Using a **sustainable materials management (SMM) framework,** Minnesota counties can design programs that direct limited resources to most effectively reduce the environmental impacts of their communities. SMM includes traditional solid waste management, but also seeks to:

- use materials in the most productive way with an emphasis on using less
- reduce toxic chemicals and environmental impacts throughout the material life cycle
- ensure we have sufficient resources to meet today's needs and those of the future.

The only way to slow or stop the upward trend of total waste generation in Minnesota is through prevention and reuse. **Most products generate greater environmental impacts through their production** (as with cement, clothing, food, packaging) **and use** (as with furnaces, refrigerators, cars), **not in the waste managed at the end-of-life**. SMM uses life cycle assessment to point to the largest opportunities for environmental benefit.

**This highlights the importance of prevention and reuse as a means of extending the life of existing materials and products.**



Figure 1 shows the environmental life cycle of materials

# Prevention & Reuse (Source Reduction)



Most preferred environmental option

Reduction
Reuse
Recycling
Composting
Waste to energy
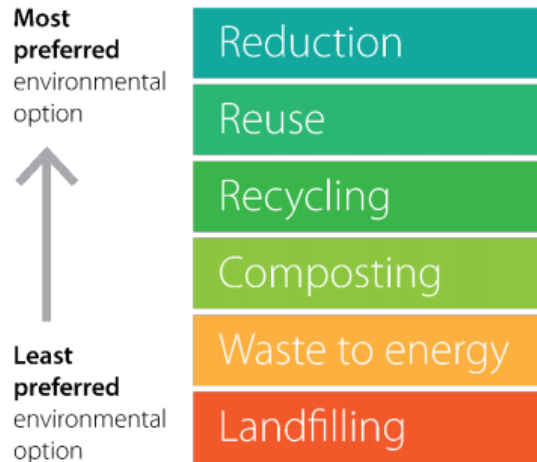Landfilling

Least preferred environmental option

**Figure 2** shows the waste management hierarchy with the most to least preferable actions identified based on environmental impact

Adopted in 1980, **the Waste Management Act** established criteria for managing solid waste, including the development of the waste management hierarchy. Based on environmental factors, the waste management hierarchy prioritizes waste reduction, reuse, recycling, and organics recovery above methods that preclude further use of the materials, including waste-to-energy (WTE), burning refuse to recover fuel or energy, and land disposal.

Prevention and reuse are sometimes referred to as "source reduction," which includes:
- Reusing a product in its original form
- Increasing the life span of a product
- Reducing material or the toxicity of material used
- Changing procurement, consumption, or waste generation habits to result in smaller quantities of waste or lower toxicity of waste

Source reduction reduces the generation of discards or the toxicity of those discards. A couple basic examples of source reduction include:
- Purchasing refurbished toner cartridges
- Shifting from disposable plastic to reusable utensils

Discards management is not source reduction. A couple basic examples of discards management include:
- Recycling toner cartridge
- Shifting from single use disposable plastic to single use compostable
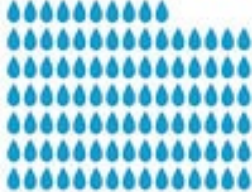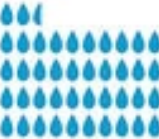
# Waste vs. Sustainable Materials Management

| | Waste Management | Materials Management |
|---|---|---|
| **Goal** | Managing discards, and more recently landfill diversion | Decreasing environmental impacts (air, water, and land) |
| **Life Cycle** | Primarily focused on downstream | Focused on all stages of life cycle |
| **Environmental Scope** | Emissions from waste and resource conservation from recovery | All pollutants |
| **Partners** | Waste generators (primarily MSW), waste industry, markets | Everyone involved across all life cycle stages of materials |

# Design for the Environment, Not Just Recycling

| Coffee Packaging (11.5 oz product) | Material | Package Weight | Recyclable by Consumers? | Energy Used (MJ/ 11.5 oz) | GHG Emissions (lbs CO2e/ 11.5 oz product)* | MSW Waste Generated (lbs./ 100,000 oz. of product) |
|---|---|---|---|---|---|---|
|  | Steel can, plastic lid | ~4 oz. | Yes | 4.21 | 0.33 | 1,305 |
|  | Plastic container and lid | ~3 oz. | Yes | 5.18 | 0.17 | 847 |
|  | Flexible pouch | ~0.4 oz. | No | 1.14 | 0.04 | 176 |

