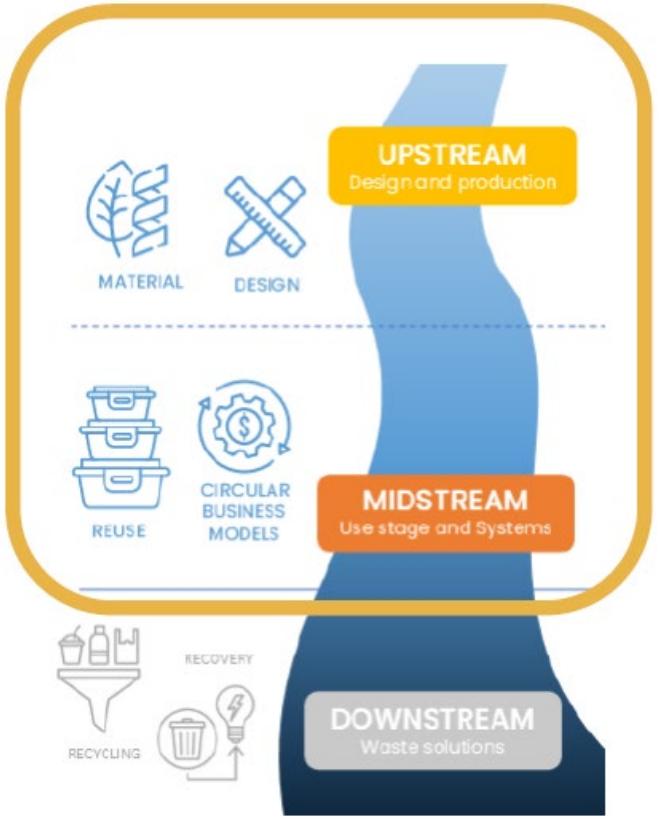
Building Circular & Resilient Maine Communities

Community Resilience Partnership

Megan Mansfield-Pryor

Talking (About) Trash

- Trash/waste are “useless, unwanted or discarded **materials**.”
  - **Waste management** is managing waste materials (disposal via landfill or incinerator or recovery like recycling or composting).
  - **Materials management** is managing waste materials ***plus*** practices across the lifecycle of materials that prevent them from becoming waste (design changes, systems changes, etc.).
- “Reuse” and “recycling” are often used interchangeably but are not the same.
  - Reuse is using an item or material again for its original purpose or repurposing it **without significant processing**.
  - Recycling is an energy-intensive industrial process that involves **breaking down, cleaning, and reprocessing** waste materials as feedstock to make new materials or products.



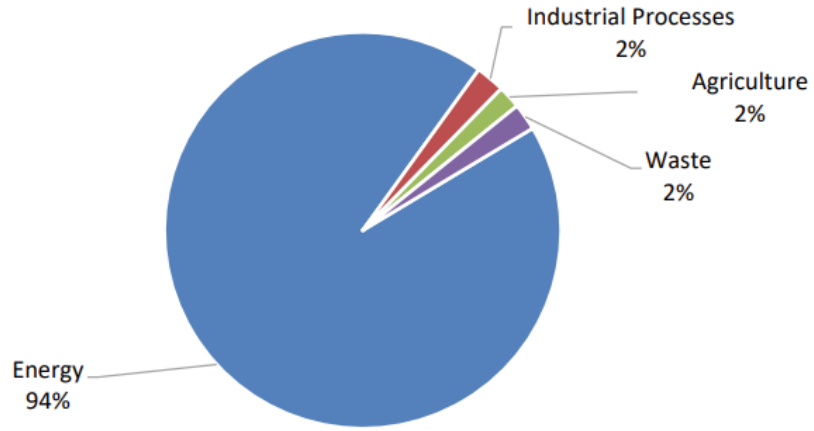
Graphic courtesy of EPPIC Business Development program

