Why Reusables?

Using Plastic Reusable Packaging to Optimize Your Supply Chain

Executive Overview

Today's supply chains are becoming more and more complex. With shorter product life cycles and rising customer demands, as well as the increasing spread of distribution, manufacturing, sourcing and engineering functions around the world, companies are seeking to successfully manage their supply chain, for improved profitability. [1]

The good news: Those who have mastered supply chain excellence can experience up to 73% greater profit margins than other companies. [2]

Plastic reusable packaging improves the flow of product all along the supply chain in many industries, to reduce total costs and achieve sustained optimization.

Whether shipping plastic bottles to a soft drink bottler for filling; trim parts to an automotive manufacturer; electronic components to a computer manufacturer or consumer goods to the mass retailer, plastic reusable containers and pallets will help move product faster, better, safer and more cost effectively.

Plastic reusable packaging is integrated in a single operation or entire supply chain to take the place of single-use corrugated shipping and storage boxes and limited-use wood pallets. Users experience a rapid return on their packaging investment…many times in 6-18 months or less.

U.S. firms will spend on average $4.8 billion a year through 2008 to tune their supply network processes. [3]

In this paper we will look closely at a basic supply chain model and address how companies, regardless of industry, can use a global plastic reusable packaging program to improve financial performance.

Why Reusables? *Using Plastic Reusable Packaging to Optimize Your Supply Chain*

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What is plastic reusable packaging?

Plastic reusable packaging products are used to move, store and distribute product within a single operation or entire supply chain. From raw material to finished goods, plastic reusable packaging safely and efficiently moves material/product along different points of the supply chain and ultimately to its destination. It is ideal for multiple trip applications in a closed-loop environment or well-managed supply chain. It can also be used effectively in a managed open-loop system, with reverse logistics in place to return empty containers or pallets for re-use or replenishment. Products can include:

- Hand-held containers, bins, boxes or totes
- Pallets, slip sheets, top frames and top caps
- Divider sheets
- Bulk containers, bins, boxes or totes
- Protective interior dunnage (custom)
- Storage containers and metal systems
- Custom designed and engineered packaging