# Paper? Plastic? Reusable?

SMM seeks to [re]use resources, materials, and products the most productively and sustainably – recognizing the specific need being met can change what is the best choice…

| | Polyethylene (mass = 6 kg) | Paper (52 kg) | Reusable nonwoven polypropylene (42 kg) | |
|---|---|---|---|---|
| | 1 use | 1 use | 1 use | 8 uses |
| Nonrenewable energy, GJ | 763 | 2,620 | 3,736 | 467 |
| Greenhouse gas emissions metric tons of $CO_2$ equivalent ● = 0.010 | 0.040 | 0.080 | 0.262 | 0.033 |
| Freshwater consumption, gal 💧 = 10 | 58 | 1,000 | 426 | 85 |

In support of Minnesota counties prioritizing environmental benefits in programming, the Minnesota Pollution Control Agency (MPCA) created this resource outlining options to incorporate in county plans. Counties aren't limited to these options, and they can discuss other programming with the MPCA during their county planning process.

**Action - Required Reporting & Material Prioritization:**
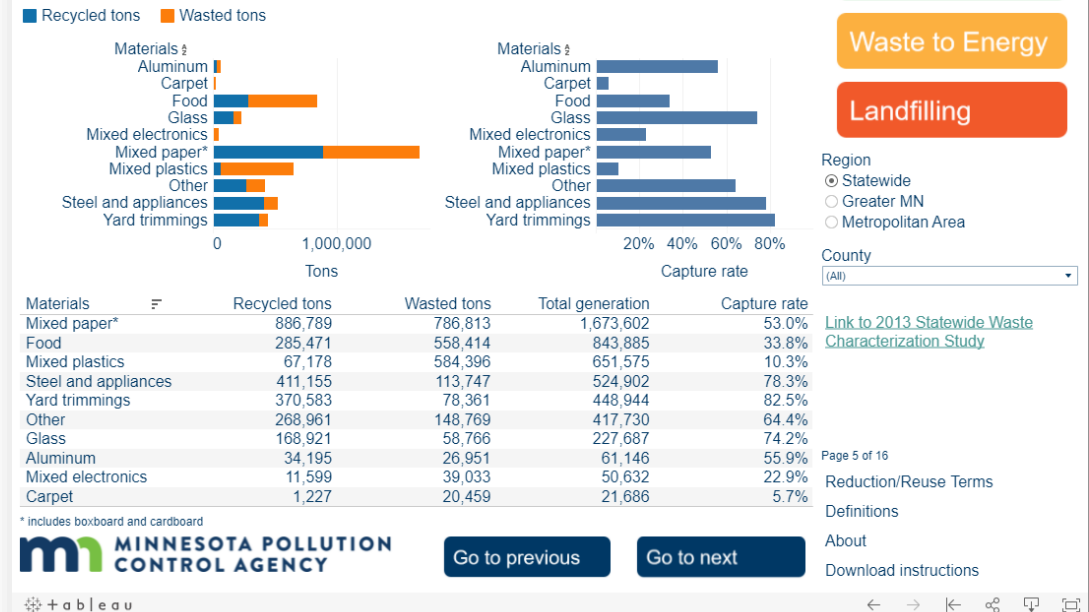To further sustainable materials management efforts and track progress, every county will set material priorities and capture rate goals using the SCORE report (updating county reported material categories in SCORE for statewide consistency). Increasing capture rates can be done by reducing the generation of the material while still capturing the material for recycling or increasing the overall amount of material captured for recycling.
*Within your county plan, choose 2 materials to set goals.*
1. Material 1: e.g. paper
2. Material 2:



**Capture rate by material**

By accounting for the total discarded amount of a *specific material*, capture rates inherently set a target for how much additional material is available to capture for recycling. In the current system, it's unrealistic to achieve a *recycling rate* of 100% as not all of the material Minnesotans discard can be recycled easily. In an ideal scenario, it would be feasible to reach a 100% *capture rate* for some traditionally recycled materials (like aluminum). As the chart below shows, some materials already have relatively high capture rates statewide, like mixed paper and steel and appliances. This means of all the discarded mixed paper, Minnesota is capturing about 53% for recycling in 2019.

