

# National Recycling Strategy

Part One of a Series on Building a Circular Economy for All



November 15, 2021





# A Letter from EPA Administrator Michael S. Regan

## Introducing the *2021 National Recycling Strategy*

We have both an opportunity and an obligation to protect and preserve our natural resources for the next generation. We've all heard the phrase "Reduce, Reuse, Recycle." It's been taught in schools; we've heard it on TV; and EPA, along with so many other organizations, have been saying it for years. But those three words can only take us so far—it's time to transform the United States recycling system.

Our current recycling system is at a crossroads and desperately needs creative energy to better serve the needs of the American people. Some are confused about what materials can be recycled. In many areas of the country, our recycling infrastructure is antiquated. Markets for recyclables vary greatly, and we have no standardized way to measure system performance. Living near recycling facilities also takes a toll on already overburdened communities when materials are not properly managed. Black, Latinx, Indigenous, and low-income communities continue to be disproportionately impacted by higher pollution levels, which result in adverse health and overall quality of life impacts. And, to top it off, according to eminent scientists on the International Resource Panel, natural resource extraction and processing make up half of all global greenhouse gas (GHG) emissions that drive the climate crisis.

We need a transformative vision for our waste management system – one that is inclusive, more equitable, and reflects the urgency of the climate crisis.

That is why I am proud to introduce the *2021 National Recycling Strategy*, a critical effort in work to build a circular economy for all. A circular economy is an industrial system that is restorative or regenerative by design. It is a change to the linear model from which resources are mined, made into products, and then thrown away. A circular economy reduces materials use, redesigns materials and products to be less resource-intensive, and recaptures "waste" as a resource to manufacture new materials and products.

The strategy responds to our recycling system's challenges through actions outlined under five objectives:

- improve markets for recycled commodities,
- increase collection and improve materials management infrastructure,
- reduce contamination in the recycled materials stream,
- enhance policies and programs to support circularity, and
- standardize measurement and increase data collection.

The *2021 Strategy* is designed to increase equitable access to recycling services, reduce environmental impacts on underserved communities, and stimulate economic development. However, we know recycling on its own isn't enough. This is part one in a series of strategies to help us re-envision how we use materials more broadly. Accomplishing President Biden's ambitious climate change goals begins with designing products to be sustainable, reducing the creation of waste with local communities in mind, maximizing reduce, reuse, and recycle, and minimizing the impacts of waste management.

When we recycle, we reduce the amount of trash sent to landfills, reduce pollution and emissions that contribute to climate change, save natural resources, such as timber and water, and keep our environment healthy by reducing the need to create new materials. We also help our economy by using domestic materials, supporting American manufacturing, and creating jobs in the recycling and manufacturing industries.

To go beyond "Reduce, Reuse, and Recycle," and to pave the way for sustainable management of our precious resources, it will take all of us working together. We call on all Americans to help meet this moment – businesses, state and local governments, Tribal Nations, and individuals. By making simple changes every day, we can create a more sustainable future for our country and the world.

I am confident that with the significant stakeholder support and interest in the development of the *2021 Strategy*, we can accomplish these ambitious goals and achieve transformational change together. We invite you to join us at [www.epa.gov/recyclingstrategy](http://www.epa.gov/recyclingstrategy).



**Michael S. Regan**

*Administrator, U.S. Environmental Protection Agency*

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## Disclaimer

The *National Recycling Strategy* represents potential actions by all stakeholders and does not imply approval for any specific action under Executive Order 12866 or the Paperwork Reduction Act. All potential federal government activities included in the *2021 Strategy* are subject to budgetary constraints, interagency processes, stakeholder input and other approvals, including the weighing of priorities and available resources by the Administration in formulating its annual budget and by Congress in legislating appropriations. This document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. This document does not impose legally binding requirements. Mention of case studies, public, private or nonprofit entities, trade names, or commercial products or services in this document does not and should not be construed to constitute an endorsement or recommendation of any such product or service for use in any manner.



# Acknowledgments

EPA coordinated the development of the National Recycling Strategy to identify the actions needed to create a strong, resilient, cost-effective and less impactful U.S. recycling system – a key element of a circular economy. Development of the *National Recycling Strategy* was a collaborative effort. EPA would like to thank the following groups for their input:

- The America Recycles pledge signatories, whose activities informed the development of the *National Framework for Advancing the U.S. Recycling System*, upon which this *2021 Strategy* was built.
- Federal offices and agencies, including the Council on Environmental Quality (CEQ), the Federal Trade Commission (FTC), the National Science Foundation (NSF), the U.S. Agency for International Development (USAID), the U.S. Department of Agriculture (USDA), the U.S. Department of Commerce (DOC) (including the International Trade Administration [ITA], National Oceanic and Atmospheric Administration [NOAA], and the National Institute of Standards and Technology [NIST]), the U.S. Department of Defense (DOD), the U.S. Department of Energy (DOE), the U.S. Department of State (DOS), the U.S. General Services Administration (GSA), and the U.S. Trade Representative (USTR).
- EPA's state, tribal and local partners, including the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), Environmental Council of the States (ECOS), South Carolina Department of Commerce, the U.S. Conference of Mayors, the National Tribal Caucus, and the Tribal Waste and Response Steering Committee.
- Recycling professional and industry associations and private companies, including the Institute of Scrap Recycling Industries (ISRI), the National Waste and Recycling Association (NWRA), the Solid Waste Association of North America (SWANA), and Waste Management (WM).
- Non-profit organizations, including the Environmental Research and Education Foundation (EREF), GreenBlue Institute, Keep America Beautiful (KAB), the National Recycling Coalition, The Recycling Partnership (TRP), and the U.S. Chamber of Commerce Foundation (USCCF).
- Private citizens; state, tribal and local governments; academia; non-governmental organizations; industry associations; private companies; the National Environmental Justice Advisory Council (NEJAC); and others for their comments on the draft *National Recycling Strategy*.