Reduce, Reuse in Maine Policy

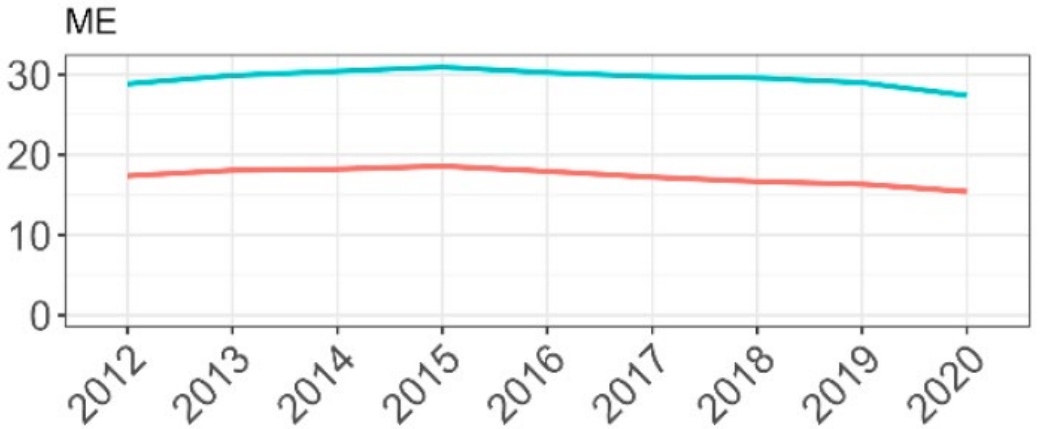
- 38 M.R.S. §2101. Solid waste management hierarchy:
  - Plan for and implement an integrated approach to solid waste management that prioritizes **waste reduction** and diversion.
  - Actively **promote and encourage waste reduction measures** from all sources and maximizes waste diversion efforts.
- 38 M.R.S. §2132. State goals:
  - Recycle **or compost 50%** of the municipal solid waste tonnage generated each year within the State.
  - **Reduce per capita disposal** of municipal solid waste tonnage to 0.55 tons.
- 38 M.R.S. §2101-B. Food recovery hierarchy:
  - Support the solid waste management hierarchy in section 2101 by **preventing and diverting food waste** from land disposal or incineration, prioritizing reduction and donation first, followed by recovery.

Materials & Consumption

- Waste is often a sliver of **sector-based** emissions.
- Northeast states' consumption-based emissions are 40-60% greater than sector-based emissions.
  - Consumption-based emissions (CBEs) are the **carbon footprint** of goods and services.
  - Manufactured goods are the biggest emissions contributors for Northeastern states CBEs.
- Materials management comprised over 40% of U.S. systems-based emissions in 2006.
- Extraction and processing of material resources generates **over 55%** of global greenhouse gas emissions (GHGS).

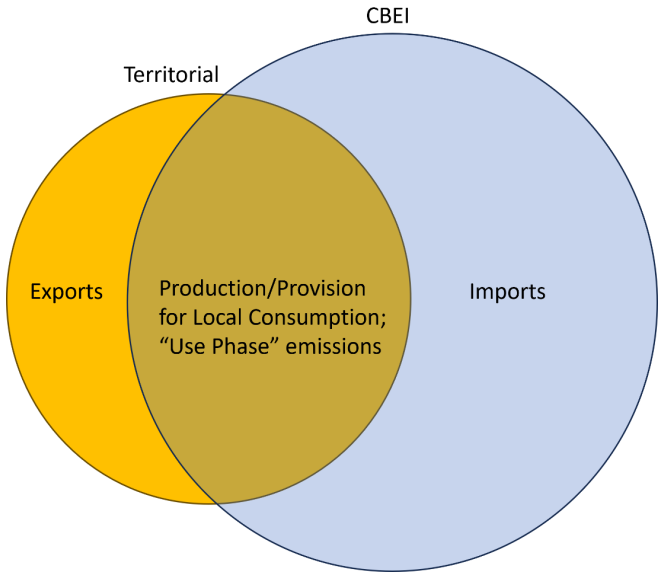


Maine's gross greenhouse gas emissions by source category, 2021 (includes biogenic emissions)



Source: EPA Consumption-Based Greenhouse Gas Inventories for Northeastern States

Recommendations for Waste Reduction in Maine's Climate Action Plan



- Support **reuse, refill, and repair.**
- Develop a **consumption-based** emissions inventory for Maine's greenhouse gas reporting.
- Lead by Example at state facilities through food waste prevention, reuse and repair.