| Materials | Recycled tons | Wasted tons | Total generation | Capture rate |
|---|---|---|---|---|
| Mixed paper* | 886,789 | 786,813 | 1,673,602 | 53.0% |
| Food | 285,471 | 558,414 | 843,885 | 33.8% |
| Mixed plastics | 67,178 | 584,396 | 651,575 | 10.3% |
| Steel and appliances | 411,155 | 113,747 | 524,902 | 78.3% |
| Yard trimmings | 370,583 | 78,361 | 448,944 | 82.5% |
| Other | 268,961 | 148,769 | 417,730 | 64.4% |
| Glass | 168,921 | 58,766 | 227,687 | 74.2% |
| Aluminum | 34,195 | 26,951 | 61,146 | 55.9% |
| Mixed electronics | 11,599 | 39,033 | 50,632 | 22.9% |
| Carpet | 1,227 | 20,459 | 21,686 | 5.7% |

* includes boxboard and cardboard

SCORE Report – Capture Rates by Material & County

## <u>Action – Prevention & Reuse:</u>

Counties are responsible for advancing prevention and reuse, along with other solid waste management strategies. This is in accordance with <u>Rule 9215.0580</u>.

*The plan must contain a description of the solid waste reduction policies and goals established by the county, district, or multicounty area including the annual amount or quantity of solid waste to be reduced.*

In the past this has not been a focus for the MPCA but given the environmental benefits of source reduction over other management methods this will be a focus for plans moving forward.

In the next slides the MPCA has outlined examples of source reduction programs for counties. Unless other programming is defined and confirmed with the MPCA, every county will select and implement some of the proposed options in the below categories. ***Within your county plan, choose at least 3 new or expanding prevention and/or reuse programs.***

## Action – Prevention & Reuse Options:

Counties are responsible for advancing prevention and reuse, along with other solid waste management strategies.

*See Prevention of Wasted Food SMM Guidance for additional options*

### Prevention of Wasted Food & Food Rescue

1.  Host a GreenCorps member or have county staff establish partnerships between food rescue organizations and restaurants/stores to increase food rescue
    *   Document county-wide food rescue data in SCORE
2.  Use existing materials and launch an educational campaign for institutions and/or at-home strategies to prevent wasted food

*See Sustainable Building SMM Guidance for additional options*

### Sustainable Building

1.  Require construction and demolition (C&D) waste plans for all demolition/renovation/construction permitted projects
2.  Adopt a deconstruction ordinance for building removal and renovation projects
3.  Require deconstruction (when applicable) and salvaging usable materials that still have value for government owned building or renovation projects.

*See Textiles & Electronics SMM Guidance for additional options*

### Reuse, Repair, & Rental

1.  Create materials and launch a county-wide educational campaign on the importance of reuse, types of reuse, and local reuse, repair, & rental businesses/organizations
2.  Host quarterly "swaps" to encourage reuse over buying new.
3.  Host quarterly Fix-It Clinics to encourage repair over buying new

*See Sustainable Purchasing SMM Guidance for additional options*

### Sustainable Purchasing

1.  Join the MPCA-hosted GREEN Group, become a CPV member, and transition buyers to using the state sustainable contracts
2.  Implement a formal county sustainable purchasing policy, setting requirements and goals for sustainable purchasing

### Measurement & Tracking

1.  Perform ongoing waste sorts, measuring contamination rates (at both point of source and MRFs)

*See Community Programming SMM Guidance for additional options*

### Community Programming

1.  Launch bi-annual sustainable consumption challenges for residents (e.g. "Zero" Waste Challenge, Prevention of Wasted Food Challenge)
2.  Start an annual training program for residents on sustainable consumption (including courses on prevention and reuse primarily, but also recognizing the value of recycling and composting)

Research indicates that between 30% and 40% of food in the United States goes uneaten, which translates to about 400 pounds of food being thrown out per person. At the same time, one in eight Americans struggles to put enough food on the table. Wasted food is also a significant contributor to climate change, responsible for at least 2.6% of all U.S. greenhouse gas emissions or 37 million cars worth. Significant resources and energy go into producing food, so preventing wasted food has a notable climate benefit.

