AMERICA

September 27, 2021

The Honorable Thomas Carper
Chairman
Committee on Environment & Public Works
United States Senate
Washington, DC 20510

The Honorable Shelley Moore Capito
Ranking Member
Committee on Environment & Public Works
United States Senate
Washington, DC 20510

RE: The Circular Economy as a Concept for Creating a More Sustainable Future

Dear Chairman Carper and Ranking Member Capito:

The Solid Waste Association of North America (SWANA) commends the Senate Environment and Public Works (EPW) Committee for holding the September 22 hearing, "The Circular Economy as a Concept for Creating a More Sustainable Future." SWANA is the largest professional association for the solid waste and recycling industry in the United States, with more than 10,000 members in 47 chapters. We are committed to advancing from solid waste management to resource management. Our members include both local government officials and private sector representatives in all fifty states.

Building a true circular economy is a pressing issue and your leadership is invaluable. China's National Sword policy disrupted recycling in America and abroad, but it also served as a wake-up call. New ways of thinking are necessary to ensure that recycling remains economically and environmentally sustainable now and into the future.

The recycling industry supports over half a million jobs throughout the United States. Recyclables are a critical source of raw materials for U.S. manufacturers and greatly reduce the environmental impact of extracting and processing raw materials into finished products. Recycling can and should play a significant role in the United States' economic growth and Climate Change commitments.

In order for these benefits to be realized, the federal government must provide ongoing support to municipal recycling programs. More than 100 local curbside collection programs across the Nation have suspended or reduced operations over the past three years, primarily due to issues of cost and contamination, both of which can be addressed through federal investment.

SWANA supports and applauds the inclusion of the RECYCLE Act (S.2941) into the Infrastructure Investment and Jobs Act (H.R. 3684) and urges its passage, but more is necessary. The RECYCLE Act provides $75 million over five years to support consumer recycling education and outreach, but there are more than 9,000 curbside recycling programs in the United States and 330 million Americans living in 140 million different households. SWANA research suggests that it costs about $1 per household per year to effectively communicate about recycling. This means at least $150 million is needed just for education.

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As I mentioned during the September 13 EPW Roundtable, "Investing in Recycling Infrastructure and Curbing Waste Stream Contamination," it is simply not realistic to expect local governments to bear these costs on their own. Cities and counties have limited resources, and when they choose between hiring more teachers or improving recycling education, they inevitably choose the former. Similarly, when the choice is between increasing pay for police or buying new recycling carts, law enforcement usually comes first. Recycling is critical infrastructure and deserves appropriate federal support.

Helping to support recycling education and outreach is one concrete way that the federal government can support municipal programs. Reducing the public's confusion around recycling is another. Senator Merkley's example of the "recyclable and renewable" claim on paper plate packaging he encountered at a hotel in Erie, Pennsylvania is a great example of how difficult it can be for consumers to make the right choices. More attention is needed on recycling claims made by producers. Millions of well-intentioned Americans put the wrong items in the recycling bin because of this confusion. The contamination that results has a real dollar and cents impact on programs. It costs more to clean-up the material and what is left is then worth less because of the contamination.

SWANA understands the challenges facing municipal recycling in the United States because our members are the stewards of those programs in every state. We urge the Committee and their Senate colleagues to continue their efforts to bring recycling into the 21st century. Transitioning to a circular economy is vitally important to protecting human health and the environment and must be thought of as an essential part of the Nation's infrastructure.

The final question asked to the four witnesses at the September 22 hearing was "what specific policy initiative should we consider?" SWANA's response is simple: the amount of annual funding for recycling-related purposes needs to be increased from $15 million to at least $150 million. Such funding would provide a meaningful opportunity for hundreds of local governments, include many smaller communities that have suspended curbside recycling programs in recent years, to revitalize, improve, and expand their recycling programs.

SWANA thanks the Committee for inviting our association to participate in the September 13 Roundtable and for holding this important hearing. We look forward to working with Committee members to build upon it and improve our Nation's recycling system. If you have any questions about municipal recycling or the contents of this letter, please do not hesitate to contact me at dbiderman@swana.org

Sincerely,

David Biderman
Executive Director & CEO

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cc: The Honorable Benjamin L. Cardin
The Honorable Bernard Sanders
The Honorable Sheldon Whitehouse
The Honorable Jeff Merkley
The Honorable Edward Markey
The Honorable Tammy Duckworth
The Honorable Debbie Stabenow
The Honorable Mark Kelly
The Honorable Alex Padilla
The Honorable James M. Inhofe
The Honorable Kevin Cramer
The Honorable Cynthia Lummis
The Honorable Richard Shelby
The Honorable John Boozman
The Honorable Roger F. Wicker
The Honorable Dan Sullivan
The Honorable Joni Ernst
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October 14, 2021

The Honorable Tom Carper
Chairman
Committee on Environment and Public Works
United State Senate
410 Dirksen Senate Office Building
Washington, DC 20510-6175

The Honorable Shelley Moore Capito
Ranking Member
Committee on Environment and Public Works
United State Senate
410 Dirksen Senate Office Building
Washington, DC 20510-6175

RE: September 22 Committee Hearing on the Circular Economy

Dear Chairman Carper and Ranking Member Capito:

The Can Manufacturers Institute (CMI) thanks you and the committee's interest in developing and sustaining a domestic circular economy for recycled consumer packaging. CMI is the U.S. trade association representing the metal can makers and suppliers. The can industry accounts for the annual domestic production of approximately 130.7 billion food, beverage, aerosol and general line cans; employs more than 28,000 people with plants in 33 states, Puerto Rico and American Samoa; and generates about $15.7 billion in direct economic activity.