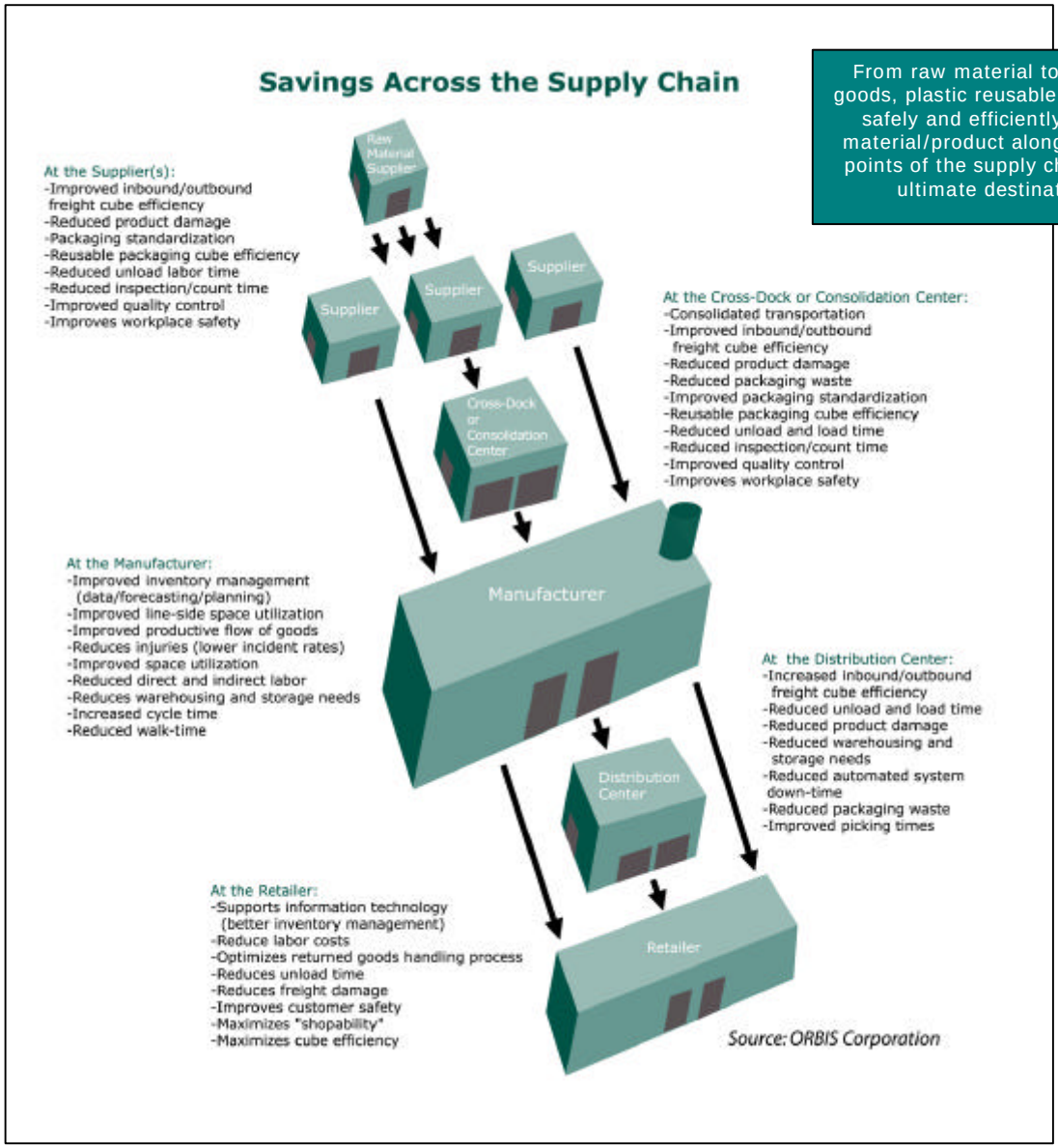
By design, plastic reusable packaging products offer durable, rigid construction; contoured surfaces; easy-to-grasp handles; high levels of recyclability and vast identification options. These dimensionally consistent containers and pallets are easy to handle and interface effortlessly with all types of high-speed automated equipment. In fact, some products are specially designed to be "hands-free" and solely handled by robots or conveyors. Plastic packaging has no nails or loose corrugated flaps to halt a high-speed system. And, in high-volume industries, hundreds of thousands of dollars are lost when an automated system is stopped.

They are available in standardized sizes, so parts, product and materials can be packed/loaded to optimize the packaging, resulting in more product being manufactured and shipped in a shorter time.

A study by Michigan State University (MSU) found that actual savings from reusable packaging, in terms of cash flow, exceeded forecasts for four automotive manufacturers with medium-to-high usage of reusable containers. One company saved $10.9 million a year over a four-year period after a $16.3 million investment in reusable packaging, including a 35% reduction in truckloads sent to landfills. Another firm estimated its savings from reusable packaging at $2.3 million. [4]

Plastic Reusable Packaging and the Supply Chain

Essential to supply chain performance is improving the effectiveness of materials management, or the flow of product that begins with the design and purchase of the product/material and continues with the work-in-process, warehousing, shipping and distribution activities required to output it in its finished state.[5]



To achieve maximum benefit, the collective and cumulative impact across the entire supply chain must be considered. Doing so will help identify opportunities for savings and efficiencies that may not be considered during simple site-specific or department-specific improvements.

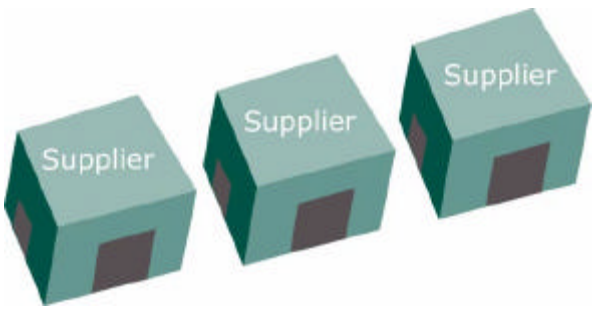
Each supply chain is different and has varying levels of complexity. Business leaders must analyze their entire supply chain to identify waste and non-value added activities, then implement process and cultural change gain financial and operational benefits.

