Life Cycle Inventory of Polystyrene Foam, Bleached Paperboard, and Corrugated Paperboard Foodservice Products

(2006 Foodservice Packaging LCI)

by Franklin Associates, Ltd.

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REPORT OVERVIEW & HIGHLIGHTS

OVERVIEW

The full 2006 Foodservice Packaging LCI includes:

- A review of hot and cold beverage cups, sandwich "clamshells" and plates made from three materials: polystyrene foam, bleached paperboard and corrugated paperboard.

- A cradle-to-grave comparative analysis of the energy and environmental attributes of foodservice packaging product systems, including an analysis of secondary packaging used in the shipment of these finished products. The results are summarized in three key areas:

    - Chapter 2: Evaluates the production of foodservice materials, the fabrication of foodservice packaging products (for the range of product weights available), and end-of-life disposal by landfilling and waste-to-energy combustion.

    - Chapter 3: Examines the contribution of secondary packaging to the overall environmental profiles of the average-weight products reviewed.

    - Chapter 4: Assesses the reduction in environmental burdens for average-weight post-consumer foodservice products modeled on a hypothetical recycling or composting rate of 2%.

- Information that expands on a prior foodservice packaging LCI (Resource and Environmental Profile Analysis of Foam Polystyrene and Bleached Paperboard Containers: Final Report, Franklin Associates, Ltd. 1990), which also examined

polystyrene foam and bleached paperboard foodservice packaging (cups, plates, and clamshells).

HIGHLIGHTS

The 2006 Foodservice Packaging LCI evaluated products across the full range of resource and energy use, solid waste generation, atmospheric emissions and waterborne emissions. Comparisons between systems were summarized for four key performance areas: energy, solid waste (weight), solid waste (volume), and greenhouse gas emissions.

- **In the four key areas, the LCI study demonstrates that polystyrene foam products in most cases have environmental burdens that are lower than or comparable to the alternative products studied.** These include plastic-coated paperboard cups for hot beverages (both with and without a corrugated sleeve), plastic-coated and wax-coated cups for cold beverages, and fluted paperboard clamshells (p. ES-16; pp. 2-60 through 2-63).

- The study also compared 9-inch high-grade foam polystyrene plates with 9-inch high-grade molded pulp plates. Across the four key results categories, the two materials proved to have roughly equivalent environmental performance, either because the differences in performance were not statistically significant or because the differences between comparative products in a particular performance category were balanced or "canceled out" by complementary differences in other categories. For example, when measured by *weight*, the amount of solid waste generated by the average molded pulp plate was significantly greater than for the average polystyrene foam plate. When measured by *volume*, however, the waste from the average polystyrene foam plate was higher than for the molded pulp plate.

- The report will disappoint gourmet coffee customers who believe they are doing something "good for the environment" by choosing to use two plastic-coated paperboard cups for one hot beverage instead of a single polystyrene foam cup. According to the data (derived from pp. 2-7, 2-23, 2-43, and 2-60) for the average plastic-coated paperboard cup and average polystyrene foam cup, this practice of "double-cupping" results in over twice as much energy and solid waste volume, over five times as much solid waste by weight, and nearly twice as much greenhouse gas emissions as the use of a single polystyrene cup.

- The 2006 Foodservice Packaging LCI assessed the potential reduction in environmental burdens for average-weight post-consumer foodservice products at modeled recycling rates of 0% and 2%. National statistics on foodservice recycling (all materials) and composting rates were researched for this study, but no reliable quantitative data were found. Franklin Associates Ltd., which provides the U.S. Environmental Protection Agency with annual municipal solid waste statistics for solid waste management, including recycling and composting, has documented that the current national average rates for the recycling and composting of foodservice products are very low (p. 4-1).

- Looking across results for polystyrene products in all performance categories, the report

concluded that achieving a *recycling*[1] rate of 2% would reduce the total energy and environmental impacts of these products by less than 1%. Some of the savings in virgin material production burdens would be offset by the burdens of collecting and reprocessing post-consumer material (p. 4-26).

- Looking across results for paper-based products in all performance categories, the report concluded that achieving a *composting*[2] rate of 2% would reduce the total energy and environmental impacts of these products by less than 2% (p. 4-26).

An independent peer-review panel found that the 2006 Foodservice Packaging LCI was completed in accordance with the International Standards Organization (ISO) 14040 series of life cycle assessment standards (p. PR-3). The peer review panel's report is included in the full 2006 Foodservice Packaging LCI available on www.polystyrene.org.

For more information, contact:

Mike Levy
Senior Director, Polystyrene Packaging Council
American Chemistry Council
(703) 741-5647
michael_levy@americanchemistry.com

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http://www.polystyrene.org*, *http://www.americanchemistry.com

Founded in 1988, the Polystyrene Packaging Council is part of the American Chemistry Council and represents companies involved in the manufacture, use and reuse of polystyrene resin and polystyrene products.

[1] For polystyrene foodservice products, recycling is evaluated as an open-loop system, where a product made from virgin material is manufactured, recovered for recycling and manufactured into a new but different product that is generally not recycled. This extends the life of the initial materials, but only for a limited time.

[2] Composting is evaluated for paper-based foodservice items. The burdens for the production of the material that is composted are divided between the original use as a foodservice product and the second use as compost. Unlike recycling, where material must be reprocessed into resin and then refabricated to form a second product, the composting step is the fabrication step for the second product (i.e., compost). Thus, the burdens for composting are allocated entirely to the compost product.