**First prioritize the upper end of the hierarchy in programming related to food - traditionally statewide efforts and resource allocations started with the middle of the hierarchy, at recycling, resulting in a lower environmental benefit.**

# Prevention of Wasted Food SMM Guidance

**Prevention**

Source Reduction

Food to People

Food Waste to Animals

Industrial Uses & AD with usable energy/digestate

Compost

AD & WTE

Landfill

**Waste Mgmt**
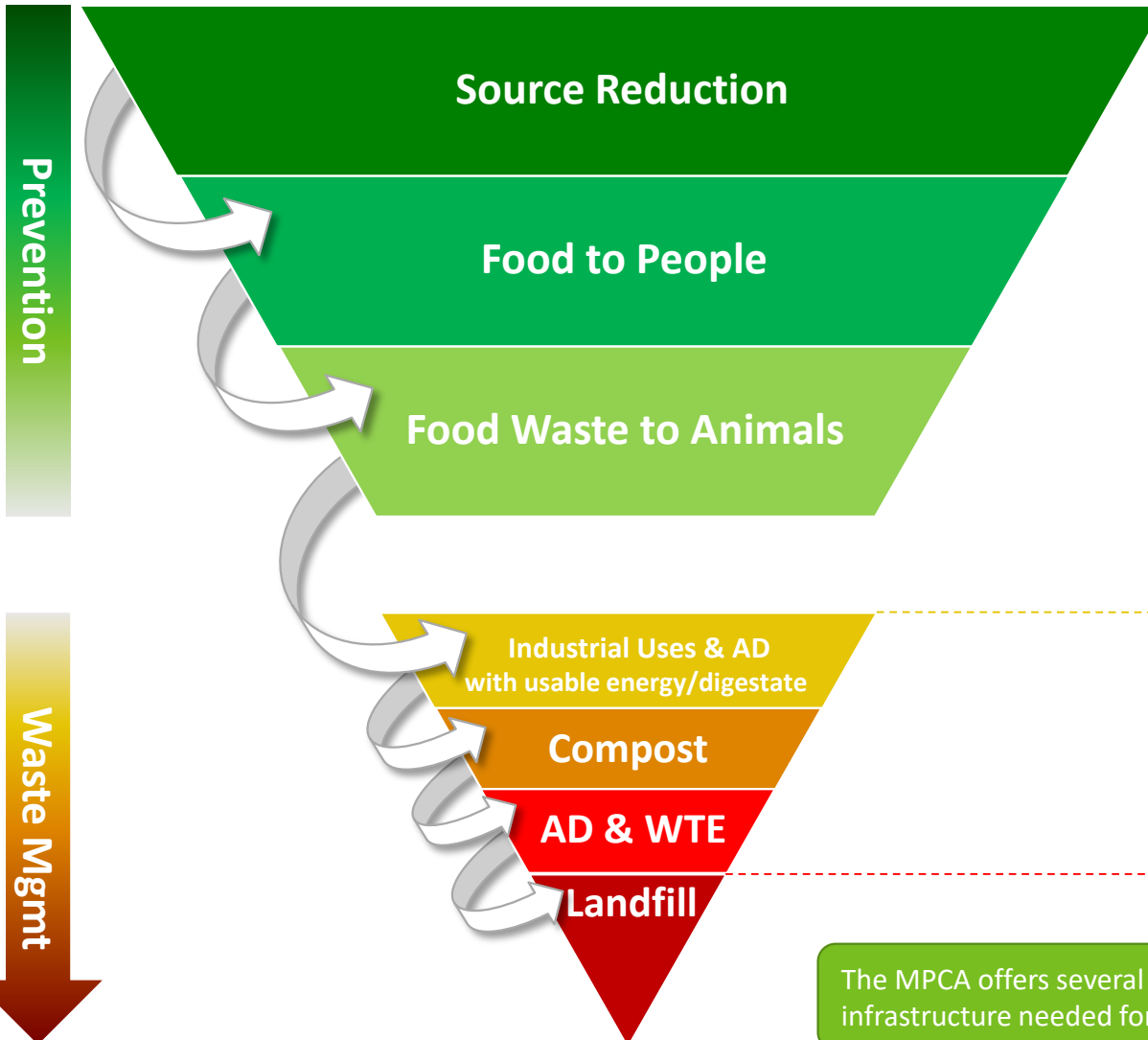
## Prevention

1. **Outreach to households for residential prevention of wasted food**
   - Distribute "EPA: Food too Good to Waste" materials & "Save the Food" resources
   - Partner with local libraries and community ed to host online/in-person classes
   - Create new programs → *MPCA Prevention of Wasted Food Grants*
2. **Partner with local food rescue organizations and support:**
   - Acquisition of additional equipment → *MPCA Prevention of Wasted Food Grants*
   - Acquisition/creation of additional space → MPCA Capital Assistance Program (CAP) Grants
   - Connection to additional orgs donating food (partner with Dept of Health)
   - Application for GreenCorps members to work on prevention of wasted food
3. **Partner with Second Harvest Heartland on MealConnect Program (prepared meal rescue)**
   - Active in Metro; starting in Duluth for 2020-2021 with GreenCorps member
4. **Partner with Health**
   - Ask your Health Dept. to provide materials on food rescue to restaurants during inspections
   - Purchase software (i.e. Leanpath) to improve purchasing & other prevention changes → *MPCA Prevention of Wasted Food Grants*
5. **Document county-wide food rescue amounts and report in SCORE**
6. **Support or establish Food to Animal programs**

## Recycling & Recovery → *MPCA Recycling Market Development or Greater Minnesota Grants*

1. **Outreach to households for residential composting of food waste**
   - Create Master Recycler/Composter training
2. **Partner with businesses on back-of-house organics collection**
3. **Establish organics collection sites**
4. **Establish organics curbside collection**