- Coordinate and fund **regional waste management planning**.
- Increase access to **waste reduction** and diversion programs through educational materials and tools

Goal: Reduce waste and emissions from products that Maine people buy and use

Recommendations for Reducing Wasted Food Impacts in Maine's Climate Action Plan

- Maximize **food rescue,** recovery and donation of edible food.
- Provide incentives for methane capture and keeping food, manure, and other high methane producing materials out of landfills.
- Require large generator food waste reporting.
- Develop a plan to reduce and capture methane from landfills.

Goal: Reduce food loss and waste 50% by 2030

EPA research on wasted food in the U.S. shows that a family of 4 spends almost **$3,000 per year** on food that's never eaten! That's about $56 per week thrown away—money that could be used for bills, savings, or fun!

Recommendations for Building Materials Reuse in Maine's Climate Action Plan

- Require large commercial and state-funded buildings to be **designed for deconstruction** and reuse. This **prevents future waste** and ensures building materials live beyond a single use phase.
- **Divert demolition debris from landfills** by encouraging municipalities to give two weeks' notice for **salvage** opportunities.
  - Posting advance public notice of pending demolitions along with a **liability waiver** to reduce risk would enable building materials salvage and **reduce waste.**

Promote the manufacture and use of climate-friendly building products

What is a Circular Economy?

- A circular economy is **modeled on the natural world** where nothing is wasted; goods are designed to be reused, repaired, repurposed, shared, or recycled, and waste is designed out of the system or has value (like delaying plants feeding soil).
  - CE offers resilience, climate action and biodiversity conservation and the tools to support social equity, **local job creation**, public health and community building.
- A linear economy relies on **continual extraction** and **consumption** of resources made into products.
  - Products are managed as waste after their use phase.
  - Potential for reuse and recovery of material tends to be limited due to design, materials, or both.

Linear Economy.

TAKE. MAKE. DISPOSE.

Circular Economy.

GIVING MATERIALS NEW LIFE.

Local Actions, Global Impacts

TRANSPORT

A circular scenario for passenger cars could reduce global emissions by 70% in 2050.

BUILT ENVIRONMENT

Applying a circular economy approach to the built environment could reduce global emissions from building materials by 38% by 2050.

FOOD

Applying circular economy principles to the food system could cut emissions by 49% in 2050.

CONSUMER GOODS

Replacing single-use cosmetics bottles with refillable designs and supporting business models could reduce emissions by up to 85%.

- Circular strategies **cut emissions across territories and sectors** by maximizing resource value through design and keeping materials circulating locally and regionally.
- Anyone can support the circular economy by **shopping secondhand first..**

Source: Ellen MacArthur Foundation

Circular Examples in Everyday Life

- **Reuse:** Buying, selling, or donating used goods or materials.
- **Redesign:** Systems changes, like installing a dishwasher in a school to switch to reusable food service ware and bulk milk over single-use disposables.
- **Repair:** Fixing, repairing, refinishing, or refurbishing to keep things in use.
- **Sharing:** Lending programs that allow people to use things when they need them.
- **Composting or anaerobic digestion:** Using organic waste to enrich soil nutrients.

  - Building deconstruction providers
  - Upcycled foods producers
  - Repair/refurbishing services
  - Vehicle share programs
  - Secondhand markets
  - Third-party washing services for reusable food & beverage service ware
  - Stores or restaurants with refillable packaging
  - Tool libraries or libraries of things
  - Community repair cafes

Economic Development Opportunities

- Communities grappling with **rising waste management costs** can benefit from adopting circular economy practices in their planning and business development incentive programs.
  - **Economic demand** for circular businesses and services, like refillable/reusable packaging, building deconstruction, repair services, and secondhand materials supports local businesses, and creates jobs that reduce waste and emissions.
  - Consider **procurement policies,** economic incentives, technical assistance, tax breaks, or prioritized permitting to support circular businesses.
- Reuse/refurbishment produces 300 jobs per 10,000 tons of waste compared to 1-6 jobs per 10,00 tons of waste for disposal.
  - Circular jobs often "cite **higher wages and better working conditions** than comparable fields and opportunities to develop and use a more varied skill set.