Our industry is proud to make metal cans, the most sustainable, circular packaging available for food, beverage and household goods. Unlike other material types, metal cans are accepted in recycling programs across the country and have a healthy and robust end market, so metal cans can be remade into packaging and other products over and over again. Metal recycles forever and as Chairman Carper noted in his opening statement, 75 percent of aluminum ever mined is still in use today and he also mentioned that aluminum products made from recycled aluminum use 75 percent less energy, a significant benefit to the plant. In the case of steel, 75 percent of all steel ever produced is still in circulation. Cans are truly representative of the circular economy, where waste is eliminated and resources are circulated. The capture and reuse of materials is shrewd domestic manufacturing policy and creates jobs throughout the recycling supply chain.

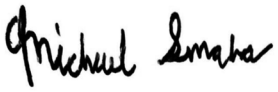
Congress can build a healthy and solvent recycling system by appropriating money that invests in the collection of materials with an economic value. Capturing higher valued materials for their resale to markets helps fund recycling programs, which are primarily funded by taxpayers at the local level. CMI applauds the inclusion of funding in the RECYCLE Act for recycling education grants from the Environmental Protection Agency (EPA) and for recycling

infrastructure investments in the bipartisan infrastructure funding proposal, which has passed the Senate and awaits action in the House. EPA has an important role to build a robust domestic circular economy. CMI thanks Environment and Public Works Committee member Senator Debbie Stabenow and her colleague Senator Rob Portman, for introducing the RECYCLE Act.

CMI requested additional appropriation funding for public education and recycling infrastructure investments, which would separate higher valued from the material stream, so more metal cans are captured, and their value reinvested in supporting local recycling programs. Further, more material would be properly sorted with state of the art, efficient equipment such as optical sorters, robots and eddy currents.

The domestic can manufacturing industry appreciates your interest in collecting and recycling more packaging material. CMI is proud to represent a circular and sustainable material. Congress plays a vital role in supporting a robust domestic manufacturing sector based on reusing materials for feedstock. We welcome the opportunity to participate in on-going stakeholder discussions and would welcome an opportunity to meet with the committee to discuss our recommendations. If I can answer any questions, please do not hesitate to contact me.

Best regards,



Michael Smaha
Vice-President, Government Relations
Can Manufacturers Institute

September 22, 2021

The Honorable Tom Carper
U.S. Senate
513 Hart Senate Office Bldg.
Washington, DC 20510

The Honorable Shelley Moore Capito
U.S. Senate
172 Russell Senate Office Bldg.
Washington, DC 20510

Re: PRC Statement for the Record – Senate Environment & Public Works Committee – Hearing on "The Circular Economy as a Concept for Creating a More Sustainable Future"

Dear Chairman Carper and Ranking Member Capito:

On behalf of the Paper Recycling Coalition (PRC) – an organization of eight member companies representing the interests of the 100 percent recycled paperboard and containerboard industries – we appreciate the opportunity to submit the following statement for the record regarding the Committee's hearing, entitled "The Circular Economy as a Concept for Creating a More Sustainable Future."

The PRC commends the Committee for evaluating the issue of circularity and the state of the nation's recycling system. The PRC supports the Committee's assessment of these issues and appreciates the Committee's support for inclusion of the RECYCLE Act in the Senate-passed "Infrastructure Investment and Jobs Act." As the Committee considers possible additional legislative policies affecting the recycling sector, the PRC encourages the Committee to recognize that recycling commodities are not created equal. Federal policy, therefore, should account for such differences rather than adopting a "one size fits all" approach to recycling infrastructure and system improvements.

I. About the Paper Recycling Coalition

The PRC's eight member companies represent the interests of the 100 percent recycled paperboard and containerboard industries. Our members operate 500 facilities in 45 states and support over 63,000 well-paid jobs with competitive benefits throughout the United States. PRC members manufacture 100 percent recycled paper products that are ubiquitous in American commerce, such as cereal and pizza boxes, tubes and cores, Amazon cartons, and other shipping containers and packaging critical to today's growing e-commerce economy.

The paperboard and containerboard manufacturing sectors are among the country's greatest economic and environmental success stories. The amount of used paper recovered for recycling has nearly doubled since 1990. In 2019, over 66 percent of all paper used by Americans was recovered to be recycled into new products, marking the tenth consecutive year with a rate above 60 percent.