## Disposal

The MPCA offers several grant and funding options that can support the implementation of programming, operations, and infrastructure needed for greater prevention of wasted food, food rescue, and recovery.

Operational sustainability through energy and water efficiency is essential for reducing the footprint of buildings; however, as operating systems have improved, it's increasingly evident that **material impacts need to be accounted for and significantly reduced**. Traditional demolition is inherently wasteful, as it aims to remove existing structures as quickly and cheaply as possible. Demolition destroys usable, valuable materials. Once materials are mixed together, during demolition, it is hard to separate them. Materials may be sent for recycling processing; however, at that stage the amount that can be separated out and has an existing, stable market is minimal. Reuse is no longer an option. Most materials end up going to landfill, and new materials need to be sourced and produced to replace the existing materials being wasted.

**Alternatives exist that better maintain the integrity and value of materials and improve the sustainability of buildings.**

# Sustainable Building SMM Guidance

**Most to least preferred option for sustainable materials management**

### Preservation & Renovation
Maintain the location and as much of the existing structure as possible, renovating for improved efficiency and usability. Especially in cases where the same building need is being satisfied with a project (i.e. residential to residential, etc.) the environmental benefit is even greater by not building new.

### Structural Moving
Maintain as much of the existing structure as possible and transport to a new location. Allows for a change in the use of a project location, while keeping a functional building in circulation.
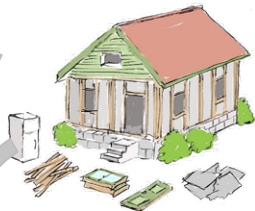
### Deconstruction
Salvage usable materials (whether valuable for aesthetic reuse, historical significance, functional or structural reuse) by strategically removing and sorting materials. Allows for a change in the use of a project location, while keeping materials in circulation.

