Environment and Natural Resources Trust Fund

2023 Request for Proposal

General Information

Proposal ID: 2023-234

Proposal Title: Modernizing Minnesota's Materials and Waste Data for Climate

Project Manager Information

Name: Colleen Hetzel

Organization: Minnesota Pollution Control Agency

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Project Basic Information

Project Summary: The MPCA will modernize statewide measurement through waste composition sorts, economic data, and life cycle coefficients to develop an environmental impact calculator for products/materials consumed and wasted in Minnesota.

Funds Requested: $1,732,000

Proposed Project Completion: June 30, 2026

LCCMR Funding Category: Air Quality, Climate Change, and Renewable Energy (E)

Project Location

What is the best scale for describing where your work will take place?

Statewide

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

According to the Environmental Protection Agency, our everyday products and materials contribute 42% of total greenhouse gas emissions (GHGe) in the United States across their lifecycle, including: raw materials extraction, manufacturing and processing, transportation, usage, and waste disposal. While Minnesota has a strong waste management system and notable efforts around increasing landfill abatement, additional focus needs to be placed on changes to the state's consumption and resource/material use. Minnesota needs to modernize and invest in statewide data and tools to track the environmental impacts from materials and waste, identify priorities for source reduction, reuse, recycling, and composting, and quantify the associated measurements of those efforts. This type of information will enable state and local government, businesses, communities, and individuals to make more informed, sustainable choices by creating tools that can be used by Agency staff as well as partners working on climate change mitigation.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

This proposal includes funding for two waste composition studies that will allow the MPCA to track the product and material make-up of the state's waste stream. The studies will look at both the waste that is being disposed in Minnesota and the waste being managed through recycling.

It also includes the development of two tools to quantify the climate and environmental impacts of materials and waste of the state in order to better prioritize efforts for source reduction, reuse, recycling, and composting based on the maximum potential environmental benefit:

-The Consumption Based Emissions Inventory (CBEI) tool will report the GHGe of the goods and materials Minnesotans consume. This includes impacts during manufacturing in addition to the impacts of materials when they are recycled or thrown away.

-The Material Impact Calculator will use data from the waste composition studies and the environmental impacts from the CBEI to model the benefits of more source reduction, reuse, or recycling of materials (as opposed to landfilling or waste-to-energy) across the state. The modeled scenarios would highlight ways to mitigate and adapt to climate change impacts and be useful for city climate action plans, county planning and sustainable business practices.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Results from the waste composition studies and CBEI provide performance indicators for the state to track progress, and the Material Impact Calculator helps make that data more accessible. Other states have modernized their data and tracking and have seen measurable success in strengthening efforts to reduce environmental impacts for individuals, businesses, and government entities.
The proposed deliverables can be used to create educational campaigns and programming, identify opportunities for design/manufacturing changes or modifications to purchasing, and develop policy proposals. These efforts can decrease the demand for new production, resulting in lower generation of emissions and less water and chemical usage.

Activities and Milestones

Activity 1: Complete statewide waste composition studies

Activity Budget: $800,000

Activity Description:
Waste composition studies involve waste sorts by material types. This is an essential measure for evaluating capture rates (recycling rates for specific materials like carboard or aluminum), identifying trends in specific material use and disposal, and evaluating the overall effectiveness of source reduction, reuse, and recycling programs in Minnesota. It informs statewide and local investments, planning, and programming by identifying actions with highest environmental benefit. It also offers valuable insight for businesses that use these materials and sell these products. In addition to a composition study analyzing what is being thrown away, this activity will include a study of what is being collected in the recycling stream from commercial and residential single stream recycling loads that are delivered to Material Recovery Facilities (MRFs). As single stream recycling has become popular, it's more difficult to distinguish what materials are actually being recycled. Recycling composition data will help focus efforts on which materials require additional public education or market support.

During Activity 1, the MPCA will draft an RFP to contract out the waste composition sorts, hire the contractor, and perform the waste composition sorts. The MPCA will also provide oversight throughout the contractor's data gathering and review the final report.