"Zero Waste Market" by SFU - Communications & Marketing is licensed under CC BY 2.0.

Example: Austin, TX Circular Economy Program

1. Provides **no-cost, one-on-one consultations** navigating business incentives, workforce and talent, business connections, and city permitting for circular businesses.
   a) Support includes help identifying end markets for recycled or reused materials.
2. Actively **recruits businesses** that fill a need in their regional circular economy, such as a business providing reusable takeout food container washing infrastructure.
   a) Incentive benefits can include wages and property tax reimbursement.
3. Annual **innovation contest** with a cash prize focused on turning materials slated to become waste into the foundation of **new business ventures**.
4. Fix-It Austin online and in person repair education events, where residents reserve time with **local repair experts** to repair clothes, tools, appliances and more.
5. **Circular Meetups and Workshops**, fast-paced, hour-long events that provide an opportunity for local business owners, start-ups, and sustainability professionals to connect and learn more about **Austin's circular economy.**

Preserve Built Assets

- Explore opportunities for adaptive reuse or building deconstruction and material reuse at **brownfield redevelopment sites**.
- Assess whether current building codes, business incentives, and procurement policies support reuse of building materials.
  - In Washington State, King County, Washington, and Eugene, Oregon, salvaged sawn lumber in good condition and devoid of areas of decay is **assumed to meet the same requirements as new lumber.**
- Consider Embodied Carbon:
  - Reusing 50,000 tons of wood flooring reduces GHGs by 141,284 (MTCO2E) - equivalent to annual emissions from **29,997 gas-powered passenger vehicles** (cars, trucks, vans, SUVs).
  - Global warming potential from buildings would be **reduced by 88%** if they were designed for reuse rather than recycling.

Workforce Development & Community Reuse

- Community reuse centers are often nonprofit but may be municipally supported, offering deconstruction services, as well as **job training** in fields related to repair, reuse, building deconstruction, and materials refurbishment.
- **Example: Finger Lakes Reuse in Ithaca, NY - programs include:**
  - ReSet - job training program with skill building and support with finding and keeping a job.
  - eCenter – offers affordable refurbished, reused electronics and parts for fixing devices.
  - Deconstruction - a sustainable way to bring down buildings and source quality building materials.
  - Fixers Collective – a weekly volunteer event for people to come together and fix things!

FINGER LAKES ReUSE

Enhancing community, economy, and environment through '***ReUse***'!

Build a Roadmap to Waste Reduction

- Set a waste reduction goal.
  - Consider separate organic waste reduction goals within the wider goal.
- Engage the community, including residents, businesses and organizations. Make sure all voices are heard.
- Set up for success by developing an action-oriented, feasible plan with phased-in steps to reach your goal.
- **Example:** Check out Boulder County, CO: "Zero Waste or Darn Near" commitment.
  - Attained communitywide 40% diversion in 2022; government operations reached 59% diversion.

Planning Resources:

Community Zero Waste Toolkit (ecocycle)
Zero Waste Planning (Institute for Local Self-Reliance)

Sharing is Caring (for Your Community)

- Community sharing/lending program for residents reduce consumption and waste by allowing people to **rent or borrow** electric vehicles, e-bikes, tools, and more…
- Evie **Car Share** – Twin Cities residents can borrow shared EVs for very low rates when and where they need them, by the minute, hour, or day. Now expanded statewide in MN with nonprofit **Hourcar.**
- Portland ME's **Bikeshare Program** offers either classic or electric bikes, with 200 bikes available at over 40 stations through the city for a modest fee.
- **E-Bike Libraries** are popping up in many locations as a simple, affordable, fun, and healthy way to get around.

