

U.S. Department of Commerce  
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Sector Focus Study Series



# **Packaging Machinery: Sustainability and Competitiveness**

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## Executive Summary

U.S. manufacturers of packaging machinery can compete successfully in both domestic and international markets by pursuing business strategies based on sustainability. Many innovative U.S. original equipment manufacturers (OEMs) of packaging machinery are already doing this. The sustainability strategies identified in this report, “Packaging Machinery: Sustainability and Competitiveness,” enable U.S. packaging machinery OEMs to target the largest cost per value component of the global packaging market: packaging materials, which are worth an estimated \$475 billion annually.<sup>1</sup>

The principal findings of this study include the following:

- Packaging machinery OEMs operate in a global packaging supply chain that faces increasing demands for sustainability.
- Retailers, in particular, play a key role in driving demand for more sustainable packaging throughout the supply chain, even though they generally are not end users of packaging machinery.
- Reducing customers’ consumption of packaging materials and ancillary products is the common objective of packaging machinery OEMs that have incorporated sustainability into their core business strategy.
- Reducing customers’ packaging-related consumption of energy and water and emissions of greenhouse gases (GHGs) are also key components of successful sustainability strategies.
- Opportunity and innovation drive a successful business strategy based on sustainability for packaging machinery OEMs.
- OEMs with sustainability strategies frequently identify and pursue opportunities for innovation as a result of their ongoing roles as technology suppliers to their customers.
- There is no appreciable demand at present for packaging machinery with sustainable characteristics, as such; end users’ procurement practices for packaging machinery do not yet reflect senior management’s emphasis on sustainability.
- OEMs are likely to begin encountering demand for packaging machinery with sustainable characteristics in the near future, as their customers aggressively seek to reduce energy and water use, GHG emissions, and waste throughout their manufacturing operations.
- The lack of definitions, certifications, or standards for sustainability in packaging machinery appears to contribute to the lack of demand.
- European laws, regulations, and standards concerning packaging and machinery are shaping the world market.
- Each OEM in this study has its own distinctive approach to sustainability, but all of them focus their efforts on technologies and services to reduce customers’ consumption of the following:
  - Packaging materials

- Ancillary products, especially inks and adhesives
- Energy and water in selected applications
- The cost savings that a focus on materials offers manufacturers of consumer packaged goods (CPG) are what make these OEMs and their products highly competitive.
- Sustainability strategies in the packaging machinery industry typically are oriented around one or more of the following:
  - Automation and integration services and technologies, including remote monitoring
  - Reduction of energy consumption connected with ancillary products
  - Development of innovative ancillary products
  - Development of new packaging systems
- OEMs in this study use one of several recognized methodologies to measure the benefits conferred by their sustainability strategies. These include Life Cycle Assessment (LCA), Total Cost of Ownership (TCO), or Overall Equipment Effectiveness (OEE).
- OEMs in this study have frequently formed strategic relationships with converters or other suppliers of packaging materials or ancillary products.

OEMs of all sizes, involving a variety of business models, are enjoying competitive success with business strategies based on sustainability. In doing so, they are aligning themselves with many others in the packaging supply chain that have also embraced sustainability, including many of their customers. They are also preparing for the day when end users begin demanding more sustainable packaging machinery.

(Endnotes)

1 World Packaging Organization, "Position Paper: Market Trends and Developments," World Packaging Organization, Stockholm, 2008, p. 1.

## **Delkor Systems, Inc.**

Delkor Systems, Inc., of Minneapolis, Minnesota, manufactures automated end-of-line, secondary packaging equipment. The company's products include case and tray packers; top-load carton formers, loaders, and closers; shrink bundlers; and robotic systems. A small business, Delkor has 100 employees and approximately \$40 million in annual sales.<sup>1</sup>

Delkor's management began investing in the late 1990s in the development of new packaging technologies to reduce the use of corrugated board in packaging. According to Delkor president Dale Andersen, the management asked themselves, "How can we change the package itself?" They realized that there was a "tremendous opportunity in reducing the corrugated that goes into packaging." Since then, Delkor has been awarded seven U.S. patents for new shipping package concepts that specifically provide greater efficiency in using corrugated board to transport product to market. The most successful new concept was a pad-shrink packaging system, Delkor's Spot-Pak<sup>®</sup> package, which is an alternative to the traditional corrugated box or regular slotted container (RSC) case.<sup>2</sup> This system is now widely used for consumer-packaged food products in a variety of package formats for plastic cups and bottles, paperboard containers, and other products.

As an alternative to the RSC—what a layperson might describe as a "cardboard box"—Spot-Pak<sup>®</sup> uses a temporary bonding adhesive to stabilize containers positioned on a flat corrugated pad. Containers can

be stacked several layers high, according to the end user's requirements, with a corrugated pad between each layer. The final assembly is then shrink-wrapped in polyethylene film into a single bundle for shipping.<sup>3</sup>

To document the environmental impact of Spot-Pak®, Delkor commissioned Allied Development Corp., a specialized consulting firm, to conduct an LCA. According to the results of that study, which was made public by Delkor and its customer, Smart Balance, use of the company's pad-shrink technology could reduce the amount of packaging waste (by weight) to be recycled or deposited in a landfill by 82 percent, compared with standard corrugated RSCs. Reduced raw material input and material handling, in turn, could cut the use of process energy by 62 percent, largely through reduced transportation costs for polyethylene film compared with corrugated board. GHG emissions were calculated to be 55 percent lower because of reduced energy consumption during transportation and material processing and from reduced use of raw materials. Finally, energy consumption from transporting packaged goods to the point of sale was reduced by 11 percent because of greater product density in shipping.<sup>4</sup>

Andersen credits lower costs and rapid return on investment (ROI) with helping Delkor compete successfully in both domestic and international markets against other manufacturers, especially European companies with a strong historic presence in the Western Hemisphere. "The big benefit for our customers is we're going to achieve at least a 50 percent reduction in packaging," he said, as well as 8 to 12 percent higher product density on shipping pallets. Because of the lower costs that it offers—which Delkor asserts may be as high as \$500,000 per installed system per year—Spot-Pak® also provides an ROI of as little as one to two years.<sup>5</sup>

According to Delkor, there will be nearly 200 SPOT-PAK® systems installed in the United States, Canada, and Mexico by the end of 2010. The company reports that its equipment is used to package as much as 50 percent of the cottage cheese, sour cream, and yogurt products in North America. Major customers include the dairy manufacturing division of Safeway Stores and Smart Balance, Inc., which manufactures a national brand of buttery spread. The company has supplied a number of packaging lines to Mexico's largest dairy company, Grupo LaLa.<sup>6</sup>

Delkor also contends that its success with Spot-Pak® has led to other business opportunities. It recently introduced Tray-Pak®, a bundled shipper similar to Spot-Pak®, which converts into retail display trays once the film shrink wrap is removed. Although the company is not a converter, it can provide customers with procurement services for materials (corrugated pads and trays, polyethylene film and specialized adhesives) that work most effectively on its equipment. In addition to its full line of carton forming, loading, and closing equipment, Delkor manufactures robotic packaging solutions based on FANUC LTD (Japan) and KUKA Robotics (Germany) technologies.

(Endnotes)

1 Andrew Joseph, "Straight Down the Line," Canadian Packaging, April 2008. 2 Peter Fox, "Quantifying the Environmental Impact of Secondary Packaging," Delkor Systems, Inc., Minneapolis, MN, p. 4. 3 Ibid., p. 5. 4 Ibid., p. 6-9. 5 Andersen, Interview. 6 Andersen, Interview.



packaging **innovation** at work.