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# Executive Summary

The *National Recycling Strategy* is focused on enhancing and advancing the national municipal solid waste (MSW) recycling system and identifies strategic objectives and stakeholder-led actions to create a stronger, more resilient and cost-effective U.S. MSW recycling system. It is part one of a series dedicated to building a circular economy for all. This substantially revised version of the *National Recycling Strategy* focuses on improving the nation's MSW recycling system and broadens the vision to include the full impact of materials while also recognizing the need to achieve environmental justice priorities. The *National Recycling Strategy* reflects the work of many stakeholders – including the public, companies, and non-governmental and community-based organizations – and input from other federal agencies, states, tribes and local governments.

The U.S. MSW recycling system currently faces a number of challenges, including confusion about what materials can be recycled, recycling infrastructure that has not kept pace with today's diverse and changing waste stream, reduced markets for recycled materials, and varying methodologies to measure recycling system performance. The *National Recycling Strategy* identifies actions to address these challenges and builds on the collaborative efforts by stakeholders from across the recycling system that began under the 2019 *National Framework for Advancing the U.S. Recycling System*.

Advancing MSW recycling alone will not achieve a circular economy for the United States; recycling is only one action in the toolkit. Work is necessary to broadly encompass areas not addressed here, including product redesign, source reduction and reuse. Recycling efforts in the United States comprise more than just the processing of MSW at materials recovery facilities (MRFs) and include many other materials, such as electronics, textiles and food waste. Future strategies will address these and other aspects of a circular economy for all.

A circular economy, as defined in the Save Our Seas 2.0 Act, means an economy that uses a systems-focused approach and involves industrial processes and economic activities that are restorative or regenerative by design, enable resources used in such processes and activities to maintain their highest value for as long as possible, and aim for the elimination of waste through the superior design of materials, products, and systems (including business models). It is a change to the model in which resources are mined, are made into products, and then become waste. A circular economy reduces materials use, redesigns materials and products to be less resource-intensive, and recaptures "waste" as a resource to manufacture new materials and products. Circularity is embraced within the sustainable materials management (SMM) approach that EPA and other federal agencies have pursued since 2009. A circular economy approach under the SMM umbrella demonstrates continuity in our emphasis on

reducing life-cycle impacts of materials, including climate impacts; reducing the use of harmful materials; and decoupling materials use from economic growth. The *2021 Strategy* recognizes the need to implement a circular economy approach for all – reducing the creation of waste with local communities in mind and implementing materials management strategies that are inclusive of communities with environmental justice concerns.

The *National Recycling Strategy* is aligned with and supports implementation of the National Recycling Goal to increase the recycling rate to 50 percent by 2030. The *2021 Strategy* includes five strategic objectives to create a more resilient and cost-effective national recycling system:

- A. Improve Markets for Recycling Commodities.
- B. Increase Collection and Improve Materials Management Infrastructure.
- C. Reduce Contamination in the Recycled Materials Stream.
- D. Enhance Policies to Support Circularity.
- E. Standardize Measurement and Increase Data Collection.

## Objective A: Improve Markets for Recycling Commodities

We need to improve markets for recyclable materials and recyclable products and better integrate recycled materials into product and packaging designs.

- A1.** Promote market development.
- A2.** Produce an analysis of different types of end markets that considers resilience, environmental benefits and other relevant factors for decision makers.
- A3.** Increase manufacturing use of recycled material feedstocks in domestic manufacturing.
- A4.** Increase demand for recycled materials through policies, programs, initiatives and incentives.
- A5.** Continue to support research and development of technologies and products that will expand market opportunities.
- A6.** Explore possible ratification of the Basel Convention and encourage environmentally sound management of scrap and recyclables traded with other countries.



## Objective B: Increase Collection and Improve Materials Management Infrastructure

Investment and innovation are necessary to improve the efficiency of materials processing infrastructure, increase collection of materials and create a more resilient recycling system.

- B1.** Improve understanding of available recycling infrastructure and needs.
- B2.** Increase awareness and availability of public and private funding and incentives and effective strategies to access the funding.
- B3.** Continue to fund research, development, demonstration and deployment of new technologies and processes for recycling.
- B4.** Increase consideration of recoverability and sustainability in the design of products.
- B5.** Optimize processing efficiencies at materials recovery facilities.
- B6.** Increase collection of recyclable materials.

## Objective C: Reduce Contamination in the Recycled Materials Stream

Reducing contamination in the recycled materials stream will improve the quality of the recycled material, enabling more material to be recycled and reducing discarded material.

- C1.** Enhance education and outreach to the public on the value of recycling and how to recycle properly.
- C2.** Ensure resources are available for education and outreach initiatives.

## Objective D: Enhance Policies and Programs to Support Circularity

Different policies and programs can be effective in increasing circularity. Efforts under this area aim to increase coordination, availability and accessibility of information on recycling programs and policies at the federal, state, tribal and local levels.

- D1.** Strengthen federal coordination to support and encourage actions to improve the U.S. recycling system.
- D2.** Conduct an analysis of different policies that could address recycling challenges.
- D3.** Conduct a study on reflecting environmental and social costs in product pricing.
- D4.** Increase awareness of and continue voluntary public-private partnerships.
- D4.** Share best practices on policies, programs, funding opportunities and outreach through a free, publicly accessible online clearinghouse.
- D6.** Coordinate domestic and international interests.

## Objective E: Standardize Measurement and Increase Data Collection

Different definitions and measurement practices create challenges in setting goals and tracking progress. We need more consistent methodologies to measure recycling system performance.

- E1.** Develop and implement national recycling system definitions, measures, targets and performance indicators.
- E2.** Create a tracking and reporting plan.
- E3.** Create recycled content measures.
- E4.** Coordinate domestic and international measurement efforts.
- E5.** Increase data availability and transparency about recyclable materials generated and the materials manufacturers need.

### Next Steps

Over the coming few months, EPA will work collaboratively with stakeholders to develop a plan for implementing the 2021 Strategy. EPA will ensure communities have a seat at the table and are involved in both developing the implementation plan and executing the actions in this strategy. EPA is also committing to develop a new goal to reduce the climate impacts from materials use and consumption, which will complement existing national goals on recycling and the reduction of food loss and waste. EPA plans to collaborate across all levels of government, including tribal nations, and with public and private stakeholders to achieve these ambitious goals.