Photo Courtesy of Evie Community Carshare

Sharing & Repairing Strengthens Communities

- **Tool Libraries** and **Libraries of Things** reduce household consumption and waste and provide community members with equitable access to quality goods.
  - South Portland, ME's **Electric Tool Library** offers electric lawn tools with a library card.
  - Curtis Memorial Library of Things in Brunswick offers library card access to 1500+ things for just about anything.
  - The **Maine Gear Library** provides low-barrier access to high quality outdoor gear across the state.
- Community organizations, often libraries, host **community repair cafes**, where people learn and teach traditional repair skills to keep things in use longer.

Repair Cafes as Climate Action

- "Intensive use of longer-lived repairable products" identified by IPCC as **necessary climate action.**
- Survey data suggests "nearly every **half of all products are discarded** after they malfunction or become defective," regardless of repairability.

Community Repair Cafés are volunteer run events; people of all ages with different backgrounds, skill sets, and income levels **come together to collectively repair** items like bicycles, electronics, small appliances, and clothing

Repair café **success rates** are high, averaging 67% for most items, with an even higher **89% success rate** for clothing and textiles

A November community repair café in Midcoast Maine recovered 36 items for an **estimated GHG savings of 1,184.4 MTCO2e** - equivalent to taking **282 gasoline powered vehicles** off the road for a year.

Photo courtesy of Hallie Kirsch and Maine GearShare

Prepare to Weather the Storms

- Develop a storm debris management plan that can **save your community money** and provide opportunities for **skill building and training**.
- Consider collaborating with tech/vocational schools to recover material after a storm.
  - Example: Camden high school students made **picnic tables** with wood from a waterfront wharf boardwalk **demolished in a storm**.

Photos courtesy the Hatchery)

Recognize & Support Climate Leaders

- Recognize climate leadership by local businesses and organizations and highlight examples of how they've taken action to reduce and divert waste.
- Create a climate change education, outreach, and engagement program for residents, businesses, and community partners that talks about the climate benefits of reducing waste and provides tips to get started with reducing waste, recycling, and composting.

Example: City of Phoenix, Arizona

- Green Business Leader Program recognizes and promotes businesses that volunteer to operate in a more **environmentally responsible** manner through sustainable actions.
- Zero Waste Business Program helps Public Works gather data on participating businesses' **reuse, recycling, or composting** efforts.
  - In exchange for this data, Public Works offers creative ways to **promote the organization's business model** as part of their public outreach and education.

Circularity Supports a Just Transition

- Example: Charlotte, NC is the first U.S. municipality to commit to adopting a **circular economy** as a public sector strategy.
  - Material resources that now end up in landfills will be the basis for Charlotte's next industrial revolution.
  - These materials are the foundation for an era of green manufacturing that unlocks new technological advances, increases local resilience, and supports workforce development.

CHARLOTTE AS A CITY WITH OPPORTUNITIES FOR ALL

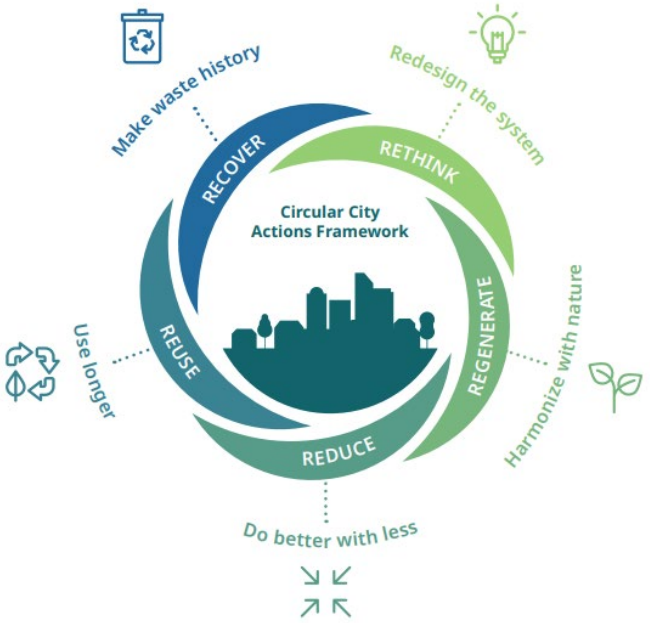
By 2050, Charlotte could have less than 0.5% of its population living in poverty. Initial efforts on establishing circular industry and innovation would be largely focused on skill development, training, and inclusive programs designed to uplift those who are economically disadvantaged. In 2019, the city's solid waste department could establish a test rehabilitation program for the homeless community, providing employment in plastic waste sorting and remanufacturing. Plastic wastes, which are of too low a quality for automated processing at that time, would be sorted, washed, and shredded for the production of small batches of local products like street furniture, waste bins, and trophies for school sporting events. Some of the trainees involved in the pilot program could go on to start their own companies focused on recycling and product manufacturing.

