Chapter 2 | The Recycling Process

Why recycle? Energy, economy and environment: the three Es

The benefits of recycling are vast. By choosing to recycle, we reduce our consumption of fossil fuels, create jobs in Minnesota, conserve natural resources, and protect our environment.

Recycling saves energy

Manufacturing products from recycled materials uses far less energy than manufacturing the same product from raw materials. It takes 90 percent less energy to manufacture an aluminum can from recycled aluminum, 50 percent less energy to manufacture a glass bottle from recycled glass, and 75 percent less energy to manufacture paper from recycled paper. Recycling decreases demand on fossil fuels and increases energy independence.

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Recycling benefits the economy

Recycling helps support local and statewide markets. About 78,000 jobs in Minnesota are directly and indirectly supported by the recycling industry. These jobs pay an estimated $7.96 billion in wages and add nearly $23.9 billion to Minnesota's economy.

Recycled materials are manufactured into a variety of products, from recycled-content paper to new aluminum cans to building supplies, and are used by many Minnesota companies.

The largest segment of the recycling industry is made up of manufacturers that use recycled paper, post-consumer paper and old corrugated cardboard (OCC) as a raw

material source. Westrock in St. Paul and Liberty Paper in Becker are major companies in Minnesota using this feedstock. Much of the recycled paper and OCC they use to make new products come from Minnesota recyclers.

Additionally, recyclable material has tremendous economic value. Minnesotans recycle about 1.78 million tons of materials every year that are worth $344 million.

Recycling protects our environment

By reducing energy use, recycling decreases greenhouse gas emissions and reduces Minnesota's carbon footprint. Recycling also has indirect benefits to climate change. For example, paper recycling mitigates the removal of mature trees. A single tree can filter up to 60 pounds of pollutants and carbon dioxide out of the air each year.

Recycling and buying recycled products also helps keep Minnesota's air and water clean. Using recycled materials to manufacture products creates significantly less water pollution than manufacturing from raw materials. For example, making white office paper from recycled paper creates 74 percent less air pollution and 35 percent less water pollution than making it from virgin wood pulp.

And beyond reducing pollution, making products out of recycled materials conserves natural resources such as water and timber.

The recycling process

Understanding recycling processes is an important part of advocating for recycling. Recycling involves much more than taking a bin of materials out to the curb. Successful recycling depends on the alignment several steps: source separation and collection; processing, marketing, remanufacturing; and finally, and the purchase of recycled-content products.

Photo credit: Republic Services

Source separation and collection

Typically, raw materials are made into products that we consume and then throw away when we finish using them. This linear process – from extraction of raw materials to production to consumption and finally disposal – creates waste.

Separating recyclable materials from other wastes at the point of disposal is called source separation This is the start of the recycling process.

In Hennepin County, there are several methods for collecting recyclable materials once they have been source-separated.

Curbside collection

In curbside collection, recyclable materials are picked up from homes and businesses at the site of generation. This method captures the most recyclable materials because it's convenient and more accessible.

In Hennepin County, all communities provide curbside recycling collection to single-family households and residential buildings with up to four units. Depending on the community and waste hauler, residents and businesses in Hennepin County have collection containers for recyclables, yard waste and organics (food and food-soiled paper).

Communities use a variety of methods to provide curbside collection to their residents. Most cities contract with a recycling hauler. A few use city crews to collect materials, and a few require licensed waste haulers to provide recycling to their customers.

Residential curbside recycling programs in Hennepin County are single-sort. In a single-sort, or commingled system, all materials (paper, glass, metal and plastic) can be placed into the same collection container. Outside Hennepin County, some communities offer dual-sort collection where paper is kept separate from metal, plastic and glass. Most residential recycling programs in the Twin Cities are single-sort.

By state statute, materials that are properly sorted for recycling cannot be collected for disposal. For this reason, communities and haulers are careful in deciding which materials belong in a curbside program. A material may be technically recyclable but not appropriate for curbside collection.

Some considerations that determine which materials are eligible for curbside pickup include:

- Stable markets to ensure indefinite recycling;
- The availability of hauling and sorting machinery necessary to collect and separate the material from other materials;
- Publicly accessible and understandable instructions for recycling the material.

