RECYCLING:

Protecting the environment, and growing the economy

NOVEMBER 2018

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Recycling Across the United States

The passage of the Resource Conservation and Recovery Act (RCRA) in 1976 established the U.S. Environmental Protection Agency (EPA) as a federal leader in the conservation and recovery of materials. EPA's Sustainable Materials Management program seeks to efficiently and effectively minimize environmental impacts throughout the entire life cycle of materials—from raw materials extraction, through transportation, processing, manufacturing, and use, as well as reuse, recycling, and disposal.

EPA recognizes the importance and impact of recycling, which contributes to American prosperity and the protection of our environment. The United States has made great progress on recycling, growing from a rate of less than 7 percent in 1960 to 35 percent in 2015 for municipal solid waste. In addition to helping to protect the environment by keeping valuable materials out of landfills, the U.S. recycling industry is an important economic driver and provides more than 757,000 jobs and $6.7 billion annually in tax revenues. There is opportunity for an even greater contribution, as the most recent data from 2015 show that materials worth $9 billion are thrown away each year.

The U.S. recycling system is facing several significant challenges: well-intending consumers accidentally place recyclable items in the trash and non-recyclable items in the recycling bin; recent changes have negatively impacted markets for recyclables; and the evolution of new materials and products has added stress to our U.S. recycling system.

With these challenges, come great opportunity. By working together, all stakeholders in the recycling system can identify solutions to:

- Create a more resilient recycling system capable of withstanding disruptions;
- Support more competitive manufacturing by converting materials that are currently managed as waste into valuable raw materials;
- Maintain U.S. economic competitiveness in the future;

- Identify opportunities for investment in municipal recycling facilities to recover more material; and
- Create jobs.

On this 21st annual America Recycles Day, we celebrate the progress we have made as a nation on recycling as we work to improve the recycling system to tackle 21st century challenges.

EPA's Role in Recycling

Responsibility for managing materials and waste is largely at the state and local levels, yet capacity and approaches vary widely. EPA helps to provide national consistency and co-implements RCRA with states by providing states, businesses, and other stakeholders with national standards, guidelines, and technical support to more effectively conserve and manage materials and waste.

In addition, through EPA's Sustainable Materials Management program, EPA facilitates the dialogue and collaboration needed to address the complex challenges of sustainably managing natural resources while experiencing healthy economic growth.

Recycling Spurs Economic Growth

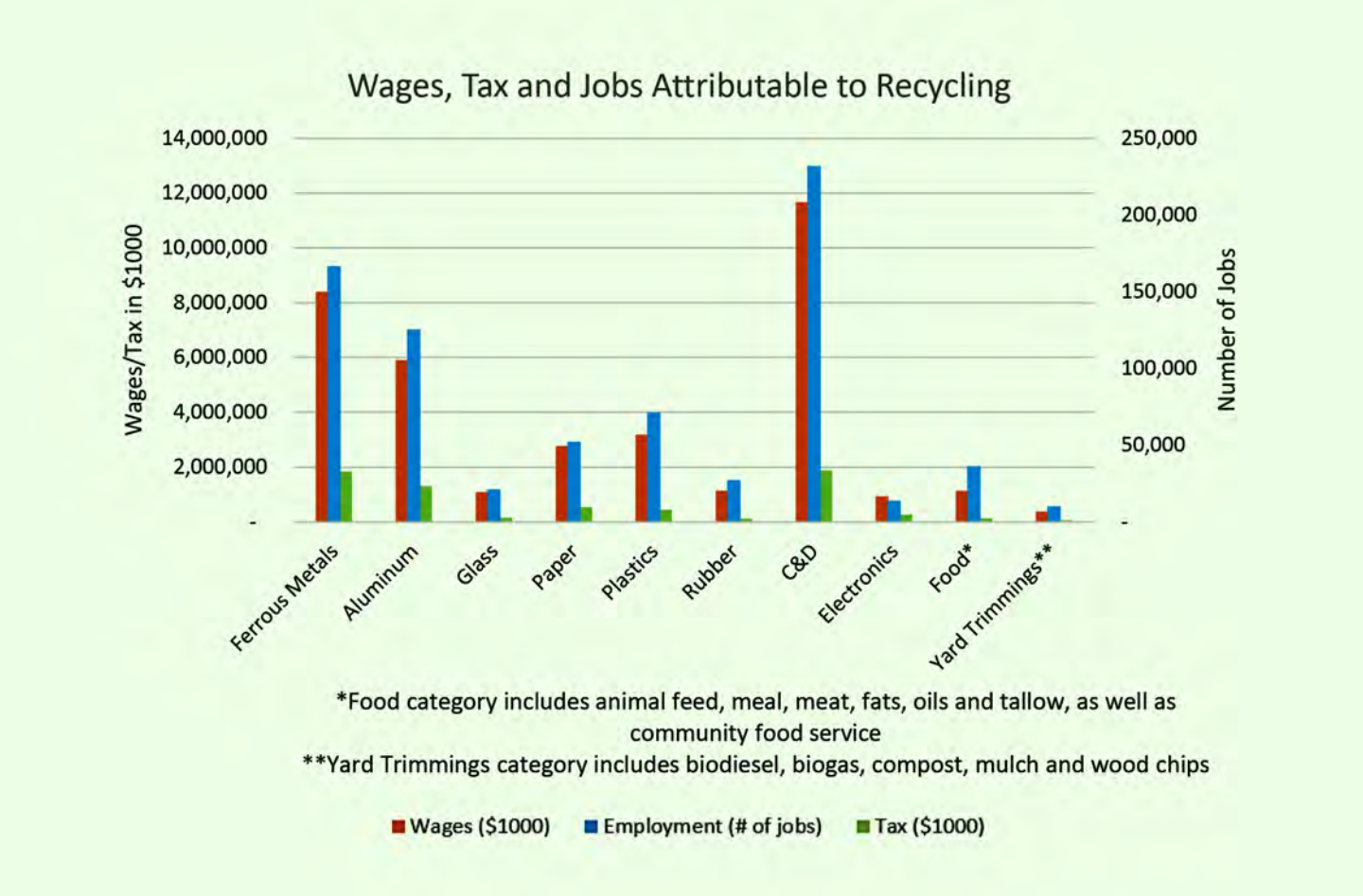
In 2016, EPA released the Recycling Economic Information (REI) Report, which increases the information on the economic implications of material reuse and recycling. How our society uses materials is fundamental to our economic and environmental future. Global competition for finite resources will intensify as economies grow. More productive and less impactful use of materials helps our society remain economically competitive, contributes to our prosperity and protects the environment in a resource-constrained future. By converting waste materials into valuable raw materials, recycling creates jobs, builds more competitive manufacturing industries and significantly contributes to the U.S. economy.

The 2016 REI Report includes updated information about the number of recycling jobs, wages, and tax revenue. The report shows that recycling and reuse of materials creates jobs, while also generating local and state tax revenues. In 2007, recycling and reuse activities in the United States accounted for:

- 757,000 jobs
- 36.6 billion in wages; and
- $6.7 billion in tax revenues

This equates to 1.57 jobs for every 1,000 tons of materials recycled. Construction and demolition materials recycling provides the largest contribution to all three categories (jobs, wages, and tax revenues), followed by ferrous and non-ferrous metals such as aluminum.

See the full report here: https://www.epa.gov/smm/recycling-economic-information-rei-report.



A Sustainable Materials Management Approach

Sustainable materials management (SMM) is a systemic approach to using and reusing materials more productively over their entire life cycles. It represents a change in how our society thinks about the use of natural resources and environmental protection.

EPA works with state and local governments, industry, academia, and non-governmental organizations to promote SMM approaches to conserve resources, reduce waste, and promote recycling. Here is a summary of recent EPA efforts.

Sustainable Materials Management (SMM) Electronics Challenge

Each year, EPA recognizes leading electronics manufacturers, retailers, and brand owners for their significant contributions in designing products sustainably and diverting electronics from landfills by sending them to third-party certified recyclers as part of the Sustainable Materials Management (SMM) Electronics Challenge. Electronics are a global economic driver with supply chains that reach around the world and products that touch every part of our lives. Today's electronics are made from valuable resources and highly engineered materials, including precious metals. If not properly managed at the end of their lifetime, some of the materials in electronics may pose a risk to human health and the environment. In 2016, SMM Electronics Challenge participants:

- Diverted 227,467 tons of end-of-life electronics from the landfill; and
- Sent 227,467 tons of end-of-life electronics to third-party certified recyclers.