Activity Milestones:

Description	Completion Date
RFP developed and posted	December 31, 2023
Contractor selected	April 30, 2024
Waste composition sorts conducted and reports approved	September 30, 2025

Activity 2: Create a Minnesota-specific CBEI (consumption-based emissions inventory) model

Activity Budget: $466,000

Activity Description:
The CBEI is a method used to estimate the environmental impacts (currently GHGe) generated from the goods and services Minnesotans buy or consume every day. It is particularly useful for looking at household and citizen consumption behaviors and prioritizing changes for the best environmental outcomes. The CBEI is a complementary measure to the in-boundary or sector-based emissions inventory, which is currently produced every two years by the MPCA. Together these two inventories tell a more complete story of how Minnesota contributes to climate change and thereby shows opportunities to reduce those emissions through changing producer operations and consumption patterns.

The current process for completing a statewide CBEI is arduous and requires the development of a new data model to become efficient and standardized. During Activity 2, the MPCA will hire staff to work on economic/data analysis and database creation to support the completion of the CBEI. The MPCA will draft an RFP and work alongside a contractor to create the data model. The goal will be a user-friendly system to ensure staff may easily complete the CBEI in future iterations, saving time and resources in the long-term. Finally, the MPCA will review and approve the final report.

Activity Milestones:

Description	Completion Date
Staff hired with economic and database/data analysis expertise (for activity 2 and 3)	July 31, 2024

RFP developed and posted	September 30, 2024
Contractor selected	January 31, 2025
MPCA staff work with contractor to create the CBEI model	March 31, 2026
A model is created to track the environmental impacts from products/materials consumed by Minnesotans	March 31, 2026
A report is written analyzing opportunities to reduce GHGe	March 31, 2026

Activity 3: Create a Minnesota-specific Material Impact Calculator

Activity Budget: $466,000

Activity Description:

Historically waste management measurements were weight-based, without considering the broader environmental and climate impacts of activities. Having a defined methodology including various environmental impact measurements, such as water and energy consumption and toxicity can more accurately document the success of managing materials and waste, prioritizing the most beneficial strategies at the state and local levels.

Minnesota-specific calculations must be defined for current management methods, waste streams, material types, transportation distances, facilities, and end-markets. These calculations can be used to build a calculator that models the impacts associated with preventing waste and reusing, recycling, or composting most material types. This data can also be used to show "what if" scenarios to help guide policy, programming, and investments. This is different than the CBEI model because it models changes and other environmental impacts. The following is an example of the type of calculator that will be built during this project activity (developed by Oregon's Department of Environmental Quality): www.oregon.gov/deq/mm/Pages/Waste-Impact-Calculator.aspx

During Activity 3, the MPCA will draft an RFP and hire a contractor to develop Minnesota-specific emissions factors and the Material Impact Calculator. The MPCA will provide input throughout development, and review/approve the final product.

Activity Milestones:

Description	Completion Date
RFP developed and posted	January 31, 2025
Contractor selected	April 30, 2025
Material Impact Calculator created	June 30, 2026

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

This effort provides data on products and materials being consumed, recycled/composted, and disposed in Minnesota, along with the GHGe, water use, and toxicity impacts. Longer-term implementation of this data includes focusing programming on greater reduction of environmental impacts and creating transparency on progress over time. Cities and counties can use this data in the development and execution of climate action plans, supporting individuals and businesses in the community. By building two tools, this project has ongoing value. It creates the ability to rerun the consumption and impact models without additional funding needs, as opposed to being a one-time report.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Groundwater Contamination Mapping	M.L. 2017, Chp. 96, Sec. 2, Subd. 03h	$400,000
Assessment of Urban Air Pollution	M.L. 2017, Chp. 96, Sec. 2, Subd. 07b	$700,000
Pilot Program to Optimize Local Mechanical and Pond Wastewater-Treatment Plants	M.L. 2018, Chp. 214, Art. 4, Sec. 2, Subd. 04a	$700,000
Reducing Municipal Wastewater Mercury Pollution to Lake Superior	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 04h	$250,000
Optimizing Local Mechanical and Pond Wastewater-Treatment Plants	M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 11b	$500,000
Groundwater Contamination Mapping Project - Phase II	M.L. 2021, First Special Session, Chp. 6, Art. 6, Sec. 2, Subd. 03f	$800,000
Developing Strategies To Manage PFAS In Land-Applied Biosolids	M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 04d	$1,404,000
Wastewater Pond Optimization Implementation	M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 20a2	$700,000
Chloride Pollution Reduction	M.L. 2021, First Special Session, Chp. 6, Art. 5, Sec. 2, Subd. 20a4	$500,000

Project Manager and Organization Qualifications

Project Manager Name: Colleen Hetzel

Job Title: Planner Principal- Sustainable Materials Management

Provide description of the project manager's qualifications to manage the proposed project.