Multifamily housing and business recycling

Recycling service to multifamily properties, including apartment buildings, condos and townhouses, and businesses differs from single-family households. Property owners and commercial businesses contract with private waste haulers for recycling service.

Hennepin County communities passed ordinances in the early 1990s that required owners of multifamily housing properties to provide the opportunity to recycle to their tenants. Some communities also mandate that businesses subscribe to recycling collection. Additionally, a state requirement went into effect in 2016 mandating that all businesses and multifamily properties that generate four yards of waste or more per week have recycling service.

Recycling drop-off collections

Recycling is also collected at drop-off locations. Drop-off collection sites include retail stores, community centers, schools, and government facilities. Materials collected at drop-off sites include plastic bags, yard waste, mattresses, printer cartridges, electronic waste, tires, and other materials not typically accepted by curbside. .

Some sites, including the county's drop-off facilities in Bloomington and Brooklyn Park, also collect the same materials that are included in curbside collection programs.

Drop-off collection sites may charge a fee for materials that are costly to recycle.

Drop-off collection containers to recycle plastic bags and wrap are available at many grocery and retail stores.

Buy-back centers

Buy-back centers collect and pay for high-value materials such as aluminum cans, scrap metal, and cardboard. In addition, buy-back centers may also accept, but not pay for, low-value materials such as glass or newspaper.

Community cleanup events

Community cleanup events are one-day or weekend events that allow residents to drop off materials for recycling or safe disposal. These events are typically focused on household garbage, but many also accept recyclable materials that are not collected curbside.

Material preparation and contamination

Successful recycling requires participants to understand what materials are accepted and how to properly prepare them. Proper participation of materials ensures that they will go to the markets for which they were intended and be successfully recycled.

Recyclable materials that contain other non-recyclable materials are referred to as "contamination." A good example of contamination is recyclables that are soiled with food.

Contamination also refers to materials that end up in the wrong stream. For example, shredded paper at recycling facilities is often too small to get sorted into the paper stream and ends up as contamination in the glass stream.

Too much contamination in the recycling stream may result in those materials being disposed of as trash instead.

Material processing

After collection, recyclables are sorted, processed, and sold to end users or manufacturers to be used in new products. Recycling would not be possible without markets that need those materials for manufacturing.

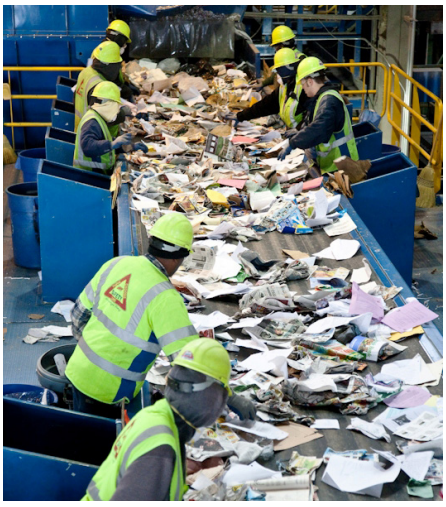
Recyclable materials collected from homes, apartments, and businesses are taken to materials recovery facilities (MRFs, pronounced murfs) to be sorted into material types. In Hennepin County, MRFs are privately owned by haulers. Three MRFs operate in the county. These are owned by Eureka Recycling, Republic Services, and Waste Management. There are several more MRFs located throughout the Twin Cities, some of which receive material from Hennepin County residents and businesses.

At the MRF, recycled materials are sorted and graded, contaminants are removed, and materials are prepared for markets. Recyclables at the MRF travel along a series of conveyor belts where various methods are used to sort them.

Mechanical processes take advantage of the physical differences among materials. For example, magnets grab steel items, electric currents kick out aluminum, optical sorters and air jets detect paper and plastic, and screens separate glass by weight.

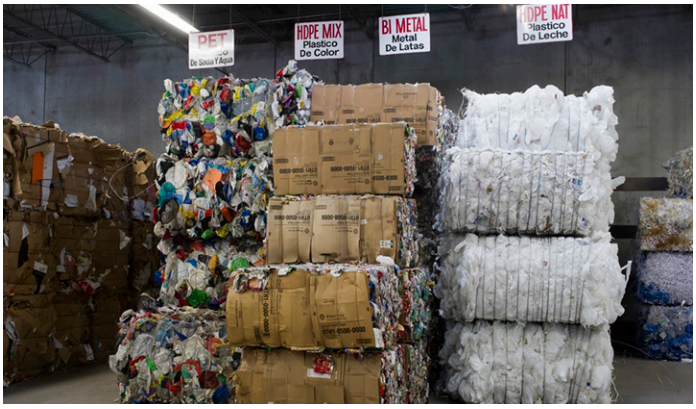
People also work on the line to hand-pick items that the machines miss, such as milk jugs and phone books.