# Introduction: Reframing Recycling and the Case for a Circular Economy Approach

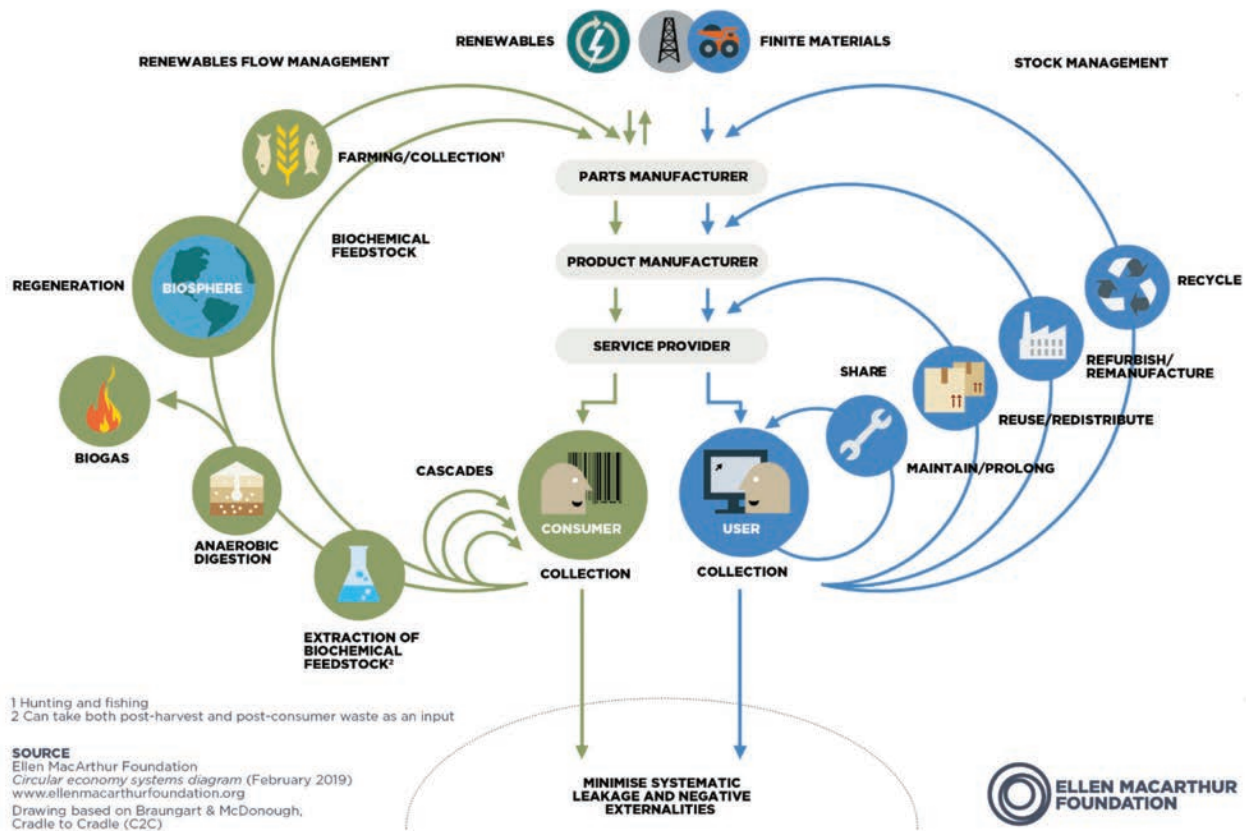
Natural resource extraction and processing activities account for approximately 50 percent of total global greenhouse gas (GHG) emissions (International Resource Panel, 2019), and global resource consumption has tripled over the past four decades (United Nations Environment Programme, 2016). Reducing GHG emissions from the production, use, consumption and disposal of materials can help countries meet the Paris Agreement 1.5°C target. The Ellen MacArthur Foundation (2019a) reported that applying circular economy strategies in five key materials (cement, aluminum, steel, plastics and food) can achieve reductions in GHG emissions – 9.3 billion metric tons of carbon dioxide equivalent in 2050 globally – equivalent to cutting current emissions from all transport to zero.

A “circular economy,” as defined in the Save Our Seas 2.0 Act, refers to a systems-focused approach and involves industrial processes and economic activities that are restorative or regenerative by design, enable resources used in such processes and activities to maintain their highest values for as long as possible, and aim for the elimination of waste through superior design of materials, products and systems (including business models). (See Figure 1.) It is a change to the model in which resources are mined, are made into products, and then become waste. A circular economy reduces materials use, redesigns materials to be less resource intensive, and recaptures “waste” as a resource that can serve as feedstock to manufacture new materials and products. Circularity is already embraced in the SMM approach that the United States has pursued since 2009. A circular economy approach under the SMM umbrella demonstrates continuity in our emphasis on reducing life-cycle impacts of materials, reducing the use of harmful materials and decoupling materials use from economic growth. The *2021 Strategy* recognizes the need to implement a circular economy approach for all – reducing the creation of waste with local communities in mind and implementing materials management strategies that are inclusive of communities with environmental justice concerns.

## Sustainable Materials Management (SMM) Program

EPA’s SMM program aims to reduce the environmental impacts of materials across their life cycle and broadly covers materials use in the United States. EPA’s activities are covered in the [EPA Sustainable Materials Management Program Strategic Plan for Fiscal Years 2017 – 2022](#) (U.S. EPA, 2015). EPA has several long-standing programs and efforts underway to advance SMM. See [www.epa.gov/SMM](http://www.epa.gov/SMM) for more information.

The United States seeks to coordinate domestic and international policies that support this approach to ensure that U.S. knowledge and approaches contribute to international discussions on circular economy, as well as leveraging the data, information, tools and experience of the international community to support domestic efforts to achieve sustainability goals.



**Figure 1. Diagram of circular economy (Ellen MacArthur Foundation, 2019b)**

The *National Recycling Strategy*, which is part one of a series on building a circular economy for all, is focused on enhancing and advancing the national MSW recycling system, including plastics, glass, metals and paper. The purpose of the *National Recycling Strategy* is to identify deliberate objectives and stakeholder-led actions to create a stronger, more resilient, less impactful and more cost-effective U.S. MSW recycling system. This strategy responds in part to Congress’ request in 2019 for EPA to develop a “national recycling strategy to strengthen and sustain the current system with recommendations for voluntary actions” (U.S. House of Representatives, 2019). The United States recognizes that MSW recycling is one contribution to a circular economy approach, but it is a critical first step since it serves as a key mechanism for returning materials to the supply chain.