SMM Electronics Challenge participants' accomplishments include:

- **LG Electronics** introduced their line of OLED TVs, which compared to LCD/LED TVs, eliminated the use of several hazardous materials, reduced their overall materials impact, and made these TVs easier to disassemble and recycle. LG showed great vision in continually replacing and reducing use of hazardous materials in electronics products by developing an OLED TV that is mercury-free, uses PVC-free internal cables and BFR-free housing and stand parts, and greatly reduces the potential harm to humans and the environment. LG was also commended for their high-level of engagement with suppliers to improve supplier environmental performance by transferring LG's green technologies and know-how to the suppliers' operations through the company's "Green Program Plus."
- **Staples** made it as easy for consumers to recycle their electronics as it is to buy them. By creating a convenient and secure option for consumers to recycle their used electronics at 1,250 stores nationwide, Staples filled a huge gap in the market, where consumers do not have simple, accessible options to recycle their electronics. Staples' outreach and public education initiative not only increased the amount of e-waste collected per store in a climate of lighter products, but also ensured that 100 percent of e-waste collected was sent to a third-party recycler.
- **Samsung Electronics** created their unique and fun Galaxy Smartphone Upcycling program. This innovative approach for the millions of old Galaxy smartphones provides all the necessary resources and tools to allows users to "upcycle" an old smartphone into a new product and share applications on the Upcycling website. Other users can download and use these crowd-sourced ideas.
- **Best Buy** worked in a unique partnership with HP to deliver a closed loop recycled plastic printer, the "first of its kind" in the retail market. The printer currently uses 10% recycled-content plastic from Best Buy's recycling efforts, and HP plans to expand its recycler base in the future.
- **Dell** created the first commercial-scale global ocean plastics supply chain by upcycling ocean waste into viable products rather than allowing the plastics to break down or become too contaminated to be reusable.

For more information about the SMM Electronics Challenge, visit https://www.epa.gov/smm-electronics/sustainable-materials-management-smm-electronics-challenge.

EPA's WasteWise Program

EPA's WasteWise program promotes more productive use and reuse of materials over their entire life cycles, and helps organizations and businesses apply SMM practices to prevent and reduce waste, save resources and money, and receive recognition for significant results. WasteWise partners reported preventing and diverting 8.5 million tons of waste in 2016 that would otherwise have been disposed in landfills or incinerated.

Participant accomplishments include:

Kohl's Department Stores – 49 States

Kohl's is a retailer with more than 1,100 locations in 49 states. It deploys waste recycling programs and waste avoidance strategies to help conserve resources, and actively encourages associates, partners, and customers to reduce their waste and look for opportunities to reuse and recycle materials. The retailer's signature grey shopping bags are made from recycled plastic, and the company offers customers the opportunity to recycle their plastic bags, shipping envelopes, air pillows, and product wrap at Kohl's stores nationwide. In 2016, Kohl's diverted more than 80 percent of its operational waste from landfills, including more than seven million pounds of plastic and 230 million pounds of cardboard.

CenturyLink Field – Seattle, Washington

CenturyLink Field in Seattle, Washington, home of the National Football League's Seattle Seahawks and Major League Soccer's Seattle Sounders FC, won a national award in 2018 from EPA's WasteWise program for reducing waste, keeping materials out of landfills, and preventing food waste through donation and composting. CenturyLink Field works with their sports teams and the Green Sports Alliance to achieve impressive sustainability results such as: keeping more than 95% of their waste out of landfills over the last four years; using food service products and vessels that are compostable; working with Cedar Grove and Sound Sustainable Farms to direct compost from CenturyLink Field to grow organic vegetables used at the stadium; generating 25% of the stadium's energy consumption by on-site solar; and saving 1.3 million gallons of water per year by using low-flow bathroom fixtures.

Beth Israel Deaconess Medical Center – Boston, Massachusetts

Beth Israel Deaconess Medical Center (BIDMC) is a patient care, teaching and research affiliate of Harvard Medical School, located in the heart of Boston. Through the commitment of all its employees, BIDMC can become more sustainable every day through employee engagement, community partnerships, and innovative solutions. In 2016, BIDMC prevented, donated and recycled nearly 1,300 tons of waste through efforts including reprocessing medical devices, donating supplies, composting food waste, and promoting green commuting with rideshare programs.

Earth Friendly Products – Parsippany, New Jersey

Earth Friendly Products operates four sustainable manufacturing facilities across the United States, including WasteWise award recipients in Parsippany, N.J. Family-owned and operated since 1967, the company has implemented rigorous recycling programs in all its divisions to dramatically reduce its production and packaging waste. By separating all recyclable materials, being vigilant in reducing consumption, and working closely with suppliers and vendors to prevent waste, Earth Friendly Products has reduced its overall waste by 95 percent since 2010. Since 2011, the company has earned over $223,000 from selling recyclable materials and has reduced its trash disposal costs by over $115,000. In addition to a WasteWise Award, each of the company's facilities has achieved TRUE Zero Waste Platinum certification from the U.S. Zero Waste Business Council and Green Business Certification Inc.

Curbell, Inc. - Orchard Park, New York

Building on past environmental successes, Curbell, Inc.'s two western New York facilities achieved a major objective in 2016: the company was able to cut its dumpster pick-ups from 104 to 52, a nearly 50 percent reduction. A main factor in the Curbell program's most recent improvement was the creation of an all-volunteer employee Green Team. The team is made up of a diverse group of individuals from all departments, from management to facilities and operations. The wide range of influence helped Curbell, Inc. implement single stream recycling and allowed the team to tackle many smaller projects that resulted in significant waste reduction. Projects included digitization/print management, in which many departments committed to using electronic records, resulting in a 75 percent reduction in ink costs. Based on an employee suggestion, Curbell, Inc. worked with a supplier to eliminate extra packaging. This effort resulted in an estimated 500 thousand plastic bags saved annually. Another suggestion led the company to negotiate with a supplier for custom-length cords, resulting in the elimination of 75 thousand feet of copper wire scrap per year. Curbell, Inc.'s Green Team meets regularly to share and encourage ideas, tackle waste reduction projects, and help ensure that the message of sustainability is embraced by the entire company.

Urban Chestnut Brewing Company - St. Louis, Missouri

Urban Chestnut Brewing Company (UCBC) has made sustainability a major focus of its business plan since its inception in 2011. Whenever possible, sustainable design and processes are implemented at the point of installation. Its award-winning LEED Silver Certified production facility is one example. These industrial processes and technological investments enable UCBC to always minimize its waste footprint, while simultaneously engaging in ongoing opportunities to improve as the company expands its operations. UCBC believes that participating in EPA's WasteWise program enables it to communicate and share its approach in the hope that the message may assist others in craft brewing and other industries. In 2016, UCBC diverted up to 97 percent of its solid waste through recycling and repurposing. The company has solid waste diversion programs for spent grain (1.1 million pounds), wood pallets (28,000 pounds), and high-density polyethylene barrels (500 pounds). In the coming years, UCBC plans to focus on improving its ability to track its processes to deliver more accurate and meaningful cost savings numbers and further improve its operational efficiencies.

Evelyn Hill, Inc., Liberty Island - New York City, New York

Evelyn Hill Inc. is a family-owned company that has provided visitor services for generations at Liberty Island, the location of the Statue of Liberty. As part of an overall 'greening' effort, Evelyn Hill Inc. opened the Liberty Gift Pavilion, a LEED Platinum Certified building. The environmentally friendly construction features recycled materials, waterless urinals, LED lighting, a geothermal heating and cooling system, and rainwater recycling. Evelyn Hill Inc., also became a leader in concessionaire recycling methods, recycling over 94 percent of the solid waste produced by its operations in 2016.

The Valley Hospital - Ridgewood, New Jersey

The Valley Hospital is dedicated to ever-increasing accuracy in waste segregation. The hospital is monitoring waste streams through education and assistance from consulting sources. The Valley Hospital is also a member of Practice Green Health, which drives ideas and innovation into actions to create an environment for better health and safety. The Valley Hospital has approximately 3,000 employees. In 2016, the hospital recycled 462 tons, or 23.4 percent, of all waste materials. The hospital is very proud of the continued work it does to reduce waste. Great successes came from some of the smaller, harder to manage waste streams that added up to overall success. Examples are textiles, ink cartridges, medical instruments, metals, pallets, and Styrofoam. The challenge is to keep waste stream segregation in front of staff continually through monthly audits, Green Team meetings, and lunch and learns.

St. John's University - New York City, New York

As a Catholic, Vincentian, and Metropolitan institution, the values of sustainability are inherent to the mission of St. John's University (SJU). In 2016, SJU diverted more than 1,084 tons of municipal solid waste from landfills through donation, recovery, recycling, and composting. With its emphasis on setting goals, assessing progress and evaluating results, EPA's WasteWise program provides structure and framework for SJU.

Town of New Paltz - New Paltz, New York

The Town of New Paltz' Sustainable Materials Management Program began in 2011 when EPA representatives reached out and asked the town to participate in the national EPA Zero Waste Initiative Pilot Program. At that time, New Paltz' transfer station was sending out over 800 tons of garbage a year to a landfill four and a half hours away. In 2017, the transfer station, now marketed as the New Paltz ReUse and Recycling Center, sent out only 297 tons of garbage. The Town of New Paltz embarked on an aggressive public education and outreach campaign to promote the New Paltz Zero Waste Action Plan, which was adopted in 2012. It conducted tabling at local events, public speaking at local schools and organizations, and improved

educational materials, including a website. The zero-waste program created a new position to assist in outreach and operate the New Paltz ReUse Center that opened in 2012. The public provided significant input into the Action Plan, resulting in the Plan's expansion beyond "garbage only" to include a food recovery program that started with commercial composting and now includes the recovery of food to feed hungry people.