As rates of paper recycling rise, the significant economic and employment benefits of paper recycling will be compounded. In addition to the 63,000 direct jobs PRC members support, the sector influences another 615,000 jobs across the recycling supply chain (collection, processing, and manufacturing), totaling nearly 680,000 U.S. jobs.[1] The annual economic impact of the paper recycling supply chain amounts to a staggering $150 billion.[2]

The domestic paper recycling sector is primed to drive $4.1 billion into recovered fiber investment between 2018-2025. These investments will add 7 million tons of additional U.S. manufacturing capacity in the form of new mills, new paper machines, paper machine conversions and the relaunching of idle mills. In fact, according to at least one industry survey, over a dozen domestic recycling mills representing millions in new investments will be coming online between 2018 and 2021, much of it able to process mixed paper feedstocks that used to be exported to China.[3] Further, 5 out of the last 7 paper mills opened in the U.S. are 100% recycled. These facilities were planned and built without federal subsidies or intervention.

Paper recycling also delivers real environmental benefits for the American people. By recycling paper and turning it into new 100 percent recycled paper products, PRC members prevent it from being landfilled where it degrades, producing methane, a potent greenhouse gas. Additionally, as the paper recycling sector has continued to add capacity in the form of new mills, machines, and related infrastructure, it has continued to improve its energy efficiency, resulting in reduced energy usage and reduced greenhouse gas emissions. In fact, the production of 100 percent recycled paperboard and containerboard products results in net negative greenhouse gas emissions.

The impressive economic and environmental benefits of paper recycling are directly tied to the availability of a clean and stable supply of recovered fiber collected for recycling. For that reason, the PRC's mission is to promote recycling education and to prevent market-distorting government subsidies from diverting recyclable paper from the supply chain. Diverting this feedstock from the circular economy to landfills or for waste-to-energy eliminates opportunities to recycle these materials and turn them into valuable new essential products, such as paper and packaging.

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[1] *See* EPA, "Recycling Economic Information Report" (2016).
[2] *See* EPA Smart Sectors, "Paper and Wood Products" (2020); ISRI, "The Economic Impact of the Scrap Recycling Industry in the United States – Paper" (2019).
[3] Scrap Magazine, "Gearing Up," (July/August 2019).

II. Summary of PRC Comments

As the Committee continues to evaluate recycling policies, the PRC encourages the Committee to consider the following perspectives and recommendations of the PRC, summarized here as follows:

- The Recycling System for Paper is Not Broken: The PRC takes issue with the negative portrayal of the nation's recycling system and the implication that all recycled commodity sectors have failed to invest and innovate toward establishing a resilient recycling system. The 100 percent recycled paper sector has invested billions of dollars in modern recycling infrastructure over the last several decades and has worked to establish robust demand for paper and paper-based packaging. Paper recycling is not broken as evidenced by our sector's robust and well-functioning markets.

- Paper Recycling is the Poster Child of the Circular Economy: As the only recyclable commodity with a consistent recovery rate above 60 percent, paper recycling has been the leader in moving the U.S. toward a more circular economy. A circular economy – with recycling at the core – can serve as an important tool to combat climate change and create a more sustainable future. Therefore, any federal legislation should properly account for the important role paper recyclers play in the circular economy. The paper recycling sector can serve as a model for policymakers interested in advancing circularity across other sectors and commodities.

- Recycling is a Climate Solution: The paper recycling sector has led the way in moving the U.S. toward a cleaner, more circular economy. A circular economy – with recycling at its core – can serve as an important tool to combat climate change and create a more sustainable future. Indeed, the 100 percent recycled paperboard and containerboard sectors have a net negative emissions profile.

- Paper Recycling is Essential: The ongoing pandemic has demonstrated the resilience of the nation's recycling system and the essential nature of paper recycling as a critical component of the domestic manufacturing supply chain. At the height of the pandemic, the packaging products and shipping cartons produced by PRC members were pivotal to keeping hospitals supplied and shelves stocked across America.

- Paper Recycling is an Economic Driver: The paper recycling sector is expected to grow significantly in the coming years, with domestic infrastructure investments expected to top more than $4 billion through 2025. Sound and consistent policies are critical to preserving and expanding this sector. In contrast, short-sighted policies – such as federal Extended Producer Responsibility (EPR) or other national fee-based regime – are likely to discourage private sector investment, hinder economic growth and job creation, and impose increased costs on consumers.

- Education and Outreach Will Improve Recycling: The federal government is well-suited to help educate the public about the benefits – both economic and environmental – of recycling. Using the resources and reach of the federal government is a cost-effective strategy that can reap immediate recycling-related rewards and have a significant return on investment for taxpayers. This can be in the form of public service announcements or funding for communities to undertake measures that can improve recycling rates and decrease contamination, such as bin labeling, web and app tools, etc.