Sorting removes contaminants that lower the value of the materials and damage processing equipment.



After sorting, recyclables are graded to reclaim higher value materials. For example, high-quality office paper and cardboard may be pulled from a mixed-paper pile of junk mail and magazines. This maximizes the revenue from the sale of materials in commodity markets. Glass may be separated by color so it can be remanufactured into clear, green, and brown bottles.

Once sorted and graded, materials are baled or otherwise condensed for transport to market. Glass is usually crushed into small pieces called cullet, while metals, paper, and plastics are baled.



The separation of commingled material is not a perfect process. Machines and workers rapidly separate materials, and as a result, the wrong materials may be baled together and end up at a processing facility. These materials, whether recyclable or waste, are considered residuals and are typically sent to a landfill. Residual rates at the MRFs serving Hennepin County are under 10 percent.

Manufacturing and marketing recycled-content products

The final steps in the recycling process are to make new products and convince individuals, businesses, and governments to purchase them.

Recycled materials compete against virgin materials, often in worldwide markets. As a result, the economics of using recycled materials can change based on virgin commodity prices. For example, if wood chips are readily and cheaply available, prices for recycled paper pulp might be low.

The volume of material available also affects manufacturers' willingness to pay. For example, when many communities began newspaper and cardboard recycling simultaneously, prices fell because the supply of recyclable material became so large. Alternatively, if too little material is available, no business will be interested in investing in the manufacturing capacity to use it.

The following provides a brief overview of the manufacturing processes for common recycled materials.

Office paper

Some office paper is used to make 100-percent recycled paper. However, most of it is mixed with virgin fiber to make a variety of products, including book covers, egg cartons, game boards, gift boxes, matches, napkins, paper towels, and toilet paper.

At a mill, used paper is mixed with water and heated in vats to break down the fibers and turn it into pulp. The pulp may be forced through a series of screens to remove contaminants such as paper clips, staples and plastic tape.

It then goes through a series of tanks, centrifugal cleaners, and water washes. Washing, bleaching, and de-inking is necessary to produce white paper.

The watery pulp is spread over rotating screens, pressed, and dried to form paper.

Paper fibers can be recycled five to seven times before the fibers are too short to be useful.

Newspaper

The process for recycling newspaper is similar to office paper. It is repulped, mixed with virgin fibers, and rolled into new paper. Newspaper is made into new newsprint, egg cartons, paperboard boxes, such as cereal or cracker boxes, or boxboard for shoe boxes.

Corrugated cardboard

Corrugated refers to brown cardboard with a ribbed layer between the flat pieces. At recycling sorting facilities, corrugated cardboard and kraft (brown paper) bags are baled together for processing.

These materials are mixed with wood-chip fiber. They are most commonly made into the middle layer for new cardboard. Some may be used in outside layers of cardboard, kraft bags or boxboard.

Mixed paper

Mixed paper is what is left after higher grades of paper have been separated out. It primarily consists of recycling mail and paperboard boxes. It is recycled into the middle layer of corrugated cardboard and into boxboard.

Cartons

Cartons that held refrigerated foods (such as milk, juice, and cream) contain valuable, high-grade white paper sandwiched between layers of polyethylene plastic. Refrigerated cartons contain about 80 percent paper and 20 percent polyethylene.

Cartons that held food stored in the cupboard (such as broth, juice and wine) contain high-grade paper sandwiched between a layer of polyethylene plastic on the outside and a thin layer of aluminum on the inside. These cartons contain on average 74 percent paper, 22 percent polyethylene, and 4 percent aluminum.

The pulping process at a paper mill separates the plastic and aluminum foil from the paper. It is then recycled as high-grade office paper.