University at Albany - Albany, New York

The University at Albany, State University of New York consists of approximately 18,000 undergraduate and graduate students, and over 4,000 employees, distributed across three campuses. Since instituting a recycling program in 2005, the University at Albany has worked to increase the number of items it diverts from the landfill. The university achieved a breakthrough in these efforts in 2013 with the implementation of a composting pilot program. Composting is now flourishing in all the dining halls. In 2016, over 660 tons of wasted food were diverted through composting. This diversion accomplishment could not have been achieved without the coordinated efforts of the university's facilities management, University Auxiliary Services; Sodexo dining services; and Empire Zero, a composting company. Additionally, a food recovery program was recently established in one of the dining halls. The food recovery effort resulted in over 4,000 pounds of food being donated to the Regional Foodbank of Northeast New York. Finally, the university has steadily increased the number and types of materials that are reused, recycled, or otherwise diverted from the landfill, achieving a current diversion rate of 60 percent.

Perishable Distributors of Iowa - Ankeny, Iowa

Perishable Distributors of Iowa (PDI) is a food distribution company servicing the retail grocery industry. PDI has long been a company that recycles, but after making a Zero Waste commitment, landfill diversion results have been substantial. In 2016, PDI's landfill diversion rate was over 98 percent, keeping 24,018,995 pounds of waste out of landfills. One of the keys to achieving this rate was the successful diversion of organic wastes. Wasted food made up 799,723 pounds of PDI's waste diversion. Organic waste diversion is a significant challenge for an operation like PDI. It carries 7,400 fresh and frozen products from live lobsters to specialty cheeses, eggs, salads, and juices. This product diversity comes with its own inherent diversion challenges, along with the many different types of product packaging. PDI is proud of its ability to overcome this challenge.

PDI achieved Platinum-level Zero Waste status through the U.S. Zero Waste Business Council. It accomplished this through a comprehensive Zero Waste program and multiple areas of focus on materials throughout its company, including redesigning, reducing, reusing, recycling, composting, anaerobic digestion, reporting metrics, upstream management, leadership, training, waste analysis, hazardous waste prevention, closed-loop practices, and innovation. The biggest key to the success of the program is the top leadership's commitment to Zero Waste.

Just Salad - New York City, New York

Just Salad is a fast-casual restaurant committed to sustainability. The restaurant sells BPA-free reusable bowls to its customers for $1 at all 30 worldwide locations. With its 18 New York City locations, Just Salad saves the city of New York over 75,000 pounds of plastic waste every year with its unique approach to cutting waste. The restaurant's incentives program encourages individuals to purchase and use reusable bowls. The company offers free salad toppings each time a reusable bowl is brought back to a Just Salad location. Just Salad also offers a VIP program, where winners receive a black reusable bowl that allows them to skip the line anytime, in addition to free toppings every time a Black Bowl is brought back to a location.

Read about all the national and regional winners' accomplishments and how they achieved them here: https://www.epa.gov/smm/wastewise#AwardsandAwardWinners

Food Recovery Challenge

To put surplus food to better use, EPA partners with businesses and organizations in the Food Recovery Challenge (FRC) to help participants support their communities through food donation and protect their bottom line by reducing waste. The FRC is a voluntary program with over 1,000 businesses and organizations that have made commitments to reduce food loss and waste, track progress, and report results. In 2017, FRC participants prevented and diverted over 719,000 tons of food waste from landfill disposal.

- Over 18,000 tons were source reduced, preventing the creation of excess food.
- More than 286,000 tons were recovered through donations to feed people and animals.
- More than 179,000 tons were anaerobically digested.
- More than 225,000 tons were composted.
- Participants also saved up to $36.4 million in landfill tipping fees because of their prevention and diversion actions. Fifteen entities were selected for national recognition in 2018 for outstanding achievements through a variety of cost-effective and practical actions.

The following are some of the success stories on reducing food loss and waste:

Philadelphia Prison System Success Story – Leveraging Resources to Achieve Waste Reduction and Significant Socio-Economic Benefits

In 2011, EPA awarded a $15,000 composting grant to the Philadelphia Prison system to begin building a four-bay aerated static pile compost system. This success led to the City of Philadelphia awarding the Prisons an additional $60,000 to expand to a 12-bay system to compost most of the food waste being generated within the Philadelphia Prison system. The finished compost is now donated to the local community and used in a newly-established Philadelphia Prisons Orchard Program which is producing fruit for the prison system and for donation. This initiative also offers a job training opportunity for inmates.

In 2016, the Philadelphia Prison system won a Food Recovery Challenge National Award Honorable Mention in the “Innovation Category” for their efforts to develop an inmate Horticultural Training Certificate program in partnership with Temple University. Inmates received both classroom and hands-on training working in the compost and orchard operations. In 2017, the Philadelphia Prison system composted 88,688pounds of food waste. The Prison is currently working with EPA to develop a Food Donation and Prevention Plan to handle surplus food generated as part of its orchard and greenhouse growing operations.

Drake University - Next Course Food Recovery - Des Moines, Iowa

The Next Course Food Recovery Program at Drake University began in 2014 when then president, Sara Hillring, saw a need to address university food waste. She helped create Next Course in her first year at Drake University. Since then, it has grown into an official student organization that serves the university and the Des Moines, Iowa, communities. Next Course is a member of Food Recovery Network and works with Sodexo on composting and food waste prevention. Recovered food is donated to the Central Iowa Shelter and Services, YMCA, Hawthorne Hill, Children and Family Urban Movement, and Hope Ministries. Excess food is gathered from the Hubbell Dining Hall, activities such as Drake's Relay Week, and catered Drake University events. In 2016, Next Course joined EPA's Food Recovery Challenge. In one year, they diverted 2.9 tons of food waste on campus. Next Course donates wholesome, excess food to provide nutritious meals to people in need. In addition, they utilize social media to build awareness of food waste and its environmental impact.

Snoqualmie Tribe – Snoqualmie, Washington

The Snoqualmie Tribe, located in Snoqualmie, Washington, has become a sustainability leader among Indian Tribes in the Pacific Northwest, especially in the area of food recovery. In 2009, the Tribe conducted a waste audit of their casino and discovered that only 18.75 percent of what was in their garbage dumpsters was not recyclable or compostable. Much of what was in their garbage was wasted food. They designed a program to increase both recycling and composting at the casino and its many restaurants, trained staff regularly, and partnered with EPA and their local composting facility. In 2009, the Tribe began composting wasted food and kitchen scraps back-of-the-house and sending fats, oils, and greases (FOG) to a local biodiesel facility. Over the past 10 years, the casino has composted over 2,000 tons of wasted food and sent over 182,000 gallons of FOG to be used as biodiesel feedstock. In 2018, they've stepped up their food waste prevention efforts and implemented catering practices which result in less wasted food by event attendees. The Tribe takes all surplus unserved food to its employee lounge and allows its 1,100 part-time and full-time employees to enjoy free meals during their lunch and dinner breaks. Whatever surplus edible food is left over, the Tribe donates to local hunger relief organizations, like the Snoqualmie Valley Food Bank. The Snoqualmie Tribe is an EPA FRC participant and they will soon be sharing their experiences with other Pacific Northwest Tribes via peer networking calls, to help them green their casino operations.

Grinnell College - Grinnell, Iowa

Grinnell College has been successfully participating in food recovery efforts since its initiation in the Fall of 2013. Their program recovers thousands of pounds annually from the dining hall and local businesses. Food is distributed to people in need at the First Presbyterian Church and a nonprofit called Station Clubhouse. In 2016, Grinnell College diverted over 8,000 pounds of food from the landfill. The program also improved its efficiency by recovering more meals per week. They started recovering six meals a week with one distribution day and increased efforts to recover 12 meals a week with four distribution days. Grinnell College is located in a rural area, with one food bank accepting non-perishable items in town, resulting in a challenge to distribute perishable foods. Therefore, they had to be creative and find local partners who would be able to host distributions. Establishing these community partnerships has been crucial to their success, as well as establishing connections with key volunteers and supporters. Increased awareness of the college's food recovery efforts has allowed the program to work.

The Forge Restaurant at Montgomery Bell State Park Inn and Conference Center (Burns, TN) Department of Environment and Conservation, TN State Parks – Burns, Tennessee

The Forge Restaurant at Montgomery Bell State Park's Inn and Conference Center in Burns, Tennessee, has worked diligently to implement a food recovery program that diverts, donates, and composts food waste as much as possible. The restaurant currently diverts approximately 8,000 pounds of food waste a year and 4,000 pounds of food waste are composted. The remaining 4,000 pounds is donated with the help of a local philanthropy group, Hearts and Hands, in Dickson, Tennessee. The restaurant composted 57 tons of food waste in 2017, saving the park approximately $4,000.

