Comparing the Lifecycle Impacts of Solid Waste Management Strategies

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Product Stewardship Institute, Inc.
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And a special thank you to

John Waffenschmidt

VP of Environmental Science & Community Affairs
Comparing Life Cycle Impacts of Solid Waste Management Strategies

Introduction

June 5, 2013

By John G. Waffenschmidt
Environmental Scientist
Certified Ecologist
Definition of LCA

ISO 14040 and ISO 14044 – International Standards for Life Cycle Assessment

Guidelines for Life-Cycle Assessment: A 'Code of Practice', Society of Toxicology & Environmental Chemistry, SETAC

ISO = International Organization for Standardization
Definitions

• **Life Cycle Analysis (LCA) (Assessment)** is a process to evaluate the environmental burdens associated with a product, process, or activity by quantifying energy and materials used, wastes released; and to identify and evaluate opportunities to affect environmental improvements. The assessment includes the entire life cycle of the product, process or activity, encompassing, extracting and processing raw materials; manufacturing, transportation and distribution; use, re-use, maintenance; recycling, and, where appropriate, final disposal. (Modified from *Guidelines for Life-Cycle Assessment: A 'Code of Practice',* Society of Toxicology & Environmental Chemistry (SETAC), Brussels)

• **Municipal Solid Waste Decision Support Tool (DST)** A web accessible LCA based analysis designed to assist solid waste planners in evaluating the costs and environmental aspects of Integrated Solid Waste Management.
Why Covanta elected to sponsor?

- LCA is one of the tools to identify more sustainable solutions
- The DST allows for solid waste decision making that incorporates the 3 pillars of Social, Environmental, and Economics in an open and transparent fashion
- To widen the knowledge base regarding LCAs and the DST.
A Few Caveats

• Methodologies used in life cycle analysis need to be carefully considered and follow standardized protocols such as the ISO

• As with most studies, assumptions can drive results

• Certain products/processes may require special consideration:
  – Toxic Products
  – Health and Safety Concerns
  – High value products (rare metals)
Spring 2013 Webinar Series

- Supply Chain
- Case Studies
- Extended Producer Responsibility
- Fair Labor
- Certifications
- Voluntary vs. Regulatory
- Eco-Design
- Retail
- Batteries
- Mattresses
- Paint
- Lifecycle Assessment
- Corporate Social Responsibility
• Setting and Sharing Standards for Corporate Social Responsibility: A Key Aspect of Product Stewardship – June 20, 1 p.m. ET
  – Dan Viederman | CEO | Verité
  – Scot Case | Director of Market Development | UL Environment
  – Michele Whyle | Global Head of Sustainability | 3M

www.productstewardship.us/webinars
Who is the Product Stewardship Institute?

- Non-profit founded in 2000
- Memberships
  - 47 States
  - 200+ Local governments
- Partnerships (75+)
  - Companies
  - Organizations
  - Universities
  - Non-US Governments
- Board of Directors: 7 states, 4 local agencies
- Advisory Council: Multi-stakeholder (14 members)
How to Participate Today

To ask a question (verbally) via phone or VOIP ... please use the hand-raising function.

To type in a question, use the Question tab.

Technical Difficulties?
Dial 800.263.6317
Expert Speakers

Susan Thorneloe, Senior Chemical Engineer, Air Pollution Prevention and Control Division, U.S. EPA

Keith Weitz, Director, Sustainability and Environmental Assessment Program, RTI International
The Municipal Solid Waste Decision Support Tool

S. Thorneloe, U.S. EPA
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Resource conservation challenge (RCC)

• Goals
  – Prevent pollution and promote recycling and reuse of materials
  – Reduce the use of chemicals at all life-cycle stages
  – Increase energy and materials conservation

• 2020 Vision
  – Reduce wastes and increase the efficient sustainable use of resources

RCC encourages a move from “waste” management to “materials” management
250 million tons of MSW as of 2008 (EPA, 2009)

**Composition**
- Paper: 31%
- Food scaps: 13%
- Yard trimmings: 13%
- Rubber, leather, and textiles: 8%
- Metals: 8%
- Plastics: 12%
- Wood: 7%
- Glass: 5%
- Other: 3%

**Management**
- Discards to landfill: 54%
- Recovery for recycling: 24%
- Recovery for composting: 9%
- Combustion with energy recovery: 13%
Flow diagram for materials and waste management

MSW MANAGEMENT ACTIVITIES

- Collection
- Compost
- Landfill

Energy Offset Analysis = Purchased energy & emissions – Generated energy & emissions offset

Materials Offset Analysis = Recycle process energy & emissions - Virgin process energy & emissions

Air Emissions
Water Releases
Solid Waste

Energy
Materials

Municipal Solid Waste

Electricity
Gas
Heat
Compost
Recyclables
Comparison of product & waste LCA

Boundary for Product LCA

Boundary for Integrated MSW Management

Boundary for LCA of MSW

Overview of the Municipal Solid Waste Decision Support Tool (MSW-DST)

- Over ~150 studies conducted for regional, community, and national assessments of materials and discards management
- Assists in decision making to compare existing and new strategies by calculating the full costs, energy, and life-cycle environmental tradeoffs
  - Can tailor defaults to reflect differences in multiple sectors (i.e., residential, commercial, suburban/rural/urban)
  - Can identify optimal solutions with respect to cost or environmental emissions such as GHGs, energy, waste diversion targets
  - Can conduct sensitivity and uncertainty analysis on key model inputs
MSW-DST is being used for developing more holistic solid waste management strategies

• Computer software provides scientific comparison of options for materials and discards management *that is credible, objective, and transparent*. The DST includes optimization software so that strategies can be developed to minimize life-cycle environmental tradeoffs, cost, and energy consumption. The DST
  – provides analysis of up to 26 individual materials (i.e., steel, aluminum, glass, paper, plastics)
  – considers differences in a region’s population density, energy offsets, infrastructure, proximity to facilities and waste composition, collection, and transport
  – calculates change in cost and environmental emissions as additional materials are included in a recycling program.

• Options can be interrelated:
  – Recycling vs waste combustion for paper and plastics
  – Composting vs landfill gas to energy for food or yard waste
Summary

- **DST helps support the goals of the RCC moving us towards materials management**
  - Identifies more efficient and sustainable options
  - Provides data needed to benchmark current operations and to identify options to improve environmental performance
  - Provides data to communicate environmental improvements

- **DST has been used in over 150 studies helping to inform management decisions**

- **Web-accessible DST is available for use**

- **Next portion of webinar is live demonstration**
Questions/Discussion

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For the Audience:
2 ways to ask questions

• **Spoken:** Use the “hand-raising function” on your control panel so we can unmute you.
  – Speak through a microphone on your computer OR
  – Be dialed-in through a telephone (and enter your Audio PIN)

• **Written:** Write your question in the Question box at any time. Please tell us to whom you are addressing your question.
Speaker Contact Information

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