Glass

Refilling and reusing glass beverage containers was once the norm in the U.S. This practice has nearly vanished 1970s due to transportation costs, consolidation of the bottling industry, and the rise of competing containers made of plastic, aluminum, and non-refillable "one-way" glass.

Glass is easily recycled into new glass, and recycling glass remains more energy-efficient than manufacturing it from raw materials. If glass is not sorted by color, new glass will be amber or brown.

Glass cullet is also recycled into abrasive construction aggregate, fiberglass insulation, floor tile, fractionator for striking matches on matchboxes, pipe bedding, reflective pain, and septic filtration medium.

Tin (steel)

The steel in cans is coated with a thin layer of tin. Cans are soaked in a chemical bath to remove the tin. The steel is sent to a mill for reprocessing into ingots and are made into new food and beverage cans.

Steel cans can be recycled without detinning, but this process produces more air pollution because the tin is burned off.

Aluminum

Aluminum is one of the most highly recycled materials in the world because it saves a lot of energy. Making a can from virgin bauxite ore take 20 times as much energy as making a can from recycled aluminum. Aluminum cans can be collected, recycled and back on store shelves within 90 days.

Plastics

Because people are adamant about recycling plastics, many markets for manufacturing recycled plastics have developed even though new plastic is cheap.

Plastics are recycled into many new products, including bottles, carpet, handbags, plastic lumber, pipe, T-shirts, and fleece clothing.

Electronics



Computers, monitors, televisions, cell phones and other household electronics contain heavy metals and other materials that are hazardous to human health and the environment if they are not properly managed. Hazardous components of electronics include lead, cadmium, and mercury. Recycling is especially important for computers and cell phones, which contain rare earth metals whose mining process requires extensive use of toxic chemicals.

Electronics are accepted from residents at Hennepin County drop-off facilities in Bloomington and Brooklyn Park. Some retailers also accept electronics for recycling.

Electronics are broken into various components, including leaded glass in CRTs, circuit boards, plastics, scrap metal, and liquid-crystal displays (LCDs). Different methods and markets are needed to recycle and remanufacture the various components.

Buying recycled

The recycling loop can only be completed when we purchase products containing recycled content. But people often don't think twice about whether a fleece garment or an aluminum can is made of recycled material. So how do markets for recycled- content products develop?

Compared with the 1990s, many recycled-content products are now mainstream. In one example, government leadership in purchasing recycled-content paper helped develop markets for recycled paper, and now recycled paper can easily be found in stores.

Costs for recycled-content products decrease with economies of scale as recycled materials move beyond niche markets and become cost-effective alternatives to products made with virgin materials.

As consumers, we all play an important part in closing the loop. Our purchase of recycled-content products helps send a message to manufacturers that more of these products are wanted.

Barriers to recycling

Although many materials are theoretically recyclable, currently only glass, metal and paper are recycled to a significant extent. Plastics are recycled, but not as much as other materials.

Some key barriers that contribute to low recycling rates include unfavorable tax laws, weak markets, inexpensive solid waste disposal, inadequate infrastructure and technology, poor economics of commercial recycling, and public awareness and consumption habits. The following provides a summary of these key barriers.

Weak markets

Sustaining a recycling business is difficult without strong, stable markets for recycled materials. In order to support a recycling business, expanded or new manufacturing facilities are needed to convert recyclable materials into useful items, a stable inflow of recyclables is needed to support the investment costs, and consumer demand is needed for sale of the products.

For some materials, such as tires, colored glass and certain plastics, markets are few. Volatile prices for materials, including paper and plastics, also affect recycling.

Public awareness and consumption habits

Changing throw-away habits continues to be one of Hennepin County's central challenges to increasing recycling programs. Continued outreach, promotion and education are necessary to maintain and increase recycling rates.

Virgin material subsidies

Some federal tax laws favor raw materials over recycled materials. Depletion allowances created in the past to encourage oil and mineral development continue to subsidize resource extraction. Investment tax credits apply to equipment that converts or refines virgin resources into products, but not to equipment that processes recycled materials. Tariffs and transportation fees have also favored raw materials over recycled materials. Some policies are changing as government agencies sponsor market development programs for recycled materials, education programs to promote recycling, and subsidized collection of recyclable materials.