Get Food Smart TN - Tennessee

A key initiative supporting EPA's FRC goals is the launch of a statewide initiative, Get Food Smart TN, endorsed by Tennessee Governor Bill Haslam. The program includes an interactive website, a recognition program, and a link to EPA's FRC. This program promotes FRC goals to grocery suppliers, schools, businesses, and consumers. As of October 2018, 140 entities have joined the program to recover and divert food. The Tennessee Department of Environment and Conservation (TDEC) Organics Management Grant funds projects that support FRC goals and raises awareness regarding the impact of food waste. Total grant funding of $3.7 million is used for diverse projects – from supplying composting equipment and organics collection receptacles, to supporting a distribution hub for a major food recovery organization. Working closely with EPA, TDEC staff presented about food waste, recovery, and diversion at 19 different events in 2017, engaging a wide variety of audiences. Staff assisted in food waste audits in select schools, and in food waste diversion, donation, and composting across the state.

EPA Partners with The Kroger Co. to Reduce Food Waste - Nationwide

The Kroger Co. is an EPA FRC participant and award winner. In 2018, Kroger joined the U.S. Food Loss and Waste 2030 Champions when EPA signed a new joint agency formal agreement under the Winning on Reducing Food Waste Initiative. The Kroger Co. focuses on addressing the complex issues of hunger and food waste through its Zero Hunger | Zero Waste Food Rescue program. Through this program, Kroger associates nationwide donate wholesome meat, produce, deli, bakery and dairy products that can no longer be sold to local food banks that have the capacity to safely handle and distribute fresh food. In 2017, Kroger donated 91 million pounds of food company-wide to local Feeding America-affiliated food banks. Working in partnership with internal food safety experts, Kroger continuously looks for opportunities to add new categories of food that can be rescued and donated safely.

In 2017, Kroger introduced its Zero Hunger | Zero Waste social impact plan. Their commitment: to end hunger in Kroger communities and eliminate waste across the company by 2025. In 2018, the company relaunched Zero Hunger | Zero Waste Food Rescue in stores to improve engagement and execution, with a goal of 100% of stores donating food consistently every month. Kroger will also create a Zero Hunger | Zero Waste Innovation Fund to find new ideas and scalable solutions to reduce food insecurity and food waste.

Food Forward – Southern California

Food Forward, a three-time EPA FRC awardee, rescues fresh local produce that would otherwise go to waste, connecting this abundance with people in need and inspiring others to do the same. Produce is collected from over 750 private backyards, 22 weekly farmers markets, and the downtown Los Angeles Wholesale Produce Market. In 2016, the Wholesale Recovery program rescued over 13.7 million pounds of fresh fruits and vegetables. This produce would have otherwise been sent to landfills at a great financial and environmental cost. One hundred percent of the recovered food is donated, within hours, to hunger relief agencies across eight counties in southern California. In 2016, Food Forward helped feed 1.25 million people facing food insecurity.

Kansas City Chiefs - Kansas City, Missouri

The Kansas City Chiefs Organization wanted to be a positive example for recycling and sustainability efforts within their community, so they created the "Extra Yard for the Environment" sustainability committee to educate their fans on environmental issues and have diverted more than 1,500 tons of materials from landfills through these efforts. In addition to waste diversion, the Chiefs have focused on energy efficiencies, glass recycling, and broadening recycling efforts, and are well on their way to having a positive environmental impact in Kansas City and throughout the region. Since 2012, the Chiefs and its vendors have diverted more than 600 tons of food from concession stands into composting and donated more than 24 tons of food to those in need.

Food Rescue Partnership - Moline, East Moline, and Rock Island, Illinois; Davenport and Bettendorf, Iowa

The Food Rescue Partnership focuses on education, awareness, community outreach activities, forming partnerships by tracking stakeholder engagement, and aiming to form and maintain relationships between community members to rescue food for its best possible use. The partnership also provides monthly food rescue education and awareness to the community, and continually looks to leverage existing, relevant, and recognized sources and authorities for the more up-to-date information to incorporate into their message. As a Food Recovery Challenge endorser, the partnership has increased the number of stakeholders; increased the number of donor-recipient relationships; increased both the number and geographic reach of education and awareness programs; and increased community visibility through in-person presence at community conferences and showcase events, in addition to online, print and broadcast media.

Johnson County Department of Health and Environment - Olathe, Kansas

The Johnson County Department of Health and Environment (JCDHE) has been a member of EPA's FRC since 2013. One of the major components of JCDHE's food recovery program is to ensure that enough outreach and education is provided to schools to decrease contamination rates in compost. JCDHE found that one of the most common contaminants in compost is straws. Straws are an unnecessary expense for schools. JCDHE also makes sure to advocate for source reduction at schools, often in the form of changes in purchasing. JCDHE believes that its work with the Shawnee Mission School District has direct application for strategies that apply to other K-12 schools.

JCDHE and the school district found that standardizing and improving signage on bins has been effective in reducing contamination, as well as encouraging waste diversion. JCDHE suggests that each bin have a dedicated color – blue for recycling, black for waste sent to the landfill, and green for compost. JCDHE also suggests that organizations look at what they are spending and why. They believe that collaborations with

food service and custodial staff has been a key factor in the success of diverting food from landfills. Finally, JCDHE also advises schools to conduct at least a week of surveying before beginning food recovery efforts. Separating liquids from other waste streams, so that the additional weight does not need to be paid for, is a best management practice that resulted from location surveys.

Iowa Waste Reduction Center (IWRC): Works with K-12 Schools to Reduce Food Waste - Cedar Falls, Iowa

Food waste reduction in Iowa is a priority for the Iowa Waste Reduction Center (IWRC). Since 2012, the center has focused on working with industrial, institutional and commercial entities. IWRC also showed a strong interest in understanding K-12 schools and reducing their wasted food. IWRC works with 29 schools, spanning 12 school districts, to provide waste audits, observe food management practices, and make recommendations to prevent and reduce food waste, with an emphasis on learning what gets thrown in the garbage daily. IWRC conducted the following work with select Iowa schools:

- Separated and measured all waste streams, including recyclables, compostables, cold lunch waste (lunches that students bring from home), trash, liquids, and food waste.
- Calculated that 0.4 pounds of food is wasted during lunch per student in the selected schools, which was extrapolated to estimate that each student generates 65 pounds of food waste per school year.
- Estimated that K-12 students in Iowa generated 33,423,650 pounds of food waste during the 2016-2017 school year.

Participating schools receive estimated potential savings in disposal costs if their food waste is diverted from the landfill. They also receive projected reductions in greenhouse gas emissions generated by the school's food waste. Recommendations are made to reduce school food waste, such as composting, repurposing food, inventory management, student involvement, and establishing share tables for uneaten, unopened foods for reuse and/or donation. IWRC's work and data collected showcase the impacts of reducing food waste in Iowa's K-12 schools and sparked interest in many institutions to learn about their food waste and what they can do to reduce, recycle and recover it.

Green Dining Alliance - St. Louis, Missouri

The Green Dining Alliance (GDA) has always encouraged their member restaurants to minimize their food waste by reducing portion sizes and composting food waste. Many of the GDA restaurant members compost, diverting more waste from landfills and reducing more greenhouse gas emissions than those restaurants who are only recycling. One GDA member is an Asian cuisine restaurant that has an all-you-can-eat buffet served Dim Sum style. Guests are offered small portions of everything on the menu but if they want more food, they must ask for it. Customers can have as much as they like, but they don't get more than they need, reducing the waste that is typical of buffets.

Mid America Regional Council (MARC) - Kansas City, Missouri

The Mid-America Regional Council (MARC) Solid Waste District serves five counties in Missouri and cooperates with four counties in Kansas, all within the Kansas City metropolitan area, which includes 119 local city governments. MARC became an EPA FRC endorser in 2015 and is very active in promoting the sustainable management of food. MARC funds food recovery and recycling grants in the Kansas City area and works to increase recovery awareness. During 2017, five of 12 grants funded by the District supported food recovery activities ranging from establishing food recovery programs in K-12 schools to composting and raising business and public awareness about food recovery. The District recently added a new wasted food webpage to Recyclespot.org. The page contains useful information for homeowners on how to reduce the amount of wasted food and encourages organizations to join the FRC. Another key objective of MARC is to share food recovery information through social media. In 2016, MARC shared 35 Facebook posts that generated more than 13,800 impressions and 25 tweets that generated more than 6,500 impressions. MARC also presents, or invites other organizations to present, on wasted food at meetings and conferences. Finally, MARC sponsors the Kansas City Environmental Educators Networks (KCEEN), which is a group of individuals and organizations focused on enhancing environmental education in K-12 schools. MARC also established a KCEEN sub-committee on food recovery. Many additional FRC participants joined as a result of MARC and KCEEN's efforts.