- Markets Work: The PRC urges caution against any federal intervention to artificially create markets, pick winners or losers, or provide federal support to build out recycling infrastructure that may not be warranted by traditional principles of supply and demand. Markets work best when permitted to operate free of government intervention. This is true of all commodities. For instance, demand for 100 percent recycled paperboard and containerboard products and packaging has attracted significant amounts of private capital to develop, sustain, and grow these markets.

- Modernize RCRA to Reflect Today's Recycling Reality: First, the definition of "solid waste" under RCRA should be amended to exclude recyclable materials. The solid waste definition treats recyclables as a waste, failing to recognize the true value of recyclables as a valuable feedstock.

- Respect and Maintain EPA's Waste Management Hierarchy: State-level efforts by the plastics industry have sought to undermine EPA's waste management hierarchy by defining "advanced recycling" to include converting plastics and other recyclable materials into chemical feedstocks, fuels, and energy recovery. The PRC strongly opposes such efforts. To this end, the PRC recommends that any legislation should expressly exclude such end products from the bill's definition of recycling. To do otherwise, would be to overturn decades of recycling law and policy, skew "real" recycling rates, disadvantage true recyclers, and destabilize the recycling economy.

III. The Recycling System for Paper is Not Broken

The PRC – and its 63,000 direct well-paid employees – take issue with the negative portrayal of the nation's recycling system and the implication that all recycled commodity sectors have failed to invest and innovate toward establishing a robust recycling system. Unfortunately, this line of messaging has led policymakers to believe that a drastic overhaul of the nation's recycling system for all commodities is necessary. This, in turn, has triggered congressional interest in adopting expansive and expensive policies, such as federal Extended Producer Responsibility (EPR) or federal financial support for recycling infrastructure. Such policies would fall short of addressing recycling challenges and risk undermining the positive efforts of recycled commodities, such as paper and aluminum, that have established vigorous and successful markets.

The 100 percent recycled paper sector has invested billions of dollars in private capital over the last two decades to develop demand for our products and establish robust and modern infrastructure to collect the raw material supply. This has resulted in a 66 percent recovery rate of recyclable paper, marking the tenth consecutive year with a rate above 60 percent.[4] The recovery rate of Old Corrugated Containers (OCC) is consistently above 90 percent. Compare that to less than 10 percent for the plastics sector.[5] In short, not all recycled commodities are created equal. The Committee should recognize and account for these key differences when developing policies related to recycling infrastructure and system improvements.

The ongoing pandemic has demonstrated the resilience of the nation's recycling system. Even at the height of the pandemic, recycled paper manufacturers, such as PRC members, were able to obtain the feedstocks necessary to produce the packaging products and shipping cartons that kept hospitals supplied and shelves stocked across America. This required resourcefulness as PRC members and other recycled product manufacturers shifted from traditional supply streams at shuttered big box stores, office buildings, and other commercial operations to residential supply streams.

This pivot did not by occur by happenstance, luck, or accident. Rather, it was the result of the nation's recycled paper product manufacturers having the foresight to ensure their businesses – and the recycling systems and supply chains upon which they rely – were prepared to undertake such shifts. Even when a portion of communities with recycling programs temporarily suspended their programs, the system bent but it did not break.[6] The pandemic showcased the very definition of resilience within the paper recycling sector; not the lack of it.

Some organizations have suggested that the only way to "fix" America's "outdated" and "broken" recycling system is through a $1 billion federal cash infusion to fund recycling infrastructure. Proponents of such federal support claim improved collection will increase recycling rates. But collection is not recycling. What is needed is greater demand for end use products made from materials that are not currently being recycled. Only then will there be sufficient demand – and investment – to pull the materials through the system. In any event, if infrastructure is indeed the answer, then private companies are capable of making such investments. And they can do so without federal subsidies that could put taxpayers on the hook for new infrastructure that may not be supported by market principles.

There is, of course, room for improvement, as is true for any far-reaching system of national significance reliant on regional, state, and local operations. Federal policies can be part of the solution as long as such policies provide only a "light touch," particularly with respect to paper recycling. Heavy-handed policies, such as federal EPR and federal financial support to construct

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[4] AF&PA, "U.S. Paper Industry Achieves Consistently High Recycling Rate," (May 2020).
[5] EPA: Plastics: Material-Specific Data (citing an 8.5 percent recycling rate in 2018).
[6] Approximately 200 communities suspended their recycling programs at the height of the pandemic; however, thousands of other communities continued to operate these vital programs.

private sector recycling infrastructure, can skew markets, pick winners and losers, and undermine the success of paper recycling.

IV. Reducing Contamination Through Education is the Key to Improved Recycling

In order for recyclables to be converted into new paperboard and containerboard packaging and shipping products, they must be clean and dry – meaning reasonably free of contaminants, such as liquids and food waste, chemicals, and personal hygiene products.