Recycling in the Home

All communities in Hennepin County accept the same basic list of materials for recycling. This includes:

- Boxboard (cereal, cake mixes and pasta boxes, shoe boxes, electronic and gift boxes, boxes from toothpaste and medications, etc.)
- Corrugated cardboard
- Glass food and beverage containers
- Magazines and catalogs
- Metal food and beverage cans
- Milk cartons and juice boxes
- Mixed paper, including mail, school, and office papers
- Newspaper and supplements
- Plastic bottles, containers and lids, #1, 2, and 5

Cities and haulers may accept additional materials beyond the basic list in their recycling programs.

Preparing recycling

Properly preparing recycling is important to ensure the materials get recycled. Here are tips for preparing various materials:

- **Cardboard:** Flatten and put into cart or bin. Some cities will allow larger amounts of cardboard to be placed alongside recycling carts.
- **Magazines:** Include everything that comes with the magazine except rubber bands and plastic bags.
- **Metal cans:** Include all aluminum and tin/steel food cans. Place metal lids and bottle caps inside metal cans and pinch shut. Rinse clean and put into cart or bin.
- **Mixed paper:** Mixed paper includes unwanted mail, envelopes, greeting cards, paper tubes, and cereal boxes. Do not include: bath tissue paper, paper towels, or paper products such as plates and cups.
- **Newspaper:** Include everything that comes with the paper except rubber bands and plastic bags.
- **Plastic bottles and containers:** Rinse the container clean and toss into the bin or cart. Leave caps on bottles. If the bottle has a plastic label wrapped around the entire bottle, remove it. Do not recycle bottles or containers that have come into contact with motor oil, pesticides, herbicides or other hazardous wastes.

Put recyclables loose into your recycling cart. You should never put your recycling into plastic bags, and it's best to not use paper bags either. Plastic bags get tangled in the equipment at recycling facilities, causing the entire facility to be shut down while the bags are cut off of the equipment. Plus, the machines and people at the recycling facility cannot tell what's in the bag, meaning your recycling will likely not get recycled. Paper bags pose a similar issue – the machines at the recycling facility can't tell what's in the bag, so the recycling in the back won't get sorted properly.

Setting up a household recycling system

Place a separate bin or paper bag in rooms where a lot of recyclable items are used. For example, place a bin or bag for recycling in the kitchen, home office, laundry room and bathroom. When these bins get full, empty them into your recycling cart or bin.

Before emptying a waste basket from a bedroom or office, check to see if there are any recyclable items you can pull out and recycle instead.

When cleaning out your garage, refrigerator, basement, cabinets, and closets, make sure a recycling bin, box or paper bag is nearby for collecting recyclable items.

Recycling beyond the curb

Many people don't realize they can recycle more materials than are accepted at the curb, but it may require a special trip. There are many places in the metro region to bring materials for reuse or recycling. As a Community Recycling Ambassador, become familiar with the recyclers and reuse centers in the county and share them with people in the community.

Hennepin County has two year-round drop-off facilities where residents can take recyclable materials not accepted curbside. Materials residents can drop off include batteries, electronics, organics, electronic media, mattresses, plastic bags, and scrap metal. There are also drop-off containers at libraries and city halls for batteries, and many retailers and grocery stores take plastic bags for recycling.

For information on locations, hours, materials accepted and fees, see the Drop-off Facilities Brochure or visit **hennepin.us/dropoffs**. For more information on a specific item, visit the Green Disposal Guide at **hennepin.us/greendisposalguide**.

Support recycling by recycling right

Recycling has changed in recent years due to shifts in markets and national and international policy changes. Recyclers have changed their focus from wanting more materials to wanting the right materials so that recycling streams that are high quality and don't contain a lot of contamination.

The best way to support recycling is to recycle right by making sure you know what does and does not go in your recycling cart.

Some of the most important materials to keep out of your recycling cart are:

- Plastic bags and wrap: These get tangled in equipment at recycling centers. Bring them to a retail drop-off location for recycling, avoid by finding reusable alternatives, or put them in the trash.
- Cords, hoses and string lights: These get tangled in the equipment at recycling centers. Recycle cords and string lights at a drop-off location or put these items in the trash.
- Paper cups and plates: These items are often lined with plastic or contaminated with food. Avoid by carrying reusable water bottles and mugs and by choosing reusable or compostable alternatives. Put paper cups and plates in the trash.
- Plastic utensils and straws: There aren't good recycling markets for these items, and they are too small to sort at recycling facilities. Avoid by carrying reusable utensils and straws with you, refuse straws when you can, use compostable alternatives, or put them in the trash.
- Plastic foam: There aren't good recycling markets for these items and transporting and sorting the material is difficult. Avoid by finding reusable, recyclable, or compostable alternatives, and put these items in the trash.