St. Louis Cardinals - St. Louis, Missouri

In 2016, the St. Louis Cardinals baseball team initiated a variety of green measures, including recycling, pollution prevention, and reducing wasted food at Busch Stadium. Sport teams and venues across the nation are encouraging Americans to protect the environment and sharing simple actions people can take to make a difference. Over the past five years, the Cardinals took advantage of EPA technical assistance to achieve food recovery goals, use a data management system, and reduce food disposal costs. In 2016, the Cardinals and their concessionaire, Delaware North, diverted approximately 217 tons of wasted food by composting and donated approximately 0.5 tons to Operation Food Search, which helps feed those in need in the St. Louis community. The Cardinals are also members of the Green Sports Alliance. Since launching nationally in March 2011 with six professional teams and five venues as founding members, the Alliance has grown to approximately 350 professional and collegiate teams and venues. Members are integrating environmental sustainability into their core operations and engaging fans in the process.

Honesdale Roots & Rhythm Music & Arts Festival - Honesdale, Pennsylvania

In 2010, the Honesdale Roots & Rhythm Music & Arts Festival Board in Pennsylvania worked with a local waste consulting firm specializing in food recovery and with a local farmer who agreed to accept the festival's food waste for on-farm use. Materials were donated by local businesses and waste reclamation stations were positioned throughout the festival along with community volunteers. Due to the community's efforts to educate festival-goers about food waste diversion and sustainability, the latest data from the 2016 festival indicates that more than 1,100 pounds of wasted food was composted and 480 pounds of recyclables were collected. These results represent more than a 90 percent increase in sustainable materials successfully diverted from the landfill when compared to 2008's Festival. For their efforts, Honesdale Roots and Rhythm Music and Arts Festival won the Innovation Award in 2017 in the EPA Food Recovery Challenge.

Aurora Public Schools (Aurora, CO) Food Recovery Challenge activities

EPA and USDA Food and Nutrition Services visited Aurora West College Preparatory Academy (Aurora Public Schools) to learn about their donation program in partnership with EPA FRC member We Don't Waste.

Patrick Davis, Advisor to the Regional Administrator, Presents Aurora Public Schools with FRC Recognition.

Students Discuss Food Waste Measurement results from their school

Students from Aurora West College Preparatory Academy Demonstrate Safe Food Handling Practices for their Food Donation Program to Local Communities

Aurora West Students Discusses School Food Donation Program with Deputy Regional Administrator Deb Thomas

Aurora Public Schools Students Measured Food Waste in the School Cafeteria

Winning on Reducing Food Waste Initiative

In October 2018, U.S. Department of Agriculture (USDA), EPA, and the U.S. Food and Drug Administration (FDA) announced the signing of a joint agency formal agreement under the Winning on Reducing Food Waste initiative. The agreement is aimed at improving coordination and communication across federal agencies and sharing information with Americans on the impacts and importance of reducing food loss and waste. While there have been significant actions taken and commitments made through public-private partnerships to date, such as the U.S. Food Loss and Waste 2030 Champions initiative, which asks businesses to reduce food loss and waste by 50% by 2030, there is still much work to be done. There are tremendous economic opportunities and possible cost savings for businesses and individual households that can result from reducing food waste. And while businesses are a critical component of food waste reductions, consumer education is also key to finding better ways to use excess food than simply throwing it away.

Pollution Prevention: Reducing Waste at the Source

An inverted pyramid with the most preferred pollution prevention option — source reduction — at the top. Other sections of the pyramid — recycling, treatment, disposal — are less desirable, in that order. Pollution prevention (P2) is any practice that reduces, eliminates, or prevents pollution at its source before it is created. If you can avoid a pollution generating activity, you can avoid the cost and impacts of waste management, including recycling (e.g., the costs of collection and handling of recycled material, and the energy costs and impacts of recycling the material). The environmental protection hierarchy triangle shown here provides a quick and easy overview of the best ways to protect the environment in the most efficient manner with source reduction being the first and preferred method.

We can all apply pollution prevention in our daily lives. Whether in the home and garden, at the supermarket or on the road, we can make pollution prevention choices every day in order to protect the environment, save money and conserve natural resources. For instance, using a reusable water bottle instead of a plastic throw-away reduces the impact on the environment from extracting the raw materials to produce the throw-away water bottle, and the handling and energy costs to recycle that bottle after it has been used.

EPA works with businesses, states, and other partners to encourage and facilitate adoption of P2 approaches through the development and delivery of P2 information and tools; technical assistance; and the sharing of those innovations so that others can replicate those P2 approaches and outcomes.

For more information, please check out our website, www.epa.gov/p2.

Federal Green Challenge

The Federal Green Challenge (FGC) calls on EPA and other federal agencies throughout the country to lead by example in reducing the federal government's environmental impact. It also furthers the goals of the President's Executive Order (EO) Regarding Efficient Federal Operations, EO 13834.

FGC participants are leading the way in advancing the goals of the President's EO, which states that agencies must prioritize reducing waste, cutting costs, enhancing the resiliency of federal infrastructure and operations, and that these reductions should be tracked to ensure accountability.

- **U.S. Drug Enforcement Agency's (DEA) Southeast Laboratory in Miami** reduced potable water use by 69 percent, from 950,710 gallons to 293,964 gallons. The facility currently utilizes a Deionized Water Purification System to remove impurities from the water supply. The previous Deionized Water Purification System was allowing the excess purified water to discharge into the drain. The Southeast Laboratory implemented a system to allow the discharged water to recirculate to a holding tank. This system can also operate continuously, even when off-line, to minimize excess water waste. Since the re-routing system was implemented, the laboratory has seen a dramatic decrease in water consumption.
- **U.S. Department of Transportation Volpe National Transportation Systems Center** was founded in 1970 to address emerging transportation issues related to safety, infrastructure, and innovation. Their 13-story office building in Cambridge, Mass., hosts 1,100 employees on 14 acres of land. In 2017, the Volpe Green Team joined with food service management to establish a back-of-the-house "compost" program designed to capture organic waste from the food preparation stations. Although a small compost program for coffee grounds was established several years earlier, this expanded program called for new equipment, training on food waste management procedures, and modified operations with the building's waste hauler.
- **U.S. Department of Energy, Bonneville Power Administration (BPA)** considers waste reduction and recovery an agency-wide priority. To achieve its 92 percent diversion rate, the highest-impact facilities (Portland headquarters and the Ross Complex) undergo waste audits every few years to determine the makeup and contamination level of its landfill, recycling and compost materials streams. In response to its FY17 audit, for example, Ross Facilities reduced the use of Styrofoam in their cafeteria by providing durable to-go options for customers. At the headquarters building, Workplace Services partnered with the Sustainability Program to design signage and engagement programs to encourage proper recycling and composting of materials. BPA's Investment Recovery Center (IRC) is also instrumental in the responsible diversion of unwanted or surplus materials. For instance, last year the IRC undertook a massive substation cleanup effort that resulted in the recycling of 128 tons of materials that would have otherwise gone to a landfill. Overall, the IRC recovered over 2,000 tons of waste in FY17.
- **General Services Administration (GSA), Fort Worth Federal Center** is a 187-acre campus that is home to the National Archives and Records Administration, the National Resources and Conservation Service, the Federal Emergency Management Agency, U.S. Geological Services, and the National Oceanic and Atmospheric Administration. This site achieved a 97 percent diversion rate in FY17. This diversion rate was achieved through a combined recycling effort from the tenants, tenant agencies and the custodial contractor, Goodwill Industries of Fort Worth.

- **Race to Recycle** Since 2016, EPA has partnered with GSA's Regional Sustainability team to conduct an annual "Race to Recycle" competition during the summer to engage federal facility managers to reinvigorate recycling and inspire tenants to boost recycling and waste diversion over an eight-week period. From 2016-2017, nine facilities diverted approximately 180 tons of waste from landfills. Race to Recycle winners are recognized with an awards ceremony and a 3-foot tall, silver trophy to the facility manager and their team. EPA and GSA provide technical assistance, tools and training to support participating facilities including posters, flyers, and weekly updates and social media posts highlighting simple ways to reduce waste. In 2018, EPA and GSA expanded web-based training to address topics including "How to Craft a Recycling Communication Plan," "How to Build a Successful Recycling Program," and "How to Conduct a Solid Waste Audit." Eleven federal facilities are participating in the 2018 competition.

- **Presidio Trust** EPA worked with the Presidio Trust, which manages a former U.S. Army base in San Francisco, Calif., to advance outstanding federal environmental leadership. The Trust developed and implemented a comprehensive waste reduction strategy through the facility's participation in EPA's Federal Green Challenge. In 2016, staff identified issues like refuse and recycling overflow, contamination of recyclables with trash, and low diversion rates. In 2017, they conducted waste audits, including a campground waste audit with EPA staff, and implemented new waste reduction practices. All told, from 2016 to 2017, the Presidio Trust increased its reuse of materials by 47 percent and grew its composting by 30 percent.
- **Department of Veterans Affairs' Sam Rayburn Memorial Veterans Center - Bonham, Texas** In 2018, the Department of Veterans Affairs' Sam Rayburn Memorial Veterans Center in Bonham, Texas, was recognized nationally for increasing its alternative Fuel Vehicle and Hybrid Electric Fleet from 91 to 167 vehicles, increasing bike miles from six to 80 miles, and increasing purchasing of Electronic Product Environmental Assessment (EPEAT) registered electronics by 542 percent over the last the last year, from 87 to 559 units. These efforts help to reflect the commitment of the VA to provide the best service in the most healthful setting possible for this nation's veterans. In addition, the Sam Rayburn Memorial Veterans Center approached recycling innovation with the use of personnel and resources that it already had on site. It incorporated a work therapy person to hold a lead position of making sure that paper goods were recycled throughout the facility. While helping work therapy personnel to get back in the workforce, they managed to recycle 7.9 tons of paper. This included cardboard, paperboard, white paper, box board, magazines and other types of paper products. Every year, the Center improved upon is outreach and education. Their leadership is centered in healthcare and environmental improvements and one example of their commitment includes creating a healing garden using harvested rainwater. The healing garden imbues beautification, relaxation, sensory stimulation and promotes physical activity for its dementia patients. The idea was very well received, and the feedback is that it is great for the families to have a place to come and sit in a seating area of choice and talk with their loved ones while enjoying the outdoors.