Improvements to the U.S. waste management system through implementation of circular economy approaches and increased recycling may offer opportunities to address environmental, social justice and civil rights concerns. Waste management has long been associated with the environmental justice movement; in fact, the event that catalyzed the environmental justice movement was a nonviolent sit-in protest against a polychlorinated biphenyl landfill in Warren County, North Carolina, in 1982. The seminal studies on environmental justice by the Government Accountability Office and United Church of Christ showed that hazardous waste management practices have



profound implications for communities in which they are located (Chavis and Lee, 1987; U.S. Government Accountability Office, 1983). Waste can impact communities where waste management facilities are concentrated, including impacts to human health, ecosystem services, property values, aesthetic and recreation values, and land productivity itself. Adverse environmental factors from waste can compound social and economic conditions and lead to higher levels of chronic health issues. Communities with environmental justice concerns, who already shoulder the burden of disposal facilities (Tishman Environment and Design Center, 2019), are most impacted by these issues.

Unsafe waste management practices can also disproportionately impact disadvantaged communities abroad. Some countries continue to strengthen their recycling and waste management systems and may face challenges to ensure that scrap and recyclables are managed in an environmentally sound manner, especially in communities with environmental justice concerns. By promoting a circular economy and a recycling system that ensures sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all, the *2021 Strategy* can support U.S. efforts to achieve Goal 8 of the UN's Sustainable Development Goals. A circular economy and recycling systems must also promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels, which is Goal 16 of the Sustainable Development Goals. U.S. efforts under the *2021 Strategy* also aim to contribute toward that goal.

Environmental benefits of advancing the U.S. recycling system include decreasing pollution and conserving energy. In 2018, approximately 292 million tons of MSW were generated in the United States, of which approximately 69 million tons were mechanically recycled and 25 million tons were composted. Together, 32.1 percent of MSW (about 94 million tons) was mechanically recycled or composted, preventing over 193 million metric tons of carbon dioxide equivalent from entering the atmosphere (U.S. EPA, 2020a).



Woman placing a plastic bottle into a recycling bin.

Economic benefits of recycling include increasing national security and resiliency by tapping a domestic source of materials – including the retention of key critical minerals needed to manufacture vital products, support American manufacturing, and create jobs in the recycling and manufacturing industries. For example, EPA’s *Recycling Economic Information Report for the United States* shows that in 2012, recycling and reuse activities accounted for approximately 681,000 jobs, \$37.8 billion in wages, and \$5.5 billion in tax revenues (U.S. EPA, 2020b). Recycling turns waste into economic opportunity.

Increasing MSW recycling is one aspect of a circular economy approach since it serves as a mechanism for reducing environmental and social impacts of materials use, keeps valuable resources in productive use rather than in landfills, and creates jobs. EPA, in coordination with other federal agencies and interested stakeholders, intends to release subsequent strategies that will encompass other activities beyond the recycling of MSW, reflecting the need for sustainable product design, reducing waste generation, and materials reuse activities critical to realizing circularity. Subsequent strategies will address other key materials, such as plastics, food, cement and concrete, and electronics. EPA will also bolster this reframed focus by developing a new goal to reduce the climate impacts from materials use and consumption, which will complement existing national goals on recycling and the reduction of food loss and waste. In the meantime, existing efforts will continue to address these material streams, some of which are discussed more in depth in Appendix A. EPA is also promoting water circularity under the National Water Reuse Action Plan.

Many stakeholders submitted comments on whether to include chemical recycling in the scope of the *National Recycling Strategy*. All options, including chemical recycling, should be discussed when considering methods for sustainably managing materials. Therefore, chemical recycling is part of the scope of this strategy and further discussion is welcome.

## Developing the *National Recycling Strategy*

In 2018, in response to recent international policy changes and other challenges, EPA began an effort to focus on recycling challenges in the United States, which led to the inaugural America Recycles Day Summit in 2018. One year later, EPA published the [National Framework for Advancing the U.S. Recycling System](#) (the *National Framework*) to highlight the four main challenges the U.S. recycling system must address to be effective: promoting education and outreach, enhancing infrastructure, strengthening materials markets and enhancing measurement. It also identified specific voluntary actions, ongoing and planned, that EPA and recycling stakeholders would take to improve the effectiveness and resiliency of America’s recycling system (U.S. EPA, 2019).

Building on the *National Framework* and EPA’s long history of providing data, tools, information and other resources to support recycling in the United States, EPA coordinated the development of the *National Recycling Strategy* to identify the actions





Robotic arms sorting different types of materials.

needed to create a strong, resilient, cost-effective and less impactful U.S. recycling system – a key element of a circular economy. EPA, working with stakeholders and other federal agencies, is resolved to meet the challenges that the U.S. recycling system faces head on and chart the course for the development of more sustainable solid waste and recycling systems. This strategy aligns with and supports implementation of the National Recycling Goal to increase the U.S. recycling rate to 50 percent by 2030<sup>1</sup>.

The *National Recycling Strategy* builds on the principles set by the *National Framework* on MSW recycling. The following key sources of information, ideas and collaborative input also informed the development of this strategy:

- **Federal Agency Input.** EPA received input from other federal agencies in the development of the *National Recycling Strategy*, including the Council on Environmental Quality (CEQ), the Federal Trade Commission (FTC), the National Science Foundation (NSF), the U.S. Agency for International Development (USAID), the U.S. Department of Agriculture (USDA), the U.S. Department of Commerce (DOC) (including the International Trade Administration [ITA], National Oceanic and Atmospheric Administration [NOAA], and the National Institute of Standards and Technology [NIST]), the U.S. Department of Defense (DOD), the U.S. Department of Energy (DOE), the U.S. Department of State (DOS), the U.S. General Services Administration (GSA), and the U.S. Trade Representative (USTR).
- **State, Tribal and Local Agency Input.** EPA obtained input from the Environmental Council of the States (ECOS), the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), South Carolina Department of Commerce, U.S. Conference of Mayors, the National Tribal Caucus, and the Tribal Waste and Response Steering Committee.
- **Non-Profit Organizations.** EPA received feedback from several non-profit organizations including the Environmental Research and Education Foundation (EREF), GreenBlue Institute, Keep America Beautiful (KAB), the National Recycling

<sup>1</sup> EPA will issue an updated Recycling Measurement Guide in 2022 and will then assess the national recycling goal.