Plastics deep dive

Plastics are increasingly prevalent in our waste stream. In the U.S., plastics make up more than 12 percent of the municipal solid waste stream, which is a dramatic increase from from 1 percent in 1960

Plastics are most commonly used for containers and packaging, such as soft drink bottles, containers and lids, and shampoo bottles. Plastics are also used for durable items like appliances, furniture, and toys and non-durable items like cups, diapers, medical devices, trash bags, and utensils.

Recycling rate for plastics

In 2018 the overall recycling rate for plastics was only 8.79 percent. However, the recycling rate varies greatly for different types of plastics, and the recycling rate for some plastics is much higher. For example, in 2018, 29.1 percent of PET bottles and jars and 29.3 percent of HDPE #2 bottles were recycled.

The 2016 Hennepin County Waste Sort found the capture rate for recyclable plastics to be about 50 to 60 percent, meaning people are only recycling about half of the plastics they could be.

How plastics are made

Plastics can be divided into two major categories: thermosets and thermoplastics.

- A thermoset solidifies or "sets" irreversibly when heated. They are useful for their durability and strength and are therefore used primarily in automobiles and construction. Other uses are adhesives, inks, and coatings.
- A thermoplastic softens when exposed to heat and returns to original condition at room temperature. Thermoplastics can easily be shaped and molded into products such as milk jugs, floor coverings, credit cards, and carpet fibers.

Plastics recycling

According to the American Chemistry Council, about 1,800 U.S. businesses handle or reclaim post-consumer plastics. Plastics from municipal solid waste are usually collected from curbside recycling bins or drop-off sites. At MRFs, plastics are sorted into a broad category of mixed plastics, then further sorted by plastic type, baled and sent to a reclaiming facility.

At the facility, any trash or dirt is sorted out, and the plastic is washed and ground into small flakes. A floatation tank further separates contaminants based on their different densities. Flakes are then dried, melted, filtered, and formed into pellets. The pellets are shipped to product manufacturing plants, where they are made into new plastic products.

Plastic resin identification codes

The number you find on the bottom of plastic containers is called the resin identification code. In 1988, SPI, the plastics industry trade association, introduced the resin identification coding system.

The following are resin identification codes for plastics:

#1 Polyethylene terephthalate (PET or PETE)

#2 High density polyethylene (HDPE)

#3 Polyvinyl chloride (PVC or V)

#4 Low density polyethylene (LDPE)

#5 Polypropylene (PP)

#6 Polystyrene (PS)

#7 Any other plastic, including mixed resins and polylactic acid (PLA), which is derived from sources like corn starch or sugar cane. PLA is compostable in commercial facilities.

Recycling programs commonly accept plastic containers, and the SPI coding system offers a way to identify the resin content of bottles and containers commonly found in the residential waste stream. Plastic containers are usually marked with a number that indicates the type of plastic.

Contrary to common belief, the resin number in a triangle, which looks like the recycling symbol, on a plastic product does not mean it is collected for recycling. However, consumers familiar with resin codes accepted in their local recycling program can use this information to determine whether or not certain plastic types are accepted for recycling.