Read about all of the national and regional winners' FGC Award Winners' accomplishments and how they achieved them here: https://www.epa.gov/fgc/federal-green-challenge-awards.

Memorandum of Understanding with the National Vehicle Mercury Switch Recovery Program

On November 15, 2018, EPA renewed a Memorandum of Understanding (MOU) with the National Vehicle Mercury Switch Recovery Program (NVMSRP). Involving more than 10,000 recyclers, this program has already removed and safely recycled more than 6.8 million mercury convenience light switches containing a total of more than 7.6 tons of mercury. EPA's Smart Sectors program revitalized the MOU with the NVMSRP, a collaboration for reducing mercury air emissions initially designed by EPA's Sectors program and its partners in 2006. By diverting the switches from the waste stream, the program has prevented the release of mercury into the environment. Other parties to the MOU include the Steel Manufacturers Association, the End of Life Vehicle Solutions Corporation, the Automotive Recyclers Association, the Institute of Scrap Recycling Industries, and the American Iron and Steel Institute. EPA Smart Sectors is a partnership program that provides a platform to collaborate with regulated sectors and develop sensible approaches that better protect the environment and public health. To learn more about the program, visit: epa.gov/smartsectors.

EPA Research Aims to Reduce, Recycle, and Reuse Waste

EPA researchers are developing new and innovative ways to reduce waste, increase recycling, and repurpose materials currently sent to landfills into commodities that not only reduce disposal costs but spark economic growth. The research is conducted in close collaboration with states to develop reuse options, and in partnership with private business to help assess promising technologies and processes. This research helps identify opportunities to reduce the volume of waste disposal, conserve natural materials, and reduce costs—all while protecting the natural environment.

A few examples of EPA SMM research include the following:

Turning Waste Streams into Resources for Removing Contaminants from Water

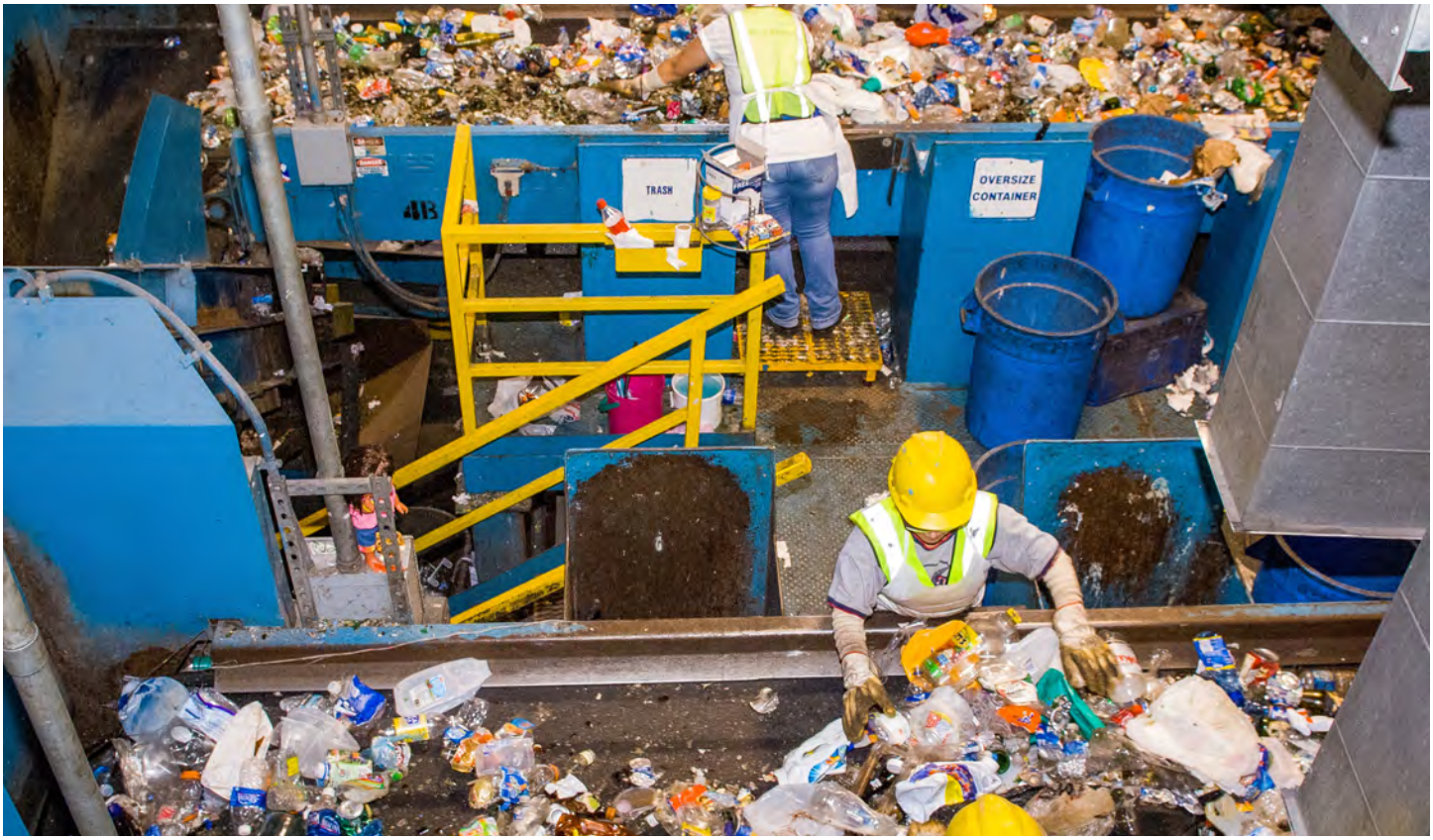
EPA researchers and collaborators are leading studies to help turn a waste stream from the seafood industry into a resource for mitigating the impacts of mining on water resources. The resource? Crab shells. The work is part of larger EPA research efforts to develop innovative, sustainable solutions for cleaning up contaminated sites and advancing waste management. One promising area they are exploring is the use of "biosorbents," materials grown by plants, animals, or other living organisms that naturally reduce acidity and bind with harmful contaminants. EPA researchers and collaborators conducted one of the first studies using samples of mine-influenced water to evaluate the effectiveness of commercially available, crab-derived products to remove contaminants from water. What they found is that the materials effectively neutralize strong acidity, as well as remove iron, copper, lead, zinc, cadmium, and manganese.

Turning Biomass into Energy and Chemicals: An Overview

Developing new sources of energy and chemicals from plants and other biomass-based materials has the potential for massive environmental, public health, and economic benefits. EPA researchers recently provided an overview of current biorefinery techniques and their status for turning feedstocks that are high in cellulose and hemicellulose into renewable fuels and more sustainable chemicals on a commercial scale.

Material Recovery for Construction and Demolition

New construction and development is a vital part of a strong and growing American economy, but it does create environmental challenges. Construction and demolition debris (CDD) is a significant component of the country's solid waste stream. EPA researchers are working to usher in a new generation of cleaner, more sustainable CDD management practices. EPA research provides state, local, and municipal waste managers with resources to better manage CDD, reduce contamination risks associated with CDD in landfills, and assess best practices. A summary of six recent reports, Sustainable Materials Management Options for Construction and Demolition, Debris provides a one-stop-shop for those looking to reduce the impacts of construction and demolition and advance sustainability in their communities. Learn more: https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials.



Sustainable Materials Management Tools and Resources

Facts and Figures Website

EPA began analyzing national data on waste and materials recycling more than two decades ago, and the Agency has data tables that go back to the 1960s. The Facts and Figures data looks at generation, recycling, composting, combustion with energy recovery, and landfilling for a variety of materials and products. In April 2018, EPA debuted the website, Facts and Figures about Materials, Waste and Recycling. This website replaces the biyearly Facts and Figures "full" report that EPA published, which was a PDF document of 100-plus pages. This data is still released in the form of a Fact Sheet and in Data Tables which can now be easily downloaded. The website includes 2015 data, which is the most recent year of data. Check out the web area here: https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/guide-facts-and-figures-report.

Waste Reduction Model (WARM)

EPA created the Waste Reduction Model (WARM) to help solid waste planners and organizations track and voluntarily report greenhouse gas (GHG) emissions reductions from several different waste management practices. WARM calculates and totals GHG emissions of baseline and alternative waste management practices—source reduction, recycling, anaerobic digestion, combustion, composting and landfilling.