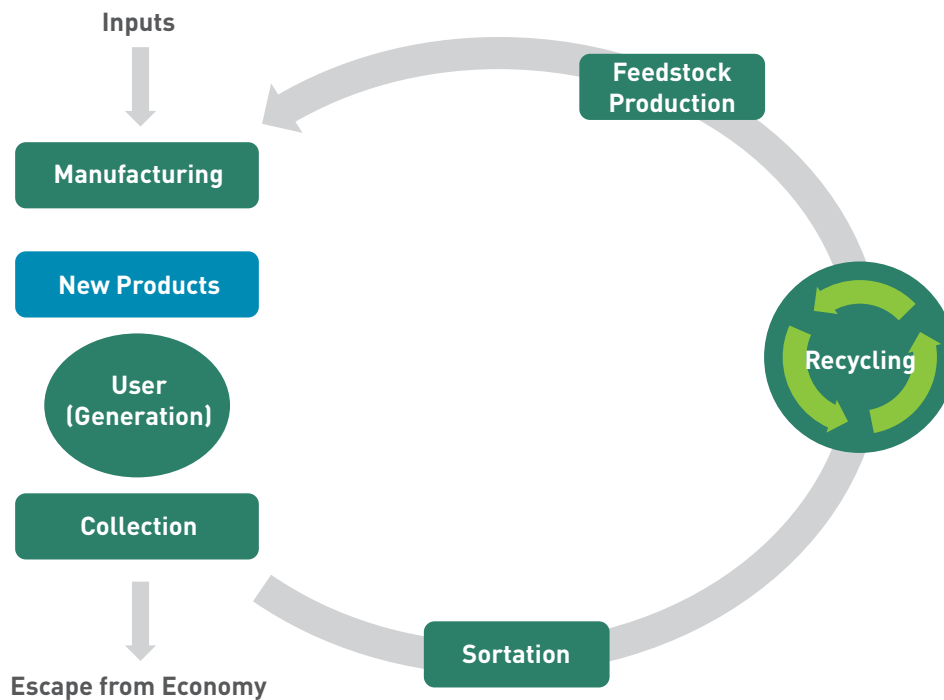
Coalition, The Recycling Partnership (TRP), and the U.S. Chamber of Commerce Foundation (USCCF).

- **EPA's America Recycles Network.** In April 2020, EPA conducted a survey of the America Recycles Network members to identify relevant actions that could make meaningful improvements to America's recycling system. Their ideas and suggestions have been incorporated into the *National Recycling Strategy* (visit <https://www.epa.gov/americanrecycles/forms/america-recycles-pledge> to see the current list of America Recycles Pledge signatories).
- **Public Comment Period.** EPA sought input from the public on the draft *National Recycling Strategy* through a federal docket (EPA-HQ-OLEM-2020-0462) in the fall of 2020. Outreach also included a publicly accessible, recorded webinar providing an overview of the draft strategy in October 2020 and discussion and dialogue with participants at the November 2020 America Recycles Summit. EPA received considerable input that the draft strategy was too narrow in scope and that it should be broadened to embrace a circular economy approach. EPA considered all input received during the public comment period in the finalization of the *National Recycling Strategy* (see Appendix B for an overview of the comments that were received and how they were addressed).
- **Consultation with EPA's National Environmental Justice Advisory Council.** At their June 2021 meeting, EPA's National Environmental Justice Advisory Council (NEJAC) provided feedback on the *National Recycling Strategy*. The NEJAC highlighted that recycling is not always seen as a good thing in communities where recycling facilities are located. They also emphasized concerns with the siting of incineration facilities. In addition, the NEJAC highlighted that plastics are often not effectively recycled and there is confusion on what plastics are recyclable. Based on NEJAC and other feedback, EPA revised the *National Recycling Strategy* to reflect the need for an environmental justice assessment of U.S. non-hazardous solid waste management infrastructure. This assessment will help convey potential impacts of existing nonhazardous solid waste management on overburdened communities and inform new facility siting and other decisions. EPA also ensured that the strategy reflected actions to clarify product labeling regarding recycling and will further consider these comments on plastic products in developing a post-consumer materials management and water management strategy under the Save Our Seas 2.0 Act.

Just as successful coordination between public and private stakeholders was instrumental in developing this document, successful implementation of this strategy will require coordinated involvement and commitment across all levels of government and stakeholders in the America Recycles Network. In addition to implementation, EPA is committed to working across the Agency and the federal government, working with communities, and leveraging the expertise of the America Recycles Network when coordinating future strategy updates.

## Overview of the MSW Recycling Process as a Component of a Circular Economy

One aspect of a circular economy approach is to recapture “waste” as a resource that can serve as feedstock to manufacture new materials through recycling. While the recycling process often differs by commodity and locality, there are essentially four main steps: generation, collection, processing and remanufacturing into a new product. Figure 2 depicts a simplified materials flow of the recycling process.



**Figure 2. Conceptual Material Flow of the U.S. Recycling System**

- **Generation:** Materials are generated by residents (e.g., households), public spaces (e.g., parks), institutions (e.g., universities), and commercial businesses (e.g., retail stores).
- **Collection:** Materials are collected by a private hauler or government entity through curbside collection, transfer stations, onsite collection, drop-off centers, take-back locations, stewardship programs and/or scrap yards.
- **Secondary Processing:** The collector transports the materials to a processing facility, such as a MRF or paper processor. At the processing facility, the recyclables are sorted, cleaned of physical contaminants, reduced in size, and prepared for transport to a milling facility or directly to a manufacturing facility. Some commodities may require more processing for additional sorting, size reduction and decontamination. For example, glass and plastic are often sent to facilities where they are processed into manufacturing feedstocks.



