

GoGreen 2016 Abstract for Speakers

Title (20 words maximum): Optimizing resource and energy recovery for materials and waste management

Session Type: Case Study/Speaker

Abstract (500 words maximum – Currently 499)

Decisions affecting materials management today are generally based on cost and a presumption of favorable outcomes without an understanding of the environmental tradeoffs. However, there is a growing demand to better understand and quantify the net environmental and energy trade-offs in setting waste management goals and priorities at a state and local level. In 2012, EPA's Office of Research and Development released the MSW decision support tool (MSW-DST) to help identify strategies for more

sustainable waste management. Depending upon local infrastructure, energy grid mix, population density, and waste composition and quantity, the most sustainable strategies will vary in regards to the net life cycle assessment (LCA) impacts and cost. Users of this tool are able to identify opportunities to reduce carbon emissions and air criteria pollutants through optimization of resource and energy recovery from waste. The tool evaluates the material and energy flows from point of collection throughout the system (as shown in the figure) to aid in materials management decision-making, planning, and policy development.



Over 400 downloads of the MSW-DST have occurred since 2012 by state and local government (21%), Non-governmental organizations (10%), academia (25%), consultants (8%), federal government and military (11%), and industry (25%). Universities such as Arizona State University, University of California at Berkeley, University of Colorado at Boulder, Harvard University, University of Virginia at Charlottesville, and Yale University are using it as an education tool across multiple disciplines and curricula, including waste and materials management, industrial ecology, environmental engineering, and LCA. To date, over 150 peer-reviewed publications have resulted from use of the tool.

Since the development of this tool, research has been conducted by North Carolina State University to update and add process models that will more accurately reflect U.S. technology and the range of practices available to manage waste. The second generation tool will provide estimates of metrics for cost, LCA environmental and energy tradeoffs, and societal aspects such as land usage and population density. Cost is based on full cost accounting – as was done in the first version of the tool – in addition to estimates of carbon, energy, waterborne pollutants, air criteria pollutants, and other life cycle environmental tradeoffs. A multi-variate optimization algorithm will be embedded in the tool to facilitate dynamic analysis reflecting evolution of the waste composition and management practices over time. Updates will be made to the user interface based on feedback from the current user group and ability to answer community-specific questions. Advanced visualization and interpretation features will be added to better communicate results with stakeholders (e.g., the public, city officials, NGOs, businesses) to better advance more sustainable materials management.

Susan Thorneloe will explain how this tool is currently in use and can help communities identify more sustainable solutions that optimize resource and energy recovery from waste. Oregon is a leader in the U.S. in the use of LCA. State Bill 263 will further Oregon's leadership, and create additional opportunities for LCA to find more efficient and effective environmental management solutions that minimize discards and maximize energy and resource recovery from waste.

Relevant Audience: Portland officials, local government, businesses interested in effective waste disposal

Learning Objectives:

1. Attendees will learn about availability of EPA tool and how it can be used to identify more sustainable solutions for managing municipal solid waste
2. Attendees will learn about a newer version of the tool under development and the opportunity to provide input as the next generation tool is developed
3. Attendees will learn about range of technologies that can be evaluated and available metrics to compare alternatives using optimization tools that reflect local priorities and infrastructure

Speaker Details

- Susan Thorneloe, Senior Scientist in EPA's Office of Research and Development
- Email Address: Thorneloe.Susan@epa.gov
- Phone Number: (919) 541-2709
- Recent Speaking Experience:
 - GreenBiz 2016 in Phoenix, Arizona
 - Life Cycle Assessment and Other Assessment Tools for Waste Management and Resource Optimization, June 2016 in Calabria, Italy
- Bio: Susan Thorneloe is an international expert on holistic evaluation of materials and waste management. She has over 30 years of experience with EPA in a wide array of research projects. She led the development of a Decision Support Tools for materials and waste management to quantify life cycle environmental tradeoffs and to facilitate management of debris and waste from natural and intentional disasters. Susan is also the technical lead for the development, validation, application, and deployment of recently adopted U.S. EPA leaching tests that are referred to as the Leaching Environmental Assessment Framework (LEAF). The LEAF test methods were developed to evaluate the use of industrial by-products (such as fly ash) for beneficial use and to evaluate new treatment and disposal technologies for hazardous waste. Susan has co-authored over 150 publications including a 2009 publication comparing the life cycle emissions of energy production for burning and burying waste. She serves on multiple international scientific advisory boards and editorial boards. Susan has been with the US EPA since 1984 and has led the application of life cycle assessment to identify more efficient and effective environmental management policies. Susan earned a Bachelor of Science in Chemical Engineering from North Carolina State University and a Masters of Environmental Management Leadership from Duke University.

Is EPA a Women's Business Enterprise (WBE), Minority Business Enterprises (MBE) or Disadvantaged Business Enterprise (DBE)?

- No