The model calculates emissions across a wide range of material types commonly found in municipal solid waste in the following:

- metric tons of carbon dioxide equivalent,
- metric tons of carbon equivalent, and
- energy units.

Read more about WARM and see the tool here: https://www.epa.gov/warm.

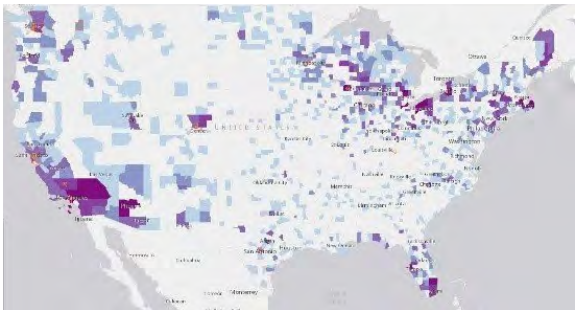
Save Energy by Recycling Widget

This interactive widget allows you to choose a recyclable (aluminum can, glass bottle, plastic bottle, weekly magazine and a plastic grocery bag) and then choose an appliance (air conditioner, hair dryer, laptop computer and 60W equivalent compact fluorescent light bulb or CFL) to find out how long that appliance can be powered for by recycling the material chosen.

See the tool here: https://www.epa.gov/recycle and add it to your website.

Excess Food Opportunities Map

In June 2018, EPA released the Excess Food Opportunities Map, a first-of-its-kind national map that provides information on places that may have excess food, and those who may be able to use it. It supports nationwide diversion of excess food from landfills through the identification and display of establishment-specific information about potential generators and recipients of excess food. The map displays over half a million potential generators of excess food, such as food processors and manufacturers, grocery stores, and hotels, along with estimates of excess food per establishment, as well as over 4,000 potential recipients of excess food, including food banks and composting and anaerobic digestion facilities. Through analysis of the data presented in the map, users from businesses, non-governmental organizations, and government can identify infrastructure gaps, assess the feasibility of developing new recipient facilities, and identify alternatives to landfill disposal of excess food. The map is supported by a technical methodology document, a user guide, and frequently asked questions. EPA also held a training webinar that was attended by approximately 700 people in July 2018. See the map here: https://www.epa.gov/sustainable-management-food/excess-food-opportunities-map.



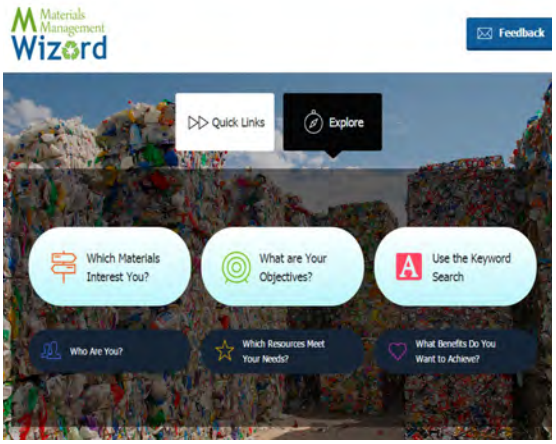
Municipal Solid Waste Decision Support Tool

The Municipal Solid Waste Decision Support Tool (MSW DST) is designed to aid solid waste planners in evaluating the cost and environmental aspects of integrated municipal solid waste management strategies. The tool enables users to simulate existing MSW management practices and conduct scenario analyses of new strategies based on cost and environmental objectives. The MSW DST includes multiple design options for waste collection, transfer, materials recovery, composting, waste-to-energy, and landfill disposal. Find the tool here: https://mswdst.rti.org/.

Anaerobic Digestion Data Collection Project Summary Report

In July 2018, EPA developed and released the *Anaerobic Digestion Facilities Processing Food Waste in the United States in 2015: Survey Results* report. The report includes information about the processing capacity of anaerobic digestion facilities (stand-alone, on-farm, and water resources recovery facility co-digestion facilities) as well as the total food and non-food waste processed in 2015. It also includes information about facility operations, pre-processing/de-packaging technologies, feedstock types and sources, biogas cleaning systems, biogas production and uses, and solid/liquid digestate uses. The report is the first of three annual reports; EPA will collect additional data for years 2016 and 2017 and will publish new reports in 2019 and 2020. Check out the full report here: https://www.epa.gov/anaerobic-digestion/anaerobic-digestion-facilities-processing-food-waste-united-states-2015-survey.

Materials Management Wizard (MWiz)



Reduce. Reuse. Recycle. Those three words capture simple ways of improving our environment. EPA's Materials Management Wizard (MWiz) is an interactive web application that supports communities, consumers and businesses interested in reducing, reusing, and recycling materials as a means of creating greener, healthier and more sustainable communities. MWiz offers quick and easy access to EPA-sourced tools and resources that support sustainable materials management and community planning decisions. The tools and resources available through MWiz can help users analyze problems, understand management options, calculate design parameters, analyze costs and benefits, evaluate tradeoffs, engage stakeholders, and develop education and outreach campaigns.

To use MWiz and find out more, visit: www.epa.gov/sustainability/mwiz.

Toxics Release Inventory

As part of the Prevention Act (PPA) of 1990, the Toxics Release Inventory (TRI) Program collects information to track industry progress in reducing waste generation and moving toward safer waste management alternatives. Each year, the TRI collects information on releases, recycling, and other waste management from more than 20,000 facilities. The public can search the TRI Pollution Prevention (P2) Search tool (www3.epa.gov/enviro/facts/tri/p2.html) for industry submitted examples of source reduction, recycling and other waste management alternatives.

Supporting Reduce, Reuse, Recycle through Grants and Contracts

EPA Funding and Technical Assistance

Tribal Communities

Through the General Assistance Program (GAP), EPA provides funding to tribes to support the development of community recycling programs. EPA funding and technical assistance helps tribes build capacity, and develop and implement waste diversion programs, thus maximizing the materials' useful life and reducing the amount landfilled. In addition to supporting strategic planning on waste management programs and the staff to manage those programs, tribes have also used GAP funds to purchase cardboard balers, recycling trailers, recycling containers, collection vehicles and community drop-off stations. EPA SMM staff have also supported tribes with hands-on solid waste characterization trainings.

EPA Waste Characterization Training at the Ak-Chin Indian Community

EPA Support of Delta Institute's Work on St. Louis Demolition and Building Materials Recycling and Reuse

With grant funding from EPA, Delta Institute, a nonprofit organization located in Chicago, IL, is working with St. Louis, Missouri, to clarify and improve their demolition processes and incorporate best practices for recycling and reusing building materials. One of several deliverables is a new demolition handbook which outlines a step-by-step timeline and requirements for contractors to follow when overseeing a demolition project. The handbook highlights actions to increase recycling and reuse including identifying local recycling facilities, creating a waste management plan with an inventory of valuable materials, and locating reuse

facilities that have an interest in selling this material. Delta is also completing a market study for construction and demolition material. This information will be useful to communities and demolition and deconstruction contractors interested in increasing the recovery and reuse of construction and demolition materials.

EPA and The Recycling Partnership Emphasize the Importance of Recycling Messaging to Reduce Contamination

In 2016, EPA supported work by The Recycling Partnership (TRP) to study consistency in recycling messaging around Materials Recovery Facilities (MRFs) in the Midwest. The study showed that not only is it difficult for citizens to find recycling information online, that information is often incorrect. Incorrect information can contribute to contamination and ultimately result in recycling being taken to the landfill rather than being recovered. Following this study, EPA held a recycling forum in 2017 to share the results with local municipal recycling coordinators, MRF operators, and other key communicators. TRP is continuing to work with surrounding communities and the state of Illinois is now exploring the development of a state-wide campaign to reduce contamination and improve local recycling.

Citizen's Committee for New York City - $50,000 - The Reusable Container Project

With EPA funding, Citizen's Committee for New York City will work to establish a reusable food takeout container program within a large corporate building. They will then use this experience and data to develop a toolkit for others to implement similar programs and make this widely available. The overall goal is to work towards finding a lasting alternative to single use takeout containers, which is a critical element for New York City achieving its Zero Waste by 2030 goal.

University of Puerto Rico - $59,336 - Pollution Prevention Programs for the Food Manufacturing Industry in Puerto Rico

The University of Puerto Rico, in partnership with the Puerto Rico Manufacturers Association, will provide training to the food manufacturing industry in Puerto Rico. UPR will provide technical assistance to twenty-two targeted food manufacturing and processing businesses. Through a series of seminars, site visits and roundtables, these businesses will receive training on ways to reduce the consumption of water and electricity, use of hazardous materials, and operational expenses.

Rowan University - $289,361 - Roadmap for Solvent Recovery in Industrial Manufacturing

Rowan University will provide technical assistance to pharmaceutical companies to assist them in reducing hazardous chemicals, in the form of solvents, in their manufacturing process. Rowan University will develop a universal framework for optimal solvent recovery and a computational tool that can be used by pharmaceutical and other manufacturing facilities. Rowan faculty and students will provide direct technical outreach to Amneal Pharmaceuticals, Bristol-Myers Squibb, and potentially other facilities with which it has previously provided green chemistry recommendations.