- **Manufacturing:** After all necessary processing has been completed, recyclables are made into new products at a manufacturing establishment, such as a paper mill or can/bottle manufacturing facility.
- **Escape from the Economy:** When materials are not recycled or reused, the remaining value of those materials no longer perpetually contributes to the economy. While few materials are infinitely recyclable, the goal of a circular economy approach is to prolong the useful lifespan of non-toxic resources for as long as possible. By recycling materials, resources remain in the economy for buying, selling and manufacturing. Although not pictured here, there are additional material losses at various points in the recycling process. For example, contamination can result in material value escaping from the economy.

## Drivers, Opportunities, and Challenges Facing the U.S. Recycling System

Two major global trends are motivating major changes to the U.S. recycling system. First, changes to global trade are shifting the markets for recycled materials and further amplifying the need for new markets and improved infrastructure across the United States. Second, increasing awareness of the extent and impacts of mismanaged waste in the environment are increasing demands for accountability and transparency in the economy, particularly for the management of materials at the end of their life. A system that extracts value from those secondary materials is critical to extending the economic benefit of natural resources.



Recycling bin in a park in downtown Washington, D.C.

The *2019 National Framework for Advancing the U.S. Recycling System* articulated a number of challenges facing MSW recycling, including confusion about what materials can be recycled, which often leads to placing recyclables in the trash or throwing trash in the recycling bin or cart; recycling infrastructure that has not kept pace with today's diverse and changing waste stream; reduced markets for recycled materials; and varying methodologies to measure recycling system performance. The *2021 Strategy* builds on existing successes and efforts to advance the U.S. recycling system that are being undertaken by federal, state, local and tribal governments; non-profit organizations; communities; and multiple industries. It seeks to identify the critical technology, policy, financial and programmatic issues that must be addressed to enhance the effectiveness and resilience of our recycling system as a critical component of a circular economy approach.

## Goals, Strategic Objectives and Actions

On November 17, 2020, at the America Recycles Summit, EPA announced the National Recycling Goal to increase the U.S. recycling rate to 50 percent by 2030 to galvanize action to further strengthen the U.S. recycling system. The national goal and future metrics will provide the benchmarks needed to evaluate the success of the

## COVID-19 Impacts

The COVID-19 public health emergency continues to affect recycling programs and markets for recyclables. With more people working from home, residential trash and recyclable collections have increased while commercial trash and recyclables have decreased (Staub, 2020). This has changed the composition of recyclables – for example, less office paper is being generated. Nationwide, office and school closures have lowered the supply of printing and writing paper for recycling; however, the increases in e-commerce and home grocery delivery have resulted in a surge of packaging paper. Containerboard mills are running at 95 percent operating rates, and the need for corrugated boxes has substantially raised old corrugated container (OCC) prices. The higher prices have lifted residential mixed-paper prices (Miller, 2020). Recyclers are also finding an increase in the prevalence of contaminants, such as masks and latex gloves, in the recycling bin, which is further challenging recycling operations to economically and efficiently process recyclables (Sangal, 2020).

## The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

On January 1, 2021, amendments to the Basel Convention to control exports and imports of plastic scrap and waste took effect. Such international actions, while limiting U.S. export markets for recyclable material, offer new incentives to develop domestic market opportunities.

## Plastics and SOS 2.0

Plastics are increasingly receiving attention domestically and internationally due to concerns about marine litter. In 2020, Congress passed the Save Our Seas 2.0 Act, which focuses on preventing, reducing and recycling marine litter (such as plastics). The Act supports investments in post-consumer materials management infrastructure, as well as education.

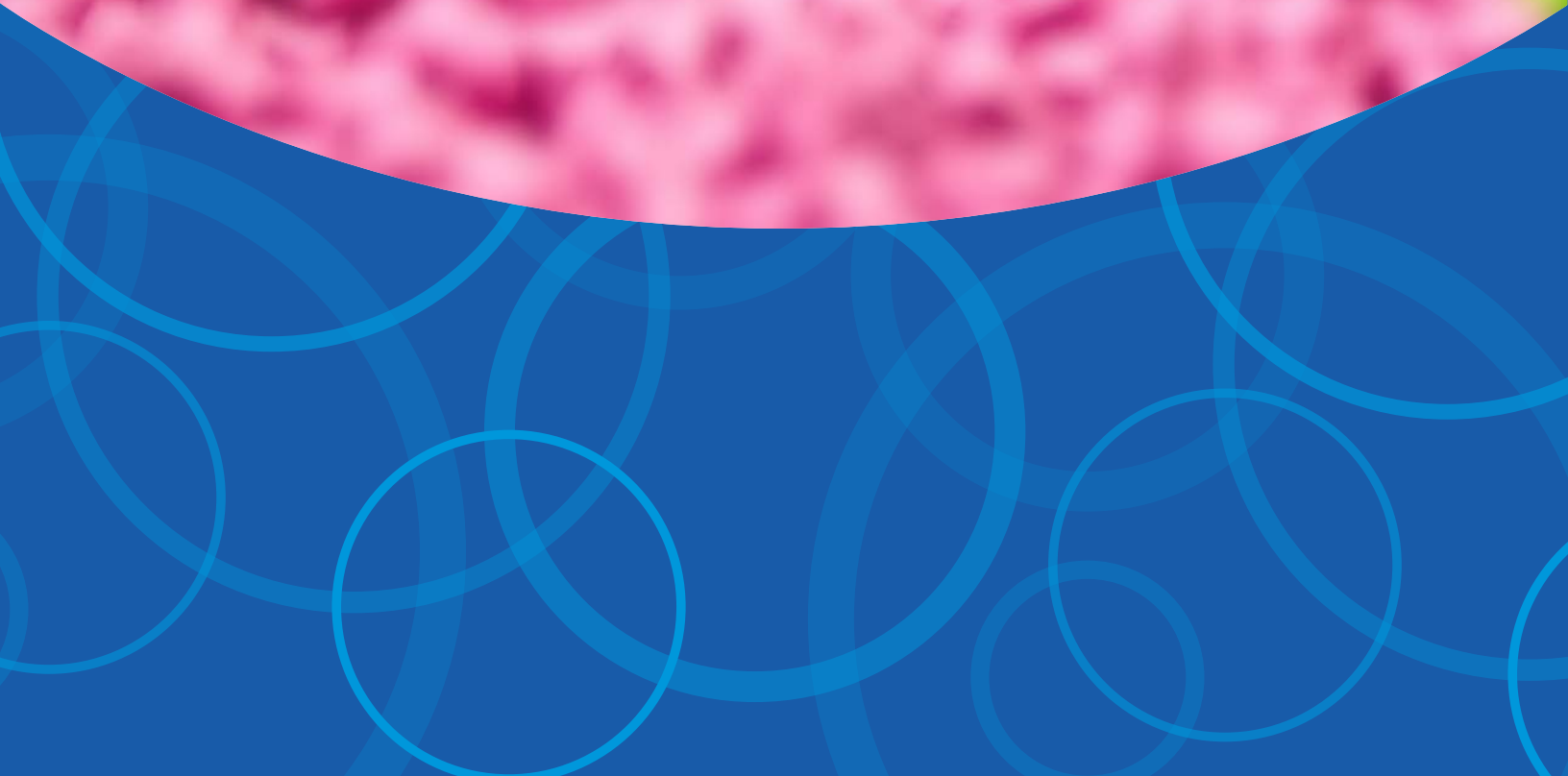
collective efforts to significantly improve the nation's recycling system. In 2021, EPA, in coordination with other interested stakeholders, intends to finalize the methodology for calculating the recycling rate, including finalizing which material streams will be included.