Resources to Tackle Waste & Emissions

- Community Action Grants supports strategies aligning with Maine Won't Wait 2024
- Waste Diversion Grants funding to keep waste out of the trash.
- Upstream Reuse Funding Opportunities Tracker tracks funding that enables reuse.
- Natural Resources Council of Maine Sustainability Seed Grants ($2K maximum).

Looking for Project Ideas?

- Sustainability Toolbox – University of Maine
- Reduce, Reuse, Recycle Guides – Maine DEP
- Circular Cities Action Framework - ICLEI Circulars
- Strategies Toward Zero Waste - C40 Cities



Tools for Measuring Upstream Emissions

- EPA Waste Reduction Model (WARM) Tool
- Repair Café Carbon Calculator
- CBEI Guidebook - Creating a CBEI for your city, Urban Sustainability Directors Network
- US Environmentally-Extended Input-Output (USEEIO) Models*, EPA
- Estimating consumption-based greenhouse gas emissions at the city scale, C40 Knowledge Hub
- Forum Products and Toolkits, West Coast Climate & Materials Management Forum
- Smart Tools for a Cooler Planet, Cool Climate Network

*This resource will be moving to an academic institution for preservation and continued improvement, but currently this is the available version.

Measuring Emissions Impacts with WARM

- EPA's Waste Reduction Model (WARM) is a free resource to estimate environmental and economic impacts of materials management choices (like recycling vs. disposal).
  - Based on national averages but has many customization options.
- Assesses different types of impact:
  - Metrics include greenhouse gas emissions, energy use, labor hours, wages, and taxes.
  - Choose the metrics that are most relevant for your community.
- WARM assesses impacts from a lifecycle perspective—it cuts across territories and sectors so it can't be used for developing GHG inventories, which rely on establishing a baseline and measuring reductions from that baseline for a specific sector over time.
  - The biggest emissions reductions come from preventing upstream resource extraction through activities like reuse and repair to ensure maximum and efficient resource use.

Quick EPA WARM Tool How-To:

1. Use most recent municipal recycling or transfer station annual report (we can help!).
2. What materials could be targeted for reuse, recycling, or composting/digestion? Estimate the tons available based on how much total waste is disposed - Maine Statewide Waste Characterization Study [PDF] can help you estimate amounts of different materials in the waste stream by percent.
3. Identify a material to explore the impacts of managing it differently.
4. Enter tonnage for a baseline and comparison scenario (recycling vs. landfill, reuse vs. recycling, compost vs. anaerobic digestion, etc.)
5. Guidance available for more complex scenarios…

Total Change in GHG Emissions ($MTCO_2E$): **(529.83)**

This is equivalent to...		
Removing annual emissions from	**112**	Passenger Vehicles
Conserving	**59,619**	Gallons of Gasoline
Conserving	**22,076**	Cylinders of Propane Used for Home Barbeques

Material Type	Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Tons Generated	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested
Paper	Corrugated Containers		150.00		NA	NA	150.00		150.00			NA	NA
	Magazines/Third-class Mail				NA	NA	0.00					NA	NA
	Newspaper				NA	NA	0.00					NA	NA
	Office Paper				NA	NA	0.00					NA	NA
	Phonebooks				NA	NA	0.00					NA	NA
	Textbooks				NA	NA	0.00					NA	NA

Contact:

- megan.e.mansfieldpryor@maine.gov
- (207) 215-7535

www.maine.gov/dep