Colleen has a degree in Biological Aspects of Conservation and an Environmental Certificate from the University of Wisconsin-Madison. She has been with the MPCA for over 20 years and has worked on various aspects of prevention and materials management.

-10 years of experience leading organizations on climate-based modeling with the U.S. Environmental Protection Agency and the West Coast Forum

-Peer reviewer on the first state Consumption Based Emissions Inventory done in the United States for the State of Oregon

-Work modernizing the waste system to reflect the positive and negative impacts of how waste is managed in Minnesota

for several years

-Adding the GHGe saved from solid waste management programming to the annual SCORE report found at https://www.pca.state.mn.us/waste/report-2020-score-programs

-Currently leading the Sustainable Materials Management team and has led several contracts resulting in successful outcomes including a construction and demolition waste sort that was application based in 2019

Organization: Minnesota Pollution Control Agency

Organization Description:
The Minnesota Pollution Control Agency is a state agency committed to ensuring that every Minnesotan has healthy air, sustainable lands, clean water, and a better climate. Through the authority of state and federal statutes and guidelines, the Agency focuses on preventing and reducing the pollution of air, land, and water, and leads Minnesota's efforts to protect against the devastating effects of climate change. We work with regulated parties, businesses, governments, organizations, and Minnesota's 11 tribal nations to develop innovative, community-centered approaches that protect our natural resources, improve human heath, and foster strong economic growth.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Research Analysis Specialist Senior		Temporary Unclassified- This person will assist with the creation of the two tools- CBEI and the Waste Impact Calculator. In order for these to be created the contractor will need access to data from the MPCA to combine with data the contractor will generate. This position will also be used to ensure the calculator is accessible to MPCA staff and partners.			34%	2		$266,000
Economic Policy Analysis		Temporary Unclassified- This person will assist with the creation of the CBEI by analyzing and providing economic data for the database. In order for these to be created the contractor will need access to data from the MPCA to combine with data the contractor will generate.			34%	2		$266,000
							Sub Total	**$532,000**
Contracts and Services								
TBD	Professional or Technical Service Contract	Conduct two types of waste sorts- one waste characterization of waste disposed in Minnesota and one on materials recycled/composted in Minnesota				-		$800,000
TBD	Professional or Technical Service Contract	Run the consumption-based emissions data for Minnesota and create a database/model that MPCA staff can easily use for future data runs.				-		$200,000
TBD	Professional or Technical Service Contract	Create a model/database and interactive interface that models the environmental impacts from changing the production/generation of the materials Minnesotans consume and the way materials are managed at end-of-life.				-		$200,000
							Sub Total	**$1,200,000**
Equipment, Tools, and Supplies								

							Sub Total	**-**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
							Sub Total	**-**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$1,732,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
In-Kind	In kind MPCA staff contributions to support the RFP development, management of the contracts, and work needed to create the models.	In kind MPCA staff contributions: 0.3 FTE staff from five different staff people including three sustainable materials management staff, one staff that works on the in-boundary GHGe report, and one contract staff person. (total 1.5 FTE x $133k per year x 3 years)	Secured	$598,500
			State Sub Total	**$598,500**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**$598,500**

Attachments

Required Attachments

Visual Component

File: 6ded9232-634.pdf

Alternate Text for Visual Component

The CBEI estimates life cycle GHGe from goods and services purchased by Minnesotans and is useful for looking at citizen consumption choices and prioritizing specific emissions reductions.

The Material Impact Calculator models scenarios as different material types are managed and summarizes the resulting environmental impacts as the inputs change....

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

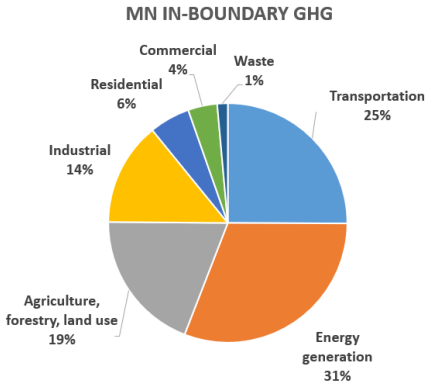
Does the organization have a fiscal agent for this project?