EPA also intends to initiate efforts to establish a goal related to climate impacts associated with the production, use, consumption and disposal of materials. This new goal will not only support a circular economy, but it will also complement the existing National Recycling Goal and the national goal to reduce food loss and waste. It will also contribute towards global climate change efforts and demonstrate U.S. leadership internationally in connecting innovative resource efficiency initiatives with goals to address climate change.

The *2021 Strategy* identifies five strategic objectives that will contribute to strengthening the U.S. recycling system. These objectives serve as the organizing framework under which specific actions are organized:

- A. Improve Markets for Recycling Commodities.
- B. Increase Collection and Improve Materials Management Infrastructure.
- C. Reduce Contamination in the Recycled Materials Stream.
- D. Enhance Policies and Programs to Support Circularity.
- E. Standardize Measurement and Increase Data Collection.

The following sections describe the strategic objectives and actions.





# Objective A: Improve Markets for Recycled Commodities

To move towards circularity, we need to improve and increase markets for recyclable materials and recyclable products, in addition to better integrating recycled materials into product and packaging designs. The decrease in available markets for recyclable materials has impacted the economics of recycling both within the United States and worldwide. It is also important to ensure that markets for recyclables do not further harm the environment or place additional burdens on communities near manufacturing, processing or recycling facilities – some of which may already face environmental justice concerns.

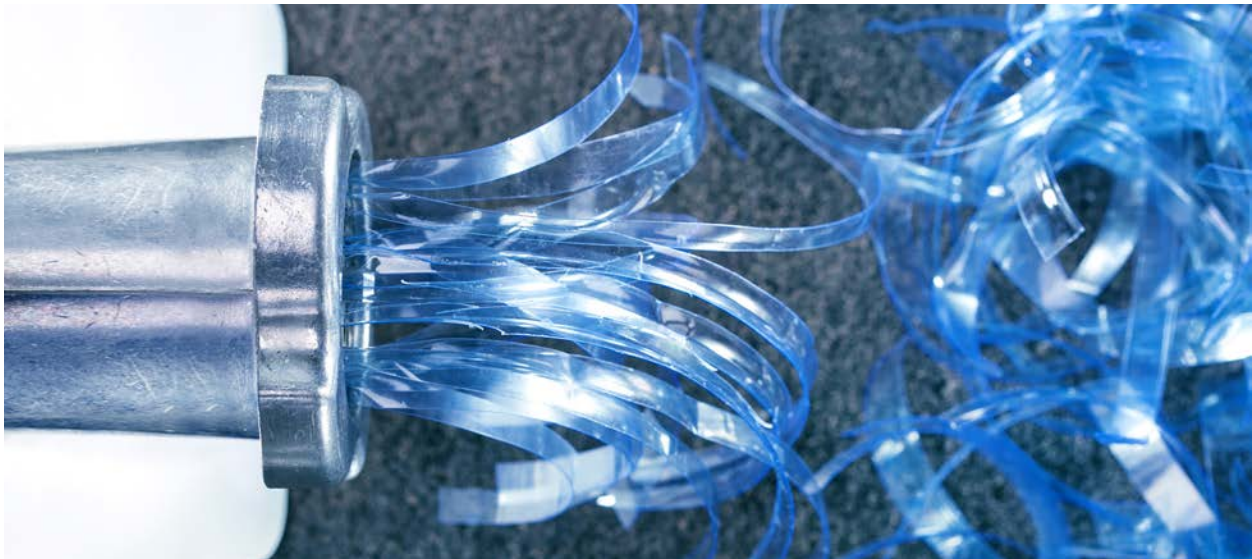
The benefits of increasing the environmentally sound use of recycled materials can include local job creation; additional resiliency to market disruptions; cost savings to local municipalities from improved, more robust recycling markets; increased opportunities for consumers to “buy recycled” and support recycling markets; new markets for less-often-recycled materials; and reduced environmental impacts over the life cycle of the product. It is also important to ensure that recyclables are managed in an environmentally sound manner when sent for further processing so that communities with environmental justice concerns are not adversely affected by recycling practices.

## A1. Promote market development.

### **A1.1. Conduct market development workshops and dialogues to spur market development for recycled materials, educate stakeholders on the value of secondary materials and identify solutions to recycling system challenges.**

Coordinate dialogues among private and public recycling programs, manufacturers, and other relevant stakeholders on actions that can be taken to strengthen markets for recycled materials at the state, regional and local levels, including smaller markets and rural areas. Market development workshops – such as those held by EPA, the Northeast Recycling Council (NERC), and the Southeast Recycling Development Council (SERDC) in 2019 – are one mechanism to bring together targeted stakeholders to engage in discussions about specific market development issues.

### **A1.2. Support regional market development entities.** Ensure funding for state or regional market development entities (existing entities or entities that need to be established), such as the Washington Recycling Development Center, NERC and SERDC, among others. Regional market development entities are positioned to focus on state and regional efforts and priorities and leverage existing materials marketplaces.



Recycled plastic being cut through a recycling machine.

**A1.3. Produce an analysis of market development opportunities suited to rural areas.** Rural areas face unique challenges to developing and sustaining markets. Building markets in rural areas would stimulate local job creation from the development of small-scale manufacturers that use locally generated materials.

**A1.4. Create market development toolkits for communities.** Collect case study success stories, ideas and resources on improving markets and compile them into a reference. Consulting the toolkit could be a first step to helping communities address their local market development challenges. Initiate community engagement and introduce market development concepts to communities facing environmental justice concerns so they can consider recycling markets as a potential redevelopment option.

## **A2. Produce an analysis of different types of end markets that considers recycled material consumption, resilience, environmental benefits and other relevant factors for decision makers.**

Markets vary in their ability to consume recycled material content, their economic viability, their stability, and how much the use of recycled materials in these product categories benefits the environment. An analysis of end markets and their requirements can inform decision makers about the value, costs, social impacts and potential benefits (environmental, social and economic) associated with investing in activities to strengthen the nation's recycling system.

### A3. Increase manufacturing use of recycled material feedstocks in domestic markets.

**A3.1. Increase awareness of regional feedstocks available to local manufacturers.** Often, manufacturers or other possible users of recycled products are not aware of the recycled material feedstock in their area or the potential to use that material. Communities do not always generate enough recycled material to make it worthwhile to transport the material long distances to other manufacturers who might be able to use it. One way to help strengthen and increase the use of recycled material as feedstock is ensuring that manufacturers in the regions where it is generated can take advantage of the available supply.

**A3.2. Form a plan to develop the needed capacity and improvement of domestic markets to use recycled materials generated in the United States.** This could include combining infrastructure and feedstock data from Actions A3 and B1 with manufacturers who use/potentially use recycled materials. Explore ways to ensure that a consistent supply of feedstock is available to manufacturers.

### A4. Increase demand for recycled materials through policies, programs, initiatives and incentives.

**A4.1. Identify strategies for addressing materials with less-mature markets.** Consider ways to help less-mature markets across the country reach maturity. Focus on materials with limited markets that could have the greatest environmental impacts. Explore ways to incentivize partnerships between feedstock producers and users and connect markets across regions.



Machines break and combine glass in a recycling facility. This broken glass, called cullet, can be mixed with sand, limestone and other raw materials to produce molten glass, which is used to create new bottles and jars.



**A4.2. Identify strategies to address barriers to using recycled content in products.** Identify barriers to recycled content use in products. This includes supply chain, contamination, economics, legislation/policies, technological limits to recycled content, product safety requirements (e.g., U.S. Food and Drug Administration approvals), perceptions of inferior quality, and product performance specifications. Collaborate with governments, academia, public interest groups, environmental organizations and manufacturers to find strategies to tackle those barriers. Develop programs for the private sector to increase recycling, like the Buy Recycled Business Alliance, and help manufacturers find ways to bring municipal materials into their facilities for use. Consider the use of existing – and, where needed, development of – third-party certifications for recycled/secondary materials.



Paper cup made from recycled paper.

**A4.3. Develop messaging about buying sustainable products made with recycled content.** Determine best approaches and strategies to develop effective messaging campaigns encouraging producers and the public to close the recycling loop by buying new sustainable products made from recycled materials. To increase awareness among consumers, identify producers of recycled products and consider a “recycled content” label, so consumers can clearly understand what portion of the materials in the product is recycled.

**A4.4. Host dialogues with manufacturers and other stakeholders to learn what policies, programs and incentives would promote greater use of recycled content in products.** Encourage communication among governments, manufacturers and stakeholders to identify programs, challenges, incentives and policies that fit best within their market to increase recycled content use in products.

**A4.5. Encourage institutions, corporations and governments to adopt procurement policies to purchase more sustainable materials made with recycled content.** Through their purchasing power, governments and other entities can increase demand for products made with recycled content. This action could include updating existing guidelines, such as EPA’s *Comprehensive Procurement Guidelines*, or creating new guidelines for buying products with post-consumer recycled content, taking into consideration existing private sector standards and certifications.

**A4.6. Create a “Demand Challenge” partnership program to encourage the use of recycled materials in products.** A voluntary recognition program (led by the federal government or other entities) could encourage companies to increase their use of secondary materials both through purchasing power (buying recycled) and incorporating recycled materials into their manufactured products.

## **A5. Continue to support research and development of technologies and products that will expand market opportunities.**

Research and development can create new markets by finding novel ways to use secondary materials as feedstocks and developing technology to allow the recycling of difficult-to-recycle materials. Funding projects and building new partnerships with universities, industry and others will both advance secondary materials use and expand markets for materials and products.

## **A6. Explore possible ratification of the Basel Convention, and encourage environmentally sound management of scrap and recyclables traded with other countries.**

**A6.1. Support the Basel Convention.** Some countries continue to strengthen their recycling and waste management systems and may face challenges to ensure that scrap and recyclables are managed in an environmentally sound manner, especially in communities with environmental justice concerns. [The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal](#) requires parties to control the transboundary movements of certain materials and hazardous waste covered by the Convention, and to take measures to not allow certain exports if parties have reason to believe the exports would not be managed in an environmentally sound manner.

Currently, EPA has authority under the U.S. Resource Conservation and Recovery Act to control transboundary movements of most hazardous recyclables and waste, but not all Basel-controlled waste. The United States signed the Basel Convention in 1990 and the Senate gave its advice and consent to ratification in 1992. The United States should explore options for strengthening U.S. participation in the Basel Convention, including options that would enable ratification.

**A6.2. Encourage environmentally sound management practices to support protection of human health and the environment.** The United States supports environmentally sound management of scrap and recyclable materials. In conjunction with exploring options for strengthening U.S. participation in the Basel Convention, EPA should identify ways to enhance practices to ensure that environmentally sound management of scrap and recyclable materials can benefit circular economy approaches.