They won't be alone. Ninety-two (92%) of supply chain executives cite operational efficiency as their top priority. [3] This efficiency can be achieved with a well-planned reusable packaging program.

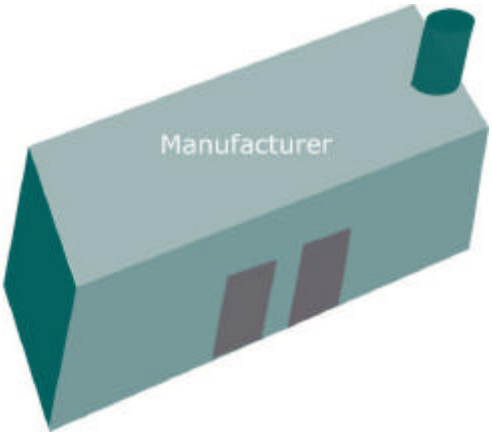
Plastic reusable packaging improves the flow of product all along the supply chain, to reduce costs. World-class companies like Ford, John Deere, Harley-Davidson, Tyson, Wal-Mart, Amcor and Coca-Cola have already recognized the value of reusable packaging in moving their product faster, better, safer and more cost-effectively.

A Closer Look: The Supplier

At supplier locations, warehousing utilization, product quality, ergonomics and workplace safety are paramount. And, as they ship their product, sub-components or raw materials to the manufacturer, THEIR customer, product quality and transportation efficiency is key. In the industrial supply chain, product can also be shipped to cross-docking facilities to combine all types of parts/product for consolidated shipments into a single manufacturer. In the consumer goods supply chain, suppliers may send ship finished product directly to a regional distribution center. In any case, on-time delivery and quality is a priority...Production or distribution cannot be halted because of faulty packaging or product damage.



A Closer Look: The Manufacturing Plant



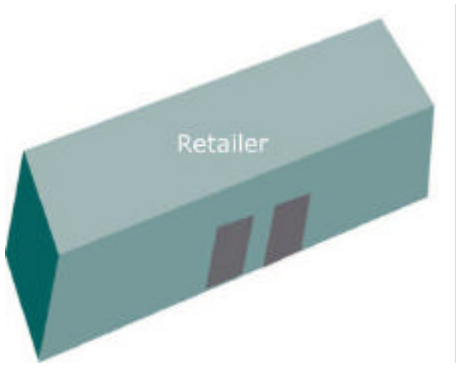
Within the four walls of the manufacturing plant, space utilization, workplace safety, improved workflow, seamless interface with automated equipment and ergonomics are priorities. If further fabrication or assembly is needed, line-side or storage space must be optimized. As product moves to a cross-docking facility, to a distribution center or directly to retail, factors like warehousing utilization, labor reduction and transportation efficiency are important.

A Closer Look: The Distribution Center

At the distribution center, interface with high-speed material handling equipment, unload time, product damage and outbound freight cube efficiency are priorities. Since 1999, logistics related costs increased 12% in the consumer goods supply chain, so driving costs out of the supply chain at every point is paramount. [6]

A Closer Look: The Retailer

In the consumer goods supply chain, the retail environment is the final step before the product reaches the end consumer. Many consumer goods are shipped to retail outlets in plastic reusable packaging...to protect product and reduce handling costs. Labor costs, consumer shopability, aesthetics and product integrity are number one for retailers. Product is moving faster than ever. In 2004, the order-to-delivery cycle is expected to be 98.4 hours in the consumer goods supply chain[6] , so the need for efficient shipments is crucial.



Plastic Reusable Packaging Benefits and Successes

Companies choose reusable packaging because of the cost savings and optimization. The sum of the varied benefits equate to tremendous supply chain success for companies in all kinds of industries.

- **Improved productive flow of product** -- The contoured, lightweight design of reusable packaging allows product to travel safely and efficiently to its destination.