Contamination, particularly at the residential level, has long prevented recycled product manufacturers from utilizing the full stream of household recyclables. This challenge has worsened in recent years as a result of paper increasingly being collected together with other materials, like plastics, glass, and in some cases, ordinary household garbage. Unfortunately, once paper is contaminated via comingling, it is worthless as a recyclable commodity and instead this vital "raw material" goes to a landfill or a waste-to-energy facility.

Policies that support the availability of a separated, clean stream of recyclable materials are vital to sustaining and growing the paper recycling sector. This can be achieved through improved recycling education and outreach. Federal programs and funding can help educate the public about how to recycle properly and drive consumer engagement by stressing the many benefits – both economic and environmental – of recycling. Using the resources and reach of the federal government to educate the public is a far more cost-effective strategy than government market interventions in the form of EPR or infrastructure spending. Recycling education can reap immediate recycling-related rewards and have a significant return on investment for taxpayers.

To this end, the PRC supports the inclusion of the RECYCLE Act in the Infrastructure Investment and Jobs Act. As the Committee is well aware, the RECYCLE Act provides targeted funding for communities to help educate households on the importance of recycling, including the proper way to recycle to reduce contamination in their community. This is a cost-effective, sensible measure that will have immediate benefits by improving household recycling rates and decreasing contamination.

V. EPR & Other Fee-Based Frameworks Will Undermine Paper Recycling

The PRC strongly discourages the Committee from adopting or supporting legislation that would establish a federal EPR regime applicable to all recycled commodities. However, should the Committee decide to consider an EPR framework or other "fee-based" approach, the PRC strongly believes any such program should be strategically tailored to address materials and products that have low recovery rates, like plastic packaging. Potential overreach could undermine markets for other recyclable commodities – such as paper – which has a robust and well-functioning market and successful recycling track record.

As the Committee continues to weigh the pros and cons of a possible EPR-related framework, the PRC respectfully requests the Committee to consider the following—

1. ***Solutions Should Target Underperforming Commodities***

In contrast to the paper sector's 66 percent recovery rate (and OCC's 90-plus percent recovery rate), other recyclable commodities have drastically underperformed. For instance, according to 2018 EPA data, the recycling rate for plastics is around 8.5 percent. Other materials are in the double digits but the recovery rate for fiber dwarfs them all. Indeed, more paper by weight is recovered from municipal solid waste (MSW) streams than plastic, glass, steel, and aluminum combined.[7] The efficiency and success of recycling commodities varies greatly across the industry. As such, federal policy should account for such differences and underperforming substrates should be held accountable.

2. ***EPR May Undermine Recycling's Economic Impact***

Sound and consistent policies are critical to preserving and expanding recycling. Federal EPR policies could lead to outcomes that discourage private sector investment, hinder economic growth and job creation, and hurt consumers. EPR fees will discourage the use of recyclable materials where the fee is higher and encourage the use of materials with lower fees. For instance, the fee structures in some EPR and fee-based models being discussed to date would have a net increase on the cost of recycled paper packaging as compared to other packaging materials.

3. ***EPR Penalizes Consumers***

Proponents of EPR allege that producers will absorb the costs and prevent those costs from being passed onto consumers. Such arguments fail to recognize how manufacturers and producers manage input costs. Consumers will pay more for products affected by EPR and these costs will not be outweighed by the purported benefits of an EPR regime. In fact, consumers often end up paying twice, both as taxpayers (as a result of increased waste management costs) and as consumers. The burden of this double payment falls most heavily on low-income consumers. At least one study of British Columbia's EPR program demonstrated that "costs increased by approximately 26 percent from program inception in 2015 to 2018 while program performance increased by only one percent."[8]

4. ***EPR Does Not Address End Use Markets***

End use markets are an essential part of the recycled value chain. EPR proponents suggest that addressing recycling infrastructure and increasing supply will eventually generate demand for certain commodities, like plastic. Economic theory would suggest that end use markets must be

[7] U.S. EPA, "Advancing Sustainable Materials Management," (December 2020).
[8] Resource Recycling, "The Whole Package?" (October 26, 2020).

established first. This demand will encourage investment and innovation in the recycling system to support that demand. With the low recovery rates of several materials, current recycling infrastructure can accommodate the demands of an emerging end use market.

VI. The Definition of Solid Waste under RCRA Should Exclude Recyclable Materials

The definition of "solid waste" under RCRA treats recyclable materials as a waste rather than a value-added commodity.[9] This does a disservice to the U.S. recycling sector and prevents the U.S. from maximizing the full economic and environmental benefits of recycling. Congress should therefore recognize that recyclable materials are valuable commodities and should not be deemed to be discarded, disposed of, or solid waste. Excluding recyclable materials from the definition of solid waste will finally put recyclable materials on par with other commodities – which are not presumed to be waste – and ensure they are treated with the same status as other commodities. Making this modest update will better reflect modern recycling realities and afford opportunities to capture the full economic and environmental value of recycling.

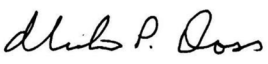
VII. Conclusion

We thank you for leadership and we look forward to working with you and your excellent staff as the Committee continues of policies in furtherance of establishing a more circular, sustainable future. The PRC would be pleased to provide testimony before the Committee should future opportunities arise.