New Jersey Institute of Technology - $225,000 - Sustainable Recovery of Metals from Waste Lithium-Ion Batteries Through a Green Process

New Jersey Institute of Technology (NJIT) will develop benign alternatives to current metal leaching processes for waste lithium-ion batteries. Current mainstream metal leaching processes for waste batteries involve the extensive use of hazardous and corrosive acids and bases. NJIT will develop benign alternatives and will pilot their use in leaching processes in selected facilities. Results will be shared though workshops, educational curricula, and disseminated by state and local organizations.

Rutgers University - $180,705 - Encouraging and Advancing Pollution Prevention

Rutgers University, New Jersey Small Business Development Centers (NJSBDC), in partnership with the New Jersey Department of Environmental Protection, will deliver pollution prevention and sustainability outreach to small and medium-sized businesses on ways to reduce greenhouse gas emissions, use of hazardous

materials and water consumption. NJSBDC will create a web-based application and business registry and will recognize participating businesses with a New Jersey Sustainable Business Award which will be presented at NJSBDC's annual Small Business Growth awards ceremony.

Rowan University - $123,335 - Process Intensification in Food Manufacture - A Path to Water, Energy, Waste Reduction

Rowan University will provide pollution prevention technical assistance to a Nestlé Corporation facility in Freehold, New Jersey. Rowan University will implement green engineering strategies to reduce water and energy consumption, reduce the use and release of hazardous materials, and save money at this facility. Using this facility as a case study, Rowan will hold a seminar on pollution prevention practices for personnel at other Nestlé facilities. Rowan will disseminate this case study and best management practices to the broader food manufacturing sector through professional conference presentations and publications.

Guam Zero Waste Plan

EPA worked closely with Guam EPA and island recyclers to develop an annual recycling measurement program and to develop a model island-wide Zero Waste Plan. Guam's recycling rate of 18% was calculated for the first time in 2012. At that time, the island did not have curbside recycling and only was only composting about 23 tons/year at a University of Guam pilot project. Since then, the Governor's Office, Guam EPA, and EPA leveraged Department of Defense funding to work with island stakeholders to develop a detailed 20-year Guam Zero Waste Plan. Guam's Governor and Guam EPA staff participated in EPA-coordinated recycling and composting facility tours and training. Guam has held America Recycles Day events at schools and implemented island-wide curbside recycling. In 2017, the island's recycling rate rose to 39%, and permitted facilities composted nearly 27,000 tons.

Guam EPA's experts have become inspirational SMM leaders by sharing their successes with other island and state colleagues. Guam EPA hosted the first Zero Waste Pacific Conference and Certification Training in 2016 and presents regularly at Association of State and Territorial Waste Management Officials (ASTSWMO) as well as annual Pacific Islands Environmental Conferences and meetings. Learn more at: http://www.one.guam.gov/zero-waste/plan/5-zero-waste-plan.html

EPA's People, Prosperity and the Planet (P3) Program

EPA's P3 Student Design Competition - People, Prosperity and the Planet – is a collegiate program that benefits people, promotes prosperity, and protects the planet by designing solutions that move us towards a sustainable future. The P3 Award competition is a two-phase team contest. Highlighted are several notable projects that relate to reducing, reusing, and recycling materials and waste.

- **California State University at Chico.** For every 10 gallons of biodiesel produced one gallon of the glycerol by-product is cogenerated. This glycerol is currently viewed as a problematic waste stream. This project seeks to improve biodiesel manufacturing by designing a sustainable solution to the industry's waste glycerol problem. The P3 Phase II Team at California State University at Chico is continuing to test the use of biodiesel waste glycerol in the production of mixed solvents, called deep eutectic solvents (DESs) that are gaining interests as a renewable, recyclable, biodegradable to conventional volatile organic solvents. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10889/report/0
- **Kennesaw State University.** The P3 Phase II Team at Kennesaw State University are researching a method of replacing power cables in aircraft with wireless power transfer systems that are much lighter and can reduce the weight of the plane. The goal is to reduce the amount of fuel needed, due to the reduced weight, and eventually reduce carbon emission per flight. This reduction factor per plane multiplied by the total number of flights in the world, results in a substantial reduction in global carbon emission and a step towards a more sustainable environment. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10891/report/0

- **Georgia Institute of Technology.** According to this P3 Phase I Team, across the globe, about one in 10 (or 700 million) people do not have any access to clean water. Yet Americans use about 99 gallons per person per day at home, over five times the necessary amount "needed lead a comfortable life", or about 13 gallons a day per person. A 30% reduction of residential water use could save about 5.4 billion gallons of potable water a day. The Phase I P3 Team at Georgia Institute of Technology is developing an in-home water saving technology to facilitate sustainable water usage habits through a novel smart-feedback device. The end goal is to alter daily water-consuming activities and help households use water more sustainably. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10863
- **Michigan Technological University.** The P3 Phase I Team at the Michigan Technological University are developing a sustainable recycling technology for the end-of-life lithium-ion batteries (LIBs) to reduce waste and promote economic profit through separation and recovery of individual battery components. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10872/report/0
- **Loyola University Chicago.** Recognizing the challenges to reduce solid waste and produce of renewable energy are goals for many institutions, particularly those in urban environments with limited available space for organic matter recycling and energy production infrastructure. The P3 Phase I Team at Loyola University Chicago aims to make their transform their school into a zero-waste and carbon-neutral urban campus by ultimately implementing a sustainable process to redirect waste streams from campus food, biodiesel, and wetland restoration into an integrated anaerobic digestion (AD) system to convert waste carbon into energy-generating biogas. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10868

EPA's Small Business Innovation Research Program

Funding from EPA's Small Business Innovation Research (SBIR) Program boosts local economies by creating jobs and promoting collaborations among small businesses through product testing and research. Highlighted below are several notable small business efforts that relate to reducing, reusing, and recycling materials and waste.

A Green Rooftop System for Commercial Buildings with Superior Energy Efficiency

This proposed project will develop a highly modularized green rooftop system that is not only long-lasting but also assemble-able/disassemble-able. At a roof's end-of-life, it can be disassembled and 100% recycled. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10918/report/0

Formulation and testing of an entirely wood-based exterior insulation board for the high-performance building market

The goal of this project is the formulation a rigid, insulating, low-density wood composite, with physical and thermal properties comparable to fossil fuel derived foams. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10917/report/0

Growth and Fungal Resin Generation for Manufacturing Novel, Formaldehyde-Free Wood Particleboard

Engineered wood represents a $8.5 billion market in the United States annually. Resins instituted in the production of traditional engineered wood products (formaldehyde) have recently come under substantial scrutiny. Ecovative is developing a drop-in replacement for engineered wood resins that is economically competitive and intrinsically safe. The mResin TM system is an entirely bio-based adhesive that is literally grown on the wood precursors and meets all new legislative requirements. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10827/report/0

Zero-Emission Reconstituted Wood Panels for Building Interiors

Organic resin-bonded reconstituted wood products, including oriented strandboard and medium density fiberboard, are major sources of the volatile organic compounds (VOCs) released to the building interior, that are harmful to human health. The main thrust of this project is to significantly reduce the release of VOCs by replacing organic resins with inorganic polymer binders in reconstituted wood panels. Inorganic polymers are zero-emission binders with significantly reduced energy content, carbon footprint and cost when compared with organic resins. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10828/report/0

Circuit board Component Recovery for Electronic Waste Reduction

The D2000 depopulator removes parts from circuit boards without using chemicals. The precious metals parts go to the smelter as opposed to the whole circuit board. Learn more about this project: https://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/10802/report/0

Waste Reduction, Reuse, Recycling and Composting Activities Across EPA Locations

Each year, the EPA collects information about waste reduction and diversion activities that are ongoing across the Agency. The following provide examples of information that EPA has collected over the past three years.

Waste Reduction and Reuse

EPA locations employ a variety of strategies to reduce the amount of waste they generate. Examples include:

- Reduce junk mail
- Establish office and laboratory reuse centers and material exchanges
- Donate unwanted supplies to outside entities
- Install water bottle filling stations
- Reduce paper towel use
- Reduce the use of plastic trashcan liners
- Encourage staff to bring reusable plates, cups and cutlery to work
- Reduce food waste
- Reduce paper use
- Promote green meetings

Recycling Best Practices

Even though the Agency's recycling programs have been well established for years, EPA locations continually strive to improve their programs. For example, locations have done the following over the past few years:

- Expanded the types of material recycled
- Implemented a centralized waste stream program
- Held diversion challenges
- Ensured strategic placement of recycling bins
- Raising employee awareness

Composting

Thirty EPA locations (or 86 percent) supported composting efforts in Fiscal Year 2017, collectively diverting more than 300 tons of organic material (including food waste, yard debris, and compostable plates, cutlery and paper towels) from landfills over the course of the fiscal year.

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