  According to *Logistics Quarterly*, December 1999, "A series of precisely scheduled milk and sweep runs were designed for Ford Motor Company and their supplier network. The milk runs were scheduled for each shift of the supplier's operation, based on the analysis of the time and place requirements for parts, load capacities and locations of supplier facilities. Small quantities of parts, enough for a few hours, are picked up from suppliers within specific window times several times a day and then delivered to Ford, again, within specific 15-minute window times. In some cases, the parts are first sent to a sequencing center so that the right color of floor mat, for example, reaches the line in time for placement in the right color of vehicle. The benefits of reduced inventory, management time, material handling and warehousing space accrue to Ford." [7]

- **Reduced packaging waste --** The disposal of corrugated and wood waste is costly, in terms of disposal fees and non-value added labor incurred for set-up and/or break-down. The long service life of reusable packaging allows it to be used over and over again, in place of one-time use corrugated boxes and wood pallets.

  At Ford Motor Company's Windsor, Ontario plant, the use of 100% reusable containers for all production parts eliminated the generation of 11 pounds of expendable waste per engine produced or 30,000 pounds per day. [8]

- **Reduced packaging costs** — Annual packaging costs plummet with plastic reusable containers and their protective interior dunnage. Containers can last 5 to 10 years, reducing packaging material costs to pennies per trip by allocating the initial

investment costs over their useful life. Recurring charges for one-time-use packaging are avoided and waste is reduced significantly compared to expendable packaging.

Estimated Savings and Payback for a Major Tier One Automotive Supplier

Five-Plant Study

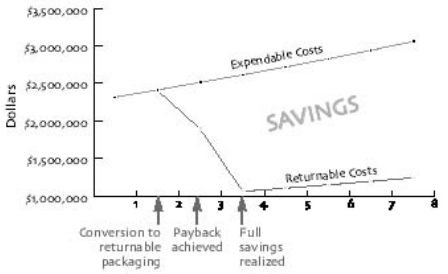
Plant	No. of Parts	Returnable Packaging Investment	Dollar* Savings	Years to Payback	Tons of Waste Eliminated
Plant 1	34	$263,008	$578,307	0.45	151
Plant 2	15	373,137	578,900	0.64	206
Plant 3	32	29,996	56,743	0.53	45
Plant 4	97	93,222	117,297	0.79	176
Plant 5	57	121,414	130,506	0.93	188
TOTAL	235	$880,777	$1,461,753	0.60	766
Per plant (avg)	47	$176,155	$292,350	0.60	153

** Dollar savings equals expendable system cost minus returnable system cost.*

Estimate for Multi-Plant Operations

25 plants	47	$4.4 million	$7.3 million
50 plants	47	8.8 million	14.6 million
87 plants	47	15.3 million	25.4 million

Estimated Packaging Expenditures Over Time



For the five plants analyzed above, the expendable packaging system costs $2.5 million/year. This graph compares the cost of continuing that system vs. converting to a returnable packaging system (estimated cost $1 million/year). Figures include 4% annual increase for inflation.

First Year: Save $583,000 (system savings minus initial investment)

Second Year/Ongoing: Save $1.4 million

Source: ORBIS Corporation Engineering Services

This exhibit shows estimated savings based on a study of five production facilities operated by a major Tier One supplier of automotive door modules and trim. Extrapolating the per-plant figures to its 87 North American plants, the company ($1.8 billion net sales) could estimate savings of $25.4 million on a reusable packaging investment of $15.3 million, just by replacing expendable packaging with reusable packaging.

And, one computer manufacturer was spending more than $1.7 million per year on expendable packaging for a single part. They were paying for labor to set up and tear down corrugated boxes and wrap electronic components with paper and plastic bags, just to move this sensitive product from one facility to another within the company where it was then unwrapped and the packaging was thrown away. By replacing this system with a knock-down bulk container with reusable, collapsible dunnage, the company could save over $1 million each year with an investment of just $187,500. This represents more than $6 million in savings over the life of the reusable packaging, and doesn't even include time

and related dollars saved by eliminated detrashing and re-packing labor necessary for the expendable materials.

- **Maximized product protection for product damage cost reduction** — Reusable packaging supports many ISO-Certified and Six-Sigma initiatives by protecting incoming parts and outgoing products from damage. Expensive components and finished products are safe in heavy-duty, durable plastic containers with customized interiors (dunnage) that protect delicate assemblies from damage. Plastic pallets are used to store and ship full loads of product. The contoured, all-plastic construction protects product from damage that can occur from nails, rust or splinters commonly found in wood pallets.