Sincerely,



Brian McPheely
Chairman, Paper Recycling Coalition, Inc.
Global CEO, Pratt Industries



Michael P. Doss
Vice Chairman, Paper Recycling Coalition, Inc.
President/CEO, Graphic Packaging Int'l, LLC



Terese Colling
President, Paper Recycling Coalition, Inc.

[9] *See* 42 U.S.C. § 6903(27).



Statement for the Record
Joshua Baca
Vice President, Plastics
American Chemistry Council

Hearing on:
The Circular Economy as a Concept for Creating a More Sustainable Future

Senate Committee on Environment and Public Works
September 22, 2021

INTRODUCTION

The American Chemistry Council's (ACC)[1] Plastics Division is pleased to submit a statement for the record to the Senate Committee on Environment and Public Works Hearing "The Circular Economy as a Concept for Creating a More Sustainable Future."

ACC and our members are deeply committed to creating a more circular economy for plastics and ending plastic waste in the environment. Plastics contribute to sustainability goals which will help protect the American environment for generations, plastic waste does not. Waste in the environment, including plastic waste, is never acceptable. We are eager and taking action to help solve this problem.

In 2018, America's Plastic Makers established two ambitious circular economy goals: 100% of U.S. plastic packaging is recyclable or recoverable by 2030 and 100% of U.S. plastic packaging is re-used, recycled, or recovered by 2040. Last year, we released our Roadmap to Reuse, which outlined a vision and set of actions to mobilize the plastics value chain to achieve these goals.

Since releasing our Roadmap, our industry has worked to accelerate the circular economy for all plastics, focusing on three core areas:

- *Public Policy Development*: Our 5 Actions for Sustainable Change call for enabling policies to accelerate grow the circular economy for plastics.

- *Value Chain Coordination*: We are engaging key stakeholders such as the Alliance to End Plastic Waste, Closed Loop Partners, The Recycling Partnership, waste companies and recyclers as well as brands and converters who are critical to achieving the actions outlined in our Roadmap that will help achieve our goals.

- *Private Sector Investments*: Since July 2017, nearly $7.5 billion in announced investments to grow plastics recycling have been announced in the United States, most of it in advanced recycling technologies.

We believe with the right approaches and commitments, the challenge of plastic waste in the environment is solvable and collective actions by government, industry, non-profits, and NGOs will make America more sustainable. The stakes are high: plastics are critical to modern society, from light-weighting vehicles that reduce emissions, to sealing and insulating our homes and buildings, to delivering essential health care, preserving food and preventing food waste, and contributing to an overall higher quality of life.

A COMPREHENSIVE STRATEGY TO ADVANCE CIRCULARITY

This summer, we announced 5 Actions for Sustainable Change and we are asking Congress to take action to lay the groundwork to accelerate a circular economy. They are:

[1] ACC represents a diverse set of companies engaged in the U.S. business of chemistry, a $486 billion enterprise that is helping to solve the biggest challenges facing our country and the world. Chemistry touches 96 percent of all manufactured goods, and the use of plastics in modern automotive, building and construction, and food packaging industries is helping to create a more sustainable society.

1. **Require a 30 by '30 national recycled plastics standard.** Require all plastic packaging to include at least 30% recycled plastic by 2030 through a national recycled plastics standard.
2. **Create a modern regulatory system to develop a circular economy for plastics.** Create a modern regulatory system that enables rapid scaling of advanced recycling while continuing to grow mechanical recycling.
3. **Develop national recycling standards for plastics.** Direct the Environmental Protection Agency (EPA) and the Department of Energy (DOE) to bring together the plastics value chain and municipalities to develop a national recycling framework for plastics.
4. **Study the impact of greenhouse gas emissions from all materials to guide informed policy.** Engage the National Academy of Sciences to conduct a study that compares the impacts of raw materials and use its findings to guide future policies.
5. **Establish an American-designed producer responsibility system.** Establish an American-designed producer responsibility system for packaging to help increase recycling access, collection, and outreach for all materials, including plastics.

We are asking Congress to act because the federal government is uniquely positioned to provide the structure necessary to provide regulatory certainty and drive even greater private investment in a circular economy for plastics.

I encourage you to read the full report, which provides significantly more details to achieve the 5 Actions for Sustainable Change.

RESIN TAXES DON'T SOLVE THE WASTE CHALLENGE

Unfortunately, Congress is discussing taxing plastic resins at 20 cents per pound to help pay for the $3.5 trillion reconciliation bill. This is a misguided policy that has the potential to raise the price of material used in consumer goods ranging from milk and most groceries to smartphones and even electric vehicles by up to 26 percent. More troubling is that there is no guarantee the revenue from the tax will be used to address plastic waste in the environment.

In addition to the tax not addressing plastic waste in the environment, it will further fuel inflation, jeopardize up to 92,000 American jobs directly employed or supported by the U.S. plastics industry, and increase imports, primarily from China, of finished plastic goods.

The tax is also misguided from an environmental perspective. Specifically, the tax risks increasing greenhouse gas emissions as it would incentivize the use of alternatives to plastic packaging and products which studies have shown to result in increased greenhouse gas emissions over their lifecycles. Plastics packaging has been shown to reduce energy use by 80 percent and greenhouse gas emissions by 130 percent compared to studied alternatives in key applications. It has also been found that if all plastics packaging were replaced by common alternative materials it would annually generate an additional 55 million more tons of waste. Lastly, a plastics tax would increase the cost of solar panels, wind turbines, and EV batteries, as many of their components are made of plastic resins.

Simply put, a resin tax on plastics would disincentivize use of many products that are helping to combat climate change, advance a circular economy and create a more sustainable future.

ADVANCED RECYCLING FOR PLASTICS

While traditional recycling processes will continue to play an important role in plastics recycling, they face some important limitations. Newer, cutting-edge technologies, known as advanced recycling, complement these traditional systems by picking up where they leave off and enabling communities to recycle significantly more types and greater quantities of plastics. Advanced recycling technologies are innovative manufacturing processes that fundamentally transform the chemical structure of post-use plastic products back to their basic chemical building blocks. These building blocks are the raw materials used for making virgin-quality plastics and other valuable products. Advanced recycling enables many types of plastics to become resources for new manufacturing, conserves natural resources otherwise required for generation of new materials, can help grow local jobs and economies and supports the transition to a more circular economy for plastics.

Advanced recycling also provides an opportunity to capitalize on the capabilities of America's world-leading petrochemical infrastructure by co-processing post-use plastics with virgin natural resources. These technologies can thereby help to accelerate the expansion of new recycling capacity and efficiently transition petrochemical facilities to more circular business models. However, with inconsistent, distinct, regulatory, and programmatic obligations being promulgated at the state and municipal levels and the lack of nationally harmonized standards that align with internationally recognized certification programs for advanced recycling, companies interested in participating in advanced recycling are challenged to invest in these manufacturing operations and disadvantaged in the expanding global market.

The absence of appropriate and consistent national standards across thousands of municipalities hinders the growth of U.S. recycling initiatives and related efforts to divert plastics waste from landfills, oceans, and incinerators.

Due to breakthroughs in advanced recycling technologies, we can now reduce waste and capture the post-use value of hard-to-recycle plastics, such as multilayer pouches and film, plastic tubes, other mixed plastics, and polystyrene foam food containers. And these technologies can create high grade plastics approved for use in food, medical and pharmaceutical applications, unlike many mechanically recycled plastics. In fact, companies have announced plans to use feedstock from advanced recycling processes in circular packaging for Philadelphia Cream Cheese and Magnum ice cream containers. Also, Eco Ello water bottles, sold at Target, are made using Eastman's advanced recycling technology.

MOMENTUM FOR ADVANCED RECYCLING

Momentum for advanced recycling is accelerating across the United States.

- Globally recognized corporations and mature recycling enterprises are making significant commitments and building infrastructure at a commercial scale.

- Technology has evolved and created new opportunities and tremendous breakthroughs and can create virgin quality packaging critical for demanding applications such as food-grade and pharmaceutical packaging.

- There is a significant and growing market for recycled products driven by company commitments and consumer demand for using more recycled plastic in products.

- Fourteen states have passed legislation to update their existing laws, so companies are more appropriately regulated in their deployment of advanced recycling technologies.

- And a first wave of advanced recycling enterprises is achieving third-party validation through international certification.

Infrastructure Being Built at Commercial Scale

Billions of dollars in private sector investments have been announced to commercially scale and accelerate our ability to reuse plastics as raw materials in new products. Existing and planned advanced recycling facilities in the United States have the potential to divert an estimated 7 billion pounds of waste from landfills annually. That's the weight of 28,000 Statues of Liberty.

Some recent highlights include:

- Eastman Chemical Company announced plans to build one of the world's largest plastic-to-plastic advanced recycling facilities at its site in Kingsport, TN.

- Brightmark opened its first advanced recycling plant in 2021 and has plans to open an additional seven facilities across the country. Most recently, Brightmark announced its second facility in Macon, Georgia, aimed to bring more than 100 new jobs and divert 400,000 tons of post-use plastics per year once finished.

- America Styrenics (Amsty) and Agilyx announced plans to explore development of a jointly owned advanced recycling facility at AmSty's styrene facility in St. James, LA, adding to the companies' existing joint ventures.

- ExxonMobil became a founding member of Cyclyx, a joint venture with Agilyx focused on aggregating and preprocessing large volumes of post-use plastics to be used as raw material in recycling processes.

Breakthroughs In Advanced Recycling

Because technology continues to evolve and is not static, there have been tremendous breakthroughs in advanced recycling.