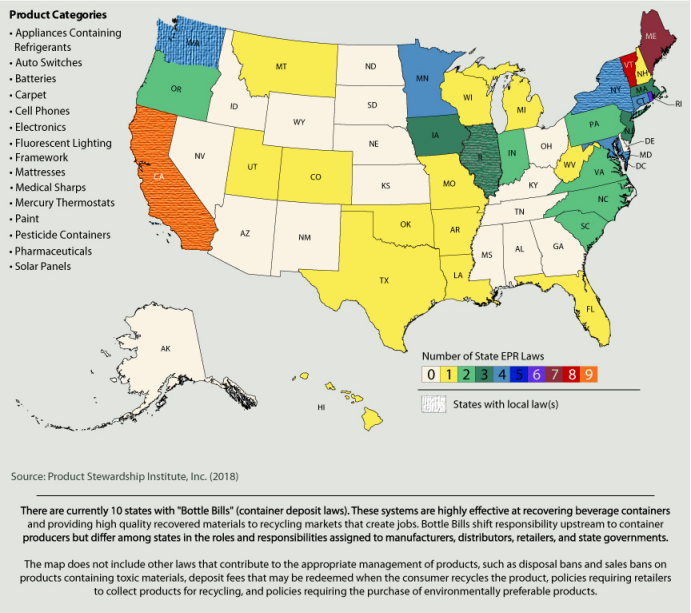
Type of plastic	How it's used	Recyclability
#1: Polyethylene terephthalate (PET or PETE)	• Bottles for water, soft drinks, juice, sports drinks, mouthwash, ketchup, beer, and salad dressings • Clamshell containers, such as for strawberries and lettuce • Food jars, such as peanut butter, jelly, jam, and pickles • Microwaveable food trays	PET is one of the most common resins. Most curbside programs accept this type of plastic. Black plastics are often not accepted for recycling. The optical sorters used at recycling facilities struggle to properly sort the black plastics. Black plastics are also commonly used for microwavable foods. These items have an additive that prevents them from melting in the microwave, which makes it difficult to recycle them.
#2 High density polyethylene (HDPE)	• Bottles for shampoo, dish and laundry detergent, and household cleaners • Cereal box liners • Juice concentrate and tofu containers • Milk jugs • Shopping bags • Shipping containers	Most curbside programs accept the bottle form of HDPE. Plastic bags are not accepted in curbside recycling programs because they get tangled in the equipment at recycling sorting facilities. Plastic bags can be recycled in drop-off containers available at many retail and grocery stores.
#3 Polyvinyl chloride (PVC or V)	• Bags for bedding, medical shrink wrap, deli and meat wrap • Blister packs • Clamshell containers • Pipes, siding, window frames, fencing, decking, and railing	PVC is not commonly accepted for recycling.
#4 Low density polyethylene (LDPE)	• Bags for dry cleaning, newspapers, bread, frozen foods, produce, and household garbage • Coating for paper milk cartons and beverage cups • Container lids • Shrink wrap and stretch film • Squeezable bottles	LPDE is commonly found as plastic film, which is not accepted in curbside recycling programs. Plastic bags and film are accepted for recycling in drop-off containers available at many retail and grocery stores.
#5 Polypropylene (PP)	• Takeout food containers • Yogurt and margarine tubs	Most curbside programs accept this type of plastic.
#6 Polystyrene (PS)	• CD cases • Coffee cup lids • Foam packaging • Foodservice items including bowls, cups, plates, and utensils • Packing peanuts • Takeout food containers	There aren't good recycling options for this type of plastic.
#7 Other (mixed resins, polylactic acid (PLA))	• Any plastic product that does not fit into resin categories 1 - 6 • Bio-based plastics made from corn, potato, or sugar derivatives • Large (three to five gallon) reusable water bottles • Oven-baking bags, barrier layers, and custom packaging • Some citrus juice and ketchup bottles	This is a broad category that includes a variety of plastics. Curbside programs don't accept this type of plastic. Bio-based plastics (such as polylactic acid, or PLA) can be composted in commercial composting facilities and are accepted in organics recycling programs. Generally, this plastic will not degrade in backyard compost.

Product stewardship

Product stewardship is a product-centered approach to environmental protection. Also known as extended producer responsibility (EPR), product stewardship calls on entities involved in a product's life cycle, including manufacturers, retailers, users, and disposers, to share responsibility for reducing the environmental impacts of products.

Product stewardship recognizes that product manufacturers must take on new responsibilities to reduce the environmental footprint of their products. However, real change cannot always be achieved by producers acting alone. Retailers, consumers, and the existing waste management infrastructure need to help to provide the most workable and cost-effective solutions. Solutions and roles will vary from one product system to another.

Product stewardship policies in the U.S. (2018)



Source: Product Stewardship Institute, Inc. (2018)

There are currently 10 states with "Bottle Bills" (container deposit laws). These systems are highly effective at recovering beverage containers and providing high quality recovered materials to recycling markets that create jobs. Bottle Bills shift responsibility upstream to container producers but differ among states in the roles and responsibilities assigned to manufacturers, distributors, retailers, and state governments.