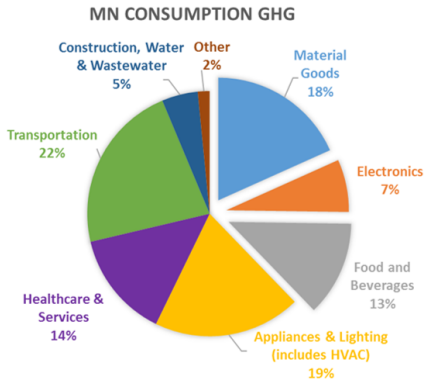
No

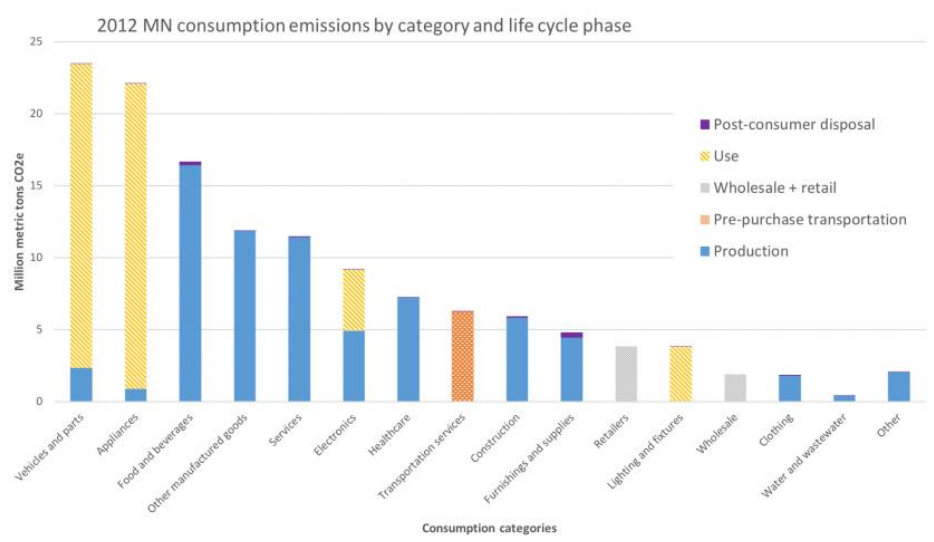
Example of Consumption-Based Emissions Inventory Outputs:

- Minnesota production-based inventory is by sector
- Highlights sector actions
- Citizen consumption is less apparent

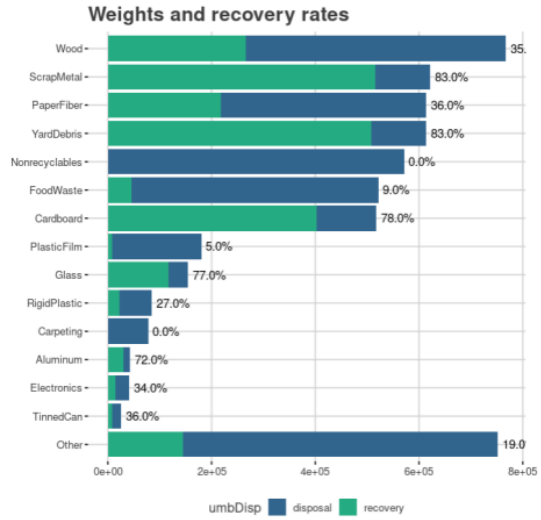
- Minnesota consumption-based inventory is by consumption category
- Highlights individual and community actions
- Citizen consumption is more apparent

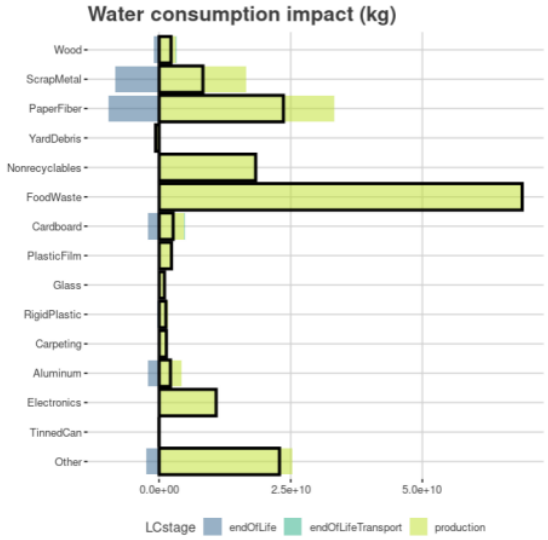






Example of Material Impact Calculator Output:





** Example from Oregon's Department of Environmental Quality*