### Demolition
Removal of a structure in cases where the building and materials are no longer usable. Allows for a change in the use of a project location, but has the greatest environmental impact.
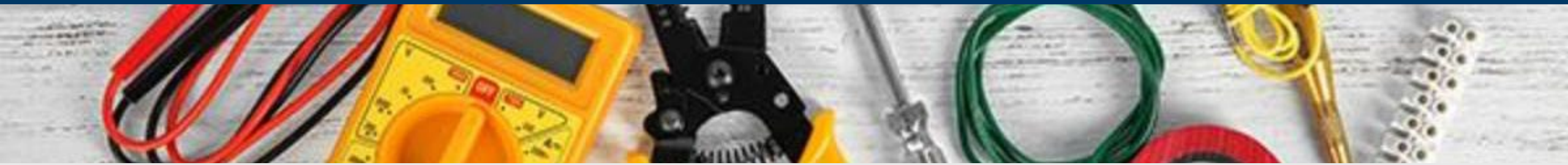
1. Create grant program to offset the additional cost of building preservation, renovations, and/or structural moving.
2. Host home and building repair and refurbishment trainings, encouraging extending the life of products and materials over replacement.

3. Adopt a requirement for construction and demolition waste plans for all demo/renovation/construction projects.
4. Create grant program to offset the additional cost of deconstruction.
5. Create a reuse warehouse in the city/county, or a reuse shed at a transfer station or landfill.
6. Host building material swaps.
7. Adopt a deconstruction and material diversion ordinance.
8. Support, promote, and partner with building material retailers.
9. Require county owned buildings or buildings obtained during right-of-way purchase to undergo structural moving, full deconstruction, or partial deconstruction.

Reuse, rental, and repair efforts extend the useful lives of materials and products, encouraging a shift towards more sustainable consumption. Reusables support a transition away from single-use items, reducing the amount of new production and material management through recycling streams or disposal. Rental programs broaden access, by supporting a "sharing economy" in place of individual ownership. Repair also creates demand for new jobs, offering valuable options for training and skills-building.

**There are important opportunities for community education and establishing partnerships with businesses and organizations that support reuse, rental, and repair.**

# Reuse, Rental, and Repair SMM Guidance

## Educational campaigns

- Organize campaigns on textile reduction and reuse, and offer funding to neighborhood associations to support community education
  - Textile Reduce & Reuse Event Series- Tangletown neighborhood in Hennepin County
  - Choose to Reuse | Join the Circle campaign in Hennepin County
  - State of Oregon: Waste Prevention Campaigns - Make Every Thread Count
- Distribute information about how to identify and purchase quality, durable, sustainable clothing to help decrease demand for low quality textiles or "fast fashion"
  - Provide lists of lower impact textiles, more sustainable clothing companies, or certifications like OEKO TEX ®
- Create materials that explain how to extend the life of clothing and other textiles instead of buying new
  - Create a list of tips for making clothing last longer and reduce wear and tear (e.g. laundry tips)
  - Create tutorials for how to mend and repair clothing and other textiles
  - Provide a directory of menders and tailors that repair and update clothing and gear

## Organize Community Programs

- Organize city/county clothing swaps or donation drives with specific asks based on community needs
  - Do It Green Swap Guide
- Provide clean out kits to customers so sold clothes can be used as credit
- Establish a fix-it clinic program with volunteers repairing and mending items, while teaching their skills to help extend the life of clothes. Current Minnesota counties hosting fix-it clinics:
  - Anoka County
  - Dakota County
  - Hennepin County
  - Ramsey County
  - Washington County

**Other Resources:**
- The organization ThredUp shares an annual report on how the resale industry is doing. You can find more information on their website.
- Top resale apps
- Eureka Recycling's Best Practices for Textile Collection for Municipal Programs Report
- ReUSE Minnesota's Reuse Impact Report

## Offer grants to support:

- Repair and reuse businesses purchasing additional tools and supplies, receiving specialized trainings, etc.
- Establishing new or expand capabilities of secondhand markets for various materials
- Creating systems for extended producer responsibility
- Clothing/textile production efforts that implement waste minimization strategies
- Create material standardization amongst manufacturers

## Offer grants that support:

- Businesses that design and create energy efficient and environmentally conscious products with longevity, durability, reusability and recyclability in mind.
  Basic Information about Electronics Stewardship | Sustainable Management of Electronics | US EPA
- Businesses that work to extend the life of electronic products.
- Offices, schools, and libraries to develop sustainable strategic plans for purchasing, refurbishing, and replacing electronics
- Educate about weighing the benefits and costs of buying used and buying new when equipment is designed with new environmentally conscious attributes
- Manufacturers and producers that promote product stewardship by creating electronics with recycled and durable materials.
- Electronic recyclers to become certified so that high environmental standards can be met while safely managing recycled electronics.