- Eastman is producing Tritan Renew, a plastic material approved for food-use and made with up to 50% plastic derived from advanced recycling. Tritan Renew is used by brands like Nalgene and Ello in their reusable water bottles.

- SABIC, Plastic Energy, and Sealed Air are producing new food-grade packaging from post-use flexible plastics made from advanced recycling.

- Mars is working with SABIC and packaging supplier Huhtamaki to use recycled plastic manufactured from advanced recycling for its pet food packaging.

Notable plastics like polystyrene can also be recycled thanks to breakthroughs in advanced recycling. These technologies not only help keep plastics out of landfills and displace the use of additional virgin natural resources, but are also regulated by the Clean Air Act and state and local regulatory authorities.

Untapped Market for Recycled Products

A 2019 report by the Closed Loop Partners, a New York-based investment firm, estimated that there is a $120 billion-dollar economic opportunity directly connected to the commercialization of advanced recycling technologies.

- By 2025, Shell plans to use 1 million metric tons of post-use plastic per year as alternative feedstocks at its facilities around the world.

- Chevron Phillips Chemical (CPChem) announced that it will produce circular polyethylene using advanced recycling technology and aims to make it a significant part of its portfolio by 2030.

- LyondellBasell announced availability of polymers made from plastic waste using advanced recycling.

- CPChem announced signing long-term supply agreements with companies like New Hope Energy and Braven Environmental for their certified renewable chemical feedstocks and pyrolysis oil, which will be used to make new, circular plastics.

States Lead the Way, But Congressional Action Needed

Thankfully, bipartisan leaders in multiple states across the political spectrum are responding to a widespread desire to recycle more plastics. To date, 14 states have passed laws supporting growth of advanced plastics recycling as an innovating manufacturing process. These laws will enable greater adoption of advanced recycling, help create new jobs, and divert post-use plastics from landfills and into valuable new materials. ACC is pleased to see several more states are considering similar legislation.

Unfortunately, several states have outdated policies that could regulate advanced recycling as "waste disposal" rather than manufacturing. Additionally, EPA recently released an advanced notice of proposed rulemaking (Docket ID No. EPA–HQ–OAR–2021–0382) that seeks information on whether to potentially regulate advanced recycling facilities as waste disposal units. Such an approach would be inappropriate and conflict with approaches taken by the 14 states that are regulating advanced recycling as a manufacturing process and set back efforts towards a more circular economy. Lastly, the uncertainty surrounding advanced recycling regulations sends

entrepreneurs down the wrong pathway for citing a facility, making it more difficult for companies to invest in new projects that deploy advanced recycling technologies.
Thankfully, bipartisan leaders in multiple states (blue, red, and purple) are responding to a widespread desire to recycle more plastics. To date, 14 states (with Louisiana being the most recent) have passed laws supporting growth of advanced plastics recycling as an innovating manufacturing process. These laws will enable greater adoption of advanced recycling, help create new jobs and divert post-use plastics from landfills and into valuable new materials. Additionally, several more states are considering similar legislation.

And while this hearing by the committee is a needed and significant step forward, Congress should do more to foster the growth of advanced recycling by:

1. Recognizing the role of advanced recycling in creating a more circular economy for all plastic packaging and providing the appropriate regulatory conditions to help ensure that it can scale up quickly.

2. Defining advanced recycling as a manufacturing process and distinguishing it from solid waste disposal.

3. Recognizing the role of third-party certification systems which apply mass balance attribution to verify production of recycled plastics.

4. Clarifying that manufacturing which uses an advanced recycling process to produce fuel, such as jet fuel for airlines or ethanol for use in automobiles, is defined as "advanced recovery" and is distinguished from recycling.

CONCLUSION

ACC is committed to a circular economy and more sustainable future. Plastics are a way to help achieve that. There is no question that plastic waste in the environment is a problem. A tax on plastics will not solve it. America's plastic makers have put forth 5 Actions for Sustainable Change that constructively address the plastic waste issue while also jumpstarting a circular economy for plastics. The aggressive target for all plastic packaging to contain at least 30 percent recycled plastic by 2030, as well as creating an American designed producer responsibility system, represent game changers towards achieving a circular economy. However, we ask Congress to lay the groundwork by creating national standards and regulatory frameworks that enable the innovation and technology for industry and problem-solving entrepreneurs to invest with certainty in the future of our circular economy. There is much to be done to create a more sustainable future and we remain dedicated and constructive partners in those endeavors.

Senator CARPER. Additionally, Senators will be allowed to submit questions for the record through the close of business on Wednesday, October 6th. We will compile those questions and send them to our witnesses, and ask our witnesses to reply by Wednesday, October the 20th.

Anything else, Senator Capito?

Senator CAPITO. No.

Senator CARPER. It was good being your wingman.

Thank you all very, very much, and with that, this hearing is adjourned.

I think we have votes on the floor, and I have to get to my other committee hearing before it breaks.

Thank you all. We are adjourned.

[Whereupon, at 11:30 a.m., the hearing was adjourned.]

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