The map does not include other laws that contribute to the appropriate management of products, such as disposal bans and sales bans on products containing toxic materials, deposit fees that may be redeemed when the consumer recycles the product, policies requiring retailers to collect products for recycling, and policies requiring the purchase of environmentally preferable products.

Product stewardship in Minnesota

In 1991, the State of Minnesota adopted one of the first product stewardship policies in the United States to promote a new approach to conserving resources, reducing waste, and increasing recycling. This approach led Minnesota to focus on developing policies and programs for specific priority materials including rechargeable batteries (1991), certain electronics (2007), paint (2013), mercury thermostats (2014), and packaging and paper products (2024).

Since 2019, over a dozen states have introduced legislation to establish extended producer responsibility (EPR) for packaging. The first four laws in the U.S. passed in Maine and Oregon in 2021 and in Colorado and California in 2022. In 2024, Minnesota became the fifth state to pass EPR for food packaging and paper products into law. The Packaging Waste and Cost Reduction Act requires producers - generally the brand owner, manufacturer, or importer - to appoint and join a 501(c)3 nonprofit organization called a producer responsibility organization (PRO), to coordinate and fund the statewide program. Packaging waste and printed paper now account for 40% of our waste stream. This program will cover up to 90% of the costs associated with recycling, refill, reuse, or composting of covered packaging and paper products.

The Partnership on Waste and Energy, a collaborative effort of Hennepin, Ramsey, and Washington counties, was a lead advocate in the bill development and supporting its passage. The law will prevent waste, increase recycling, and save Minnesotans millions of dollars. In addition to reducing the cost of recycling the law will also:

- Require packaging and paper products to be reusable, recyclable, or compostable by 2032.
- Simplify and standardize recycling across the state, including establishing a universal recycling list.

The next few years will be an exciting time of establishing the framework to implement this new law. To learn more about the law, visit **www.pca.state.mn.us/air-water-land-climate/extended-producer-responsibility-for-packaging**.

Why product stewardship?

Instituting product stewardship policies can help reduce loss of resources, ease rising costs to governments, and avoid potential hard from hazardous materials.

Treating waste as a resource has economic benefits. Minnesota spends a significant and growing amount of money to manage discarded products that cannot or should not be managed as garbage. Looking at discarded products as resources rather than waste has the potential to bring additional jobs, economic wealth, and tax revenue to the state.

Toxic materials continue to be a problem for our state. Materials used in some products continue to pose a threat to the health of our communities and the environment. For example, every pound of lead or mercury in a product has the potential to harm human health and the environment if it is not used and managed properly. Managing these materials in a responsible way means spending public taxes and fees on pollution control equipment or special disposal. By encouraging the redesign of products to remove problem materials, product stewardship can reduce the amount of public funding that needs to be spent on proper disposal.

Resources

- **hennepin.us/recycling**: Information about materials typically accepted in curbside programs and contact information for city recycling coordinators.
- **hennepin.us/apartmentsrecycle**: Information and free resources for property owners and residents to implement or improve recycling in multifamily buildings.
- **hennepin.us/businessrecycling:** Information and resources for reducing waste and recycling in a business.
- **hennepin.us/drop-offs:** Information about the county's drop-off facilities in Bloomington and Brooklyn Park, including locations, hours, facility guidelines and materials accepted.
- **hennepin.us/greendisposalguide:** The Hennepin County Green Disposal Guide provides recycling and disposal information for a wide variety of household items.
- **pca.state.mn.us/air-water-land-climate/recycling-in-minnesota**: The Minnesota Pollution Control Agency's website with information on the recycling process and economics in Minnesota.
- **pca.state.mn.us/air-water-land-climate/using-and-developing-products-responsibly**: Information about product stewardship in Minnesota.

Footnotes

[1] Most Plastic Products Release Estrogenic Chemicals: A Potential Health Problem That Can Be Solved, Chun Z. Yang, et.al, **http://ehp.niehs.nih.gov/1003220/**

[2] Widespread Occurrence of Bisphenol A in Paper and Paper Products: Implications for Human Exposure, Chunyang Liao and Kurunthachalam Kannan, **http://pubs.acs.org/doi/abs/10.1021/es202507f**