## Educational campaigns

- Distribute educational material about when it is best to reuse electronic devices or to replace for more energy efficient models
  MPCA The Repair (r)evolution
- Provide material about best repair and reuse options for various electronic devices
  Repair Manuals for Every Thing - iFixit
- Retailers such as Amazon, Apple, Best Buy, Sprint have trade-in or buy-back programs Research and educate about donation options for old phones
  5 Ways to Donate Your Old Smartphone or Cell Phone to Charity | HowStuffWorks
- Create material that educates about best recycling practices and what locations in your area accept electronics recycling
  Example: Green Disposal Guide | Hennepin County Electronic waste and recycling | MPCA
- Advocate for Right to Repair legislation
  Advocacy — The Repair Association

## Offer Community Programs

- Organize mail-in take back and warranty programs at electronic retail businesses for repair and resale of reusable electronics or proper recycling of valuable material such as copper, glass, and aluminum.
- Organize community drop-off points and collections of used electronics eligible for repair and reuse.
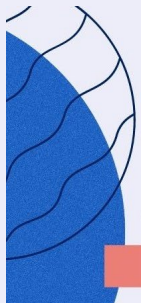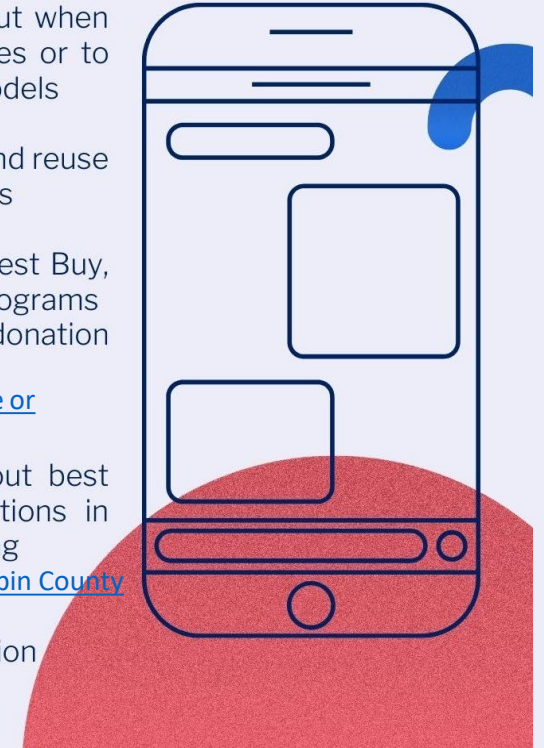
Allocating dollars towards sustainable materials is key to ensuring support for sustainable, non-toxic, and closed-loop markets. Sustainable purchasing considers environmental, social, and economic factors by considering the lifecycle impacts of a product — from raw material extraction through end-of-life management. This approach allows buyers to decrease the impact of their purchases more strategically and effectively. Local governments can save money and identify where impacts can be reduced the most.

**These resources help to narrow the choices available and provide support for making new purchases.**

# Sustainable Purchasing SMM Guidance

# Sustainable Purchasing SMM Guidance

## Become a Cooperative Purchasing Venture (CPV) member

- Utilize Minnesota sustainable purchasing contracts for various goods and services. This membership will make it easier to find and maintain maximum value contracts. Look over this pdf for details and eligibility.

## Join the MPCA-hosted GREEN Group

- Get connected with other county and city staff focused on sustainable purchasing to stay informed on opportunities and best practices. This group provides valuable experience and facilitates group project development to help organizations meet their goals.

## Transition buyers and ensure the use of State Sustainable Priority contracts

- There are 19 priority contracts that offer products and services that meet specified sustainability requirements. These contracts work towards the State of Minnesota's sustainable procurement goal and are an easy way to commit to environmental, social, and economic responsibility in purchases of goods and services.
- Find the sustainable purchasing program's priority contracts here.

