

White Paper

What is Sustainable Materials Management?

Sustainable Materials Management (SMM) is the systematic approach of using and reusing materials in the most sustainable way across the entire lifecycle of a particular product or material. It represents a change in thinking from the current integrated waste management system about the use of natural resources and environmental protection.¹

Traditionally products follow the same path. Materials are harvested and used to make a product that is then sold to consumers, used by consumers and then enters the end-of-life management stage, like disposal or recycling. Environmental protection is focused on the end-of-life stage like disposal. For example landfills are required to meet regulations to ensure protection of groundwater. Products are encouraged to be collected for recycling but the current integrated-waste management system does not measure the environmental impacts of these products nor does it focus on anything but the end-of-life stage. SMM is different. It looks at each stage of a product's lifecycle and measures the resources needed as inputs to make, distribute and use the product. It also reviews the types of outputs generated during each stage of the lifecycle. Outputs like energy and water use are measured to determine the overall impact on the environment for that particular stage and that particular product.

When examining a product's lifecycle all the stages of a products life from the harvesting of natural materials through the manufacturing process to distribution, consumer use and finally, end-of-life management are analyzed to identify those materials and processes that present the greatest environmental impacts.

When examining a material's life cycle all stages are considered, as shown in **Figure 1** below. Material extraction, the manufacturing process, the distribution supply chain, consumer usage and end-of-life management are all analyzed to identify those materials and processes that present the greatest environmental impacts. By implementing SMM, a framework develops to identify opportunities to reduce environmental impacts, conserve resources, and reduce costs. Next steps can involve educating consumers on these **impacts** and how it affects them, working with producers to utilize resources more sustainably and developing policies that will reduce costs, increase technical advances and lessen the impact on the environment.

This approach allows a regulating agency to develop policies, goals and metrics that can focus on reducing specific environmental impacts of a product through its entire life cycle. Impacts including energy use, water use, greenhouse gas emissions, carcinogens or a host of other human health and environmental impacts can be used as a priority for reduction or as a measure of program success. Related additional impacts can also be considered including job creation, extension of landfill life and producer cost savings.

¹ United States Environmental Protection Agency (US EPA). (2018, August 14). "What is Sustainable Materials Management?" Retrieved September 28, 2018 from <https://www.epa.gov/smm/sustainable-materials-management-basics>

Figure 1



Sustainable Material Management's Life-cycle Perspective.
United States Environmental Protection Agency (US EPA). (2018, August 14) Retrieved October 25, 2018 from <https://www.epa.gov/smm/sustainable-materials-management-basics>.

Federal Direction

The U. S. Environmental Protection Agency (EPA) is encouraging state agencies to integrate material management approaches in existing government programs and educate the public on the benefits of the SMM approach and how it differs from the current system. Materials management is different from current waste management approaches in several important ways:

- Materials management seeks the most productive use of resources, while waste management seeks to minimize and/or manage wastes or pollutants.
- Materials management focuses broadly on impacts and policies relating to all the lifecycle stages of a material or product—including such upstream considerations as using less material, using less environmentally intensive materials, or making products more durable, as well as downstream solutions such as reuse and recycling.
- Waste management usually focuses only on what to do with wastes once they are generated. Materials management is concerned with inputs and outputs from/to the environment, including use of materials, energy and water, plus multiple environmental impacts.
- Waste management is concerned mainly with outputs to the environment (air, water, land) and usually only those from waste and only where the waste is managed. The goal of materials

management is overall long-term system sustainability, while the goal of waste management is often focused on managing a single set of environmental impacts.

- Materials management counts as responsible parties all those who are involved in the life cycle of a material or product, including industry and consumers. In contrast, waste management usually counts as responsible parties only those who generate waste.²

SMM provides a new way to look at material recovery and address issues prevalent in the current waste system. By utilizing resources more sustainably, reducing the amount of materials used and decreasing the overall impact on the environment, materials management can provide an approach to conserve and enhance natural resources for future generations.

State-Level

Products created and used in Iowa originate from both renewable and nonrenewable sources and follow divergent paths resulting in differing end-of-life-management. Every phase these products encounter requires inputs like energy and/or water and each stage impacts the environment.³ SMM works to reduce these environmental impacts throughout the product's lifecycle from creation to end-of-life management. Adopting this approach will allow the state to measure a specific products influence on the air, water and land and develop corresponding policies and goals to limit its impact.

The following are a few ways Iowa can utilize a materials management approach:

1. Employ existing waste sort reports to identify the amounts and types of products currently being landfilled and determine which products and materials should be targeted for a life cycle analysis. The results of which will determine the highest and best use for each product by developing policies that feature both short-term and long-term goals that increase collection and processing of these targeted materials and reduce environmental impact.
2. Review existing environmental programs to determine if materials management elements should be added or create new programs that promote life-cycle materials management more fully.
3. Promote greener products, product stewardship and working directly with producers to lessen the environmental impact of their products and processes and save costs.
4. Expand research and innovation support programs to promote materials management.
5. Support and reward state and local champions for materials management and encourage collaboration.⁴

SMM measures the actual environmental impact of products and processes and promotes the using and reusing of materials in the most sustainable way. Any effort to implement materials management in Iowa will require a coordinated effort to engage a diverse group of stakeholders. The state working with these stakeholders will develop, prioritize and select environmental metrics for regulatory development, permitting and environmental programs that promote education, reduce producer costs and improve the Iowa environment.

² EPA. "Sustainable Materials Management: The Road Ahead." Page 14-15. June 2009.

³ EPA. "Sustainable Materials Management: The Road Ahead." Page 4. June 2009.

⁴ EPA. "Sustainable Materials Management: The Road Ahead. Recommendations. Page V. June 2009.