Zero Waste: Is it an End-of-Pipe Dream?

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Zero Waste

- "Zero Waste" *generally* means that all discarded materials become resources for others to use. Achieving Zero Waste means designing and managing products and processes to reduce the volume and toxicity of waste materials, conserve and recover all resources, and not burn or bury them.[1]

[1] Zero Waste International Alliance, http://zwia.org

Zero Waste in Industry

- At the end of 2011, more than half of General Motor's worldwide manufacturing sites were ***zero waste to landfill.***
  - GM's plants reused or recycled more than 97% of materials that would otherwise be sent to landfills, with remaining 3% waste-to-energy.
  - GM's first U.S. facility achieved landfill-free status in 2005.

  http://www.gm.com/vision/environment1/quest_for_zero_landfill.html
- Proctor&Gamble's first manufacturing facility in the U.S. achieved zero waste in December 2010.
  - 60% recycled, remainder waste-to- energy.

  http://news.pg.com/press-release/pg-corporate-announcements/pg-announces-its-first-north-american-manufacturing-plant-a

July 2011: 10 of 14 Honda manufacturing plants in North America are **zero waste to landfill**. Remaining 4 are “virtually zero”.

http://www.honda.com/newsandviews/article.aspx?id=6126-en

Zero Waste in Industry (Cont.)

- As of February 2001, all 11 of Ricoh's North American manufacturing facilities achieved **zero waste to landfill.**
  - Each facility given flexibility to design their own system to achieve the goal in 22 months.
  - Included both industrial and general waste.
  - Facilities manufactured diverse products: office machines, printed circuit boards, toner cartridges, toner and developer, thermal sensitive paper, thermal transfer ribbon.
  - http://www.rei.ricoh.com/env_activities0landfill.html

Zero Waste: How they did it

- Environmental Management Systems (EMS) platform for establishment and implementation of zero waste programs with objectives and measurable targets.
- ***5Rs***
  - ***R****efuse (to buy what becomes waste, such as non-recyclable packaging) - standardized stretch film from suppliers makes it easier to recycle*
  - ***R****eturn (materials to suppliers)*
  - ***R****educe (waste at source through improved manufacturing yield)*
  - ***R****e-use (anything possible) – office supplies*
  - ***R****ecycle (anything possible) – toner waste sent to fuel blend for cement manufacture*

Zero Waste: How they did it

- Green Purchasing… examples
  - Required suppliers to provide re-usable packaging.
  - Changed from drums to bulk shipment and storage of some raw materials (resin), eliminating waste drums, pallets, and stretch wrap.
- Employee Involvement… examples
  - Improved awareness via a newsletter: “Zero in on zero waste”.

DOE Drivers Towards Zero Waste

- **Environmental Management System:** Pursuant to DOE Order 436.1 *Departmental Sustainability*, DOE sites must
  - use EMS as platform for establishment of programs with objectives and measurable targets that contribute to the Department meeting or exceeding its sustainability goals, including its waste reduction goal. [EMS must be certified to ISO 14001 standard or self-declared to be in conformance]

- **Sustainable Acquisition Contracting:** Pursuant to Executive Order 13514 and the DOE's Strategic Sustainability Performance Plan (SSPP), DOE must
  - ensure "95% of new contract actions...require the supply or use of products and services that are energy efficient (ENERGY STAR or FEMP-designated), water efficient, bio-based, environmentally preferable (including EPEAT-registered products), non-ozone depleting, contain recycled content, or are **non-toxic or less toxic alternatives"**.

DOE Drivers Towards Zero Waste (Cont.)

- **Electronic Stewardship**: DOE goal of 95% for purchases of electronics products to be designated EPEAT-registered.
  - DOE goal of increasing the quantity of electronic assets disposed through sound disposition practices such as re-use and recycling.
    - Average reported for FY 2011: 97%.
- **Recycling:**
  - DOE goal in SSPP: 50% recycling rate for construction and demolition (C&D) wastes and municipal solid wastes (MSW).
    - Average reported for FY 2011: 88% for C&D and 48% for MSW .

How Some DOE Sites are Approaching Zero Waste

- National Renewable Energy Lab is the closest to near-zero waste of any DOE site with a two-pronged approach http://www.nrel.gov/sustainable_nrel/
  - Implement 4 Rs for waste reduction throughout site:
    - **Reduce**; **reuse**; **recycle**; **re-buy** products with recycled content, biobased , etc (sustainable acquisition)
    - 2011: Recycled 87% C&D waste; 87% MSW; 100% electronics
  - Establish a carbon-neutral campus:
    - Scope 1 emissions of GHG decreased 25%; Scope 2 emissions decreased 100%; Scope 3 reductions still in progress

Some DOE Sites Nearing Zero Waste

	C & D Waste Recycled	MSW Recycled	Electronics ReUsed/ Recycled
LLNL	86%	63%	100%
Hanford	99%	33%	100%
SLAC	98%	53%	100%
Y-12	58%	50%	98.6%
SNL-NM	92%	51%	100%
LANL	91%	58%	100%
SNL-CA	90%	75%	100%
PNNL	96%	53%	100%

FY 2011 Data

Discussion and Questions

- DOE has begun zero waste thinking with sustainable acquisition and re-use and recycling of C&D, MSW, and electronics waste.
- Questions for discussion
  - Is “zero waste to landfill” a goal we want to set?
  - What are the next waste streams to tackle?
  - How can we improve our disposition options?
  - Others?

THANK YOU!

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