## Develop sustainable purchasing policies

- Help organizations and businesses improve their sustainable purchasing policies by using the MPCA's guide.
- These steps provide guidance for organizations to construct their own sustainable purchasing goals and commit to improving their social and environmental impact. The guide outlines how to plan and make decisions about various purchasing needs and includes examples done by cities and counties throughout the U.S.

Partnerships between local governments and community organizations can help further work being done locally to prevent and reduce waste. Programs can also facilitate individual education through trainings and challenges. These also help to promote community in working towards similar goals of sustainable living.

**Examples of challenges and trainings implemented by communities in the past are highlighted in the following slides.**

# Community Programming SMM Guidance

## Consumption Challenges
Organize and run challenges for residents that encourage them to reduce their own waste in various areas.

Examples:
- Zero Waste Challenge
- Prevention of Wasted Food
  - EPA Get Smart Challenge
  - Track Food Waste at Home – Hennepin County
  - Hennepin County Stop Food Waste
  - San Diego Save the Food Challenge
  - Hennepin County- preventing waste in various aspects of life curriculum

## Training Programs
Offer educational trainings that give residents tools they need to better prevent waste and support reuse efforts.

Examples:
- Green Warrior
- Master Recycler/Composter
  - Dakota County Report
  - Hennepin County course topics
- Repair trainings: textile mending, wiring workshop, woodworking restoration

It's important to be able to track the impacts of prevention and reuse efforts. In this case, material is not present in waste streams to be measured. It can be helpful to track reduction in overall waste generation. However, it is best to consider measuring the production and use of a given material through baseline weights and final weights. Final weights are taken after prevention and reuse methods have been employed.

**Minnesota cities and counties have tracked their prevention and reuse projects in the past using various metrics to measure their outcomes.**

# Measurement and  Tracking SMM Guidance

# Measurement and Tracking SMM Guidance

## Possible metrics

- Pound/tons increase
- Dollars ($) spent on purchasing
- Greenhouse Gas Emissions avoided/ energy conserved

## Possible outcomes

- Increase/decrease in waste generation
- Increase/decrease in materials reused
- Increase/decrease in materials consumed/produced

### Food Rescue Program

MN Waste Wise utilized Leanpath Online software to help reduce wasted food in restaurant kitchens. The software helped the restaurants to identify what food was being wasted and why, apply solutions, and eventually see a decrease in wasted food. The results were determined by measuring and tracking purchasing of food items throughout several months. Overall three restaurants reduced their food waste by 29% in value, totaling $40,110.

## Reuse Centers

**Becker County Waste Diversion and Material Reuse Pilot Project:** Becker County had a goal of measuring the amount of material that could be diverted from the landfill. After identifying and recovering reusable materials from demolition piles and other materials entering the Transfer Station, the county is able to track weights of each item to measure how much material was successfully diverted for reuse.

**C & D Reuse Project in Hubbard County:** Hubbard County Solid Waste acquired roll-off containers to separate recycled and reusable materials. Reusable material is set aside for use by residents and it is tracked in the roll-off containers over the grant period to have a measurable outcome material reused and diverted from the recycling waste stream.

**WLSSD Materials Recovery Center** prioritizes data measurement and tracking to "help determine how much weight is being diverted from a landfill and when it may be time to budget for more staff or hours of operation." They work to track weights of materials brought into the center with the average material types and weights table in the tools below, in addition to counts of community members who use the center.

**St. Louis Park clothing swaps** prevent textile waste and promote reuse. All materials brought in to the swap are weighed, and all leftover material is weighed to determine how many pounds of textiles were reused through the swap. Only quality material is accepted so that most material can be donated rather than recycled.

### Purchasing for Prevention and Reuse

Fairview Health Services has reaped some major cost and environmental savings, and saved staff time by reducing office supplies purchases and eliminating junk mail. Fairview created Reuse Stores at 5 different sites to help consolidate unused office supplies from various departments. After collecting and organizing these supplies, staff can now pick up needed supplies from the Reuse Stores rather than buying new. Fairview also teamed up with Partnership Resources, Inc. to reduce junk mail from 49% to 13% of their total mail received. They did this over the course of three months and saw a reduction in waste bills and time spent sorting mail.

Other examples to implement: Refillable bottled water stations, bamboo office paper, reusable dishware and utensils