  After being plagued with scuffs, dents and other damage to parts shipped in expendable packaging, the General Electric Appliance Park in Louisville, Kentucky, reduced damage to inbound component parts by 85% through implementation of reusable plastic containers.

- **Reduced transportation costs due to packaging modularity and standardization —** Customized interior dunnage in "right-sized" reusable containers standardizes the number of parts per container and ultimately per truckload, enabling better ordering capabilities, cost estimating, logistics and transportation planning. Stacking containers to the truck's full capacity improves cube efficiency to streamline transportation costs. To minimize return transportation costs, reusable packaging often nests or collapses when empty to optimize the trailer.

  Canada's CAMI Automotive, the Canadian joint venture between General Motors of Canada Ltd. and Suzuki Motors Corp., increased cube utilization on inbound trucks to about 85 to 90 percent. [9]

  Ford estimates that the variable sizes and strengths of expendable packaging result in transportation being underutilized by up to 35%. They opt for modular and stackable reusable containers and pallet systems to maximize trailers and bring freight utilization close to 100%. [10]

- **Supports lean production --** Reusable packaging is a catalyst for implementing lean production, where frequent parts deliveries, standardized package sizes and efficient packaging processes improve the flow of work in process and reduce the need for extra storage or warehouse space.

  According to Ford, reusable packaging drives lean production by facilitating the tremendous benefits. It opens the door to better scheduling, smaller batches and inventories, faster response to schedule changes and smaller, more frequent deliveries leading to "Synchronous Material Flow." It facilitates improved layouts and processes and provides a cleaner, safer, more ergonomic workplace. The net effect drives costs down. "Benefits of Right Sized Reusable Packaging to Suppliers," [10]

- **Reduced labor costs due to standardized work flow –** Multiple layers of paper, plastic bags and other expendable packing materials can be eliminated. This reduction, in turn, requires fewer labor steps in the packaging process, as well as less ordering and set-up time, and virtually no container disposal cost. Plastic containers will securely stack higher than expendable ones and nest or collapse to take up less floor space, making inventory management and material handling easier. Receiving and inspection of deliveries are faster and easier with standardized packaging and consistent unit sizes. Corresponding indirect labor and equipment costs are driven from the system.

  After CAMI Automotive implemented reusable packaging in the late 1990's, incoming product (in reusable plastic containers) was loaded onto carts at a cross-docking facility. At the CAMI assembly plant, the cart was rolled from the trailer to the receiving dock, enabling a full truck to be unloaded safely and easily in minutes. [9]

  Ford estimates that if an operator makes 1,500 parts per day and small-lot packaging saves three feet of walking distance for each part, this would equate to 54 hours per year, or 1.35 man-weeks. [10]

- **Optimized inventory management through standardized sizes --** Shipping in smaller quantities, on a more frequent basis, and delivering parts closer to the time of usage reduces the number of days of parts inventory and therefore limits the days

that inventory is nonproductive. Combining supplier pick-ups or customer deliveries into small, daily truck routes (milk runs) also reduces dollars tied up in inventory.

Supported by suppliers who deliver needed parts just-in-time, CAMI Automotive cut inventory up to 40% with conversion to reusable packaging and related process improvements. [9]

After implementing reusable packaging, one major truck manufacturer increased inventory turns from 30 to 55 per year, and reduced on-hand inventory from 8 to 3.2 days.

- **Improved warehouse space utilization** -- Process improvements enabled by reusable packaging can reduce inventory and make better use of fixed assets, including line-side and warehouse floor space and material handling equipment.

  When using plastic reusable hand-held containers for inbound part deliveries, a major truck manufacturer was able to reallocate 20,000 square feet of production space by storing only a one-day supply of parts line-side, rather than the larger quantity containers that previously came standard from its suppliers. The company provided suppliers with "right-sized" reusable containers designed to hold a half-day supply of each component.

- **Improved worker safety and better ergonomics --** Plant managers report fewer incidents related to packaging because of improved stackability, easier handling, better tracking/locating of materials. In the age of skyrocketing workers' compensation and health care costs, ergonomically designed containers improve worker safety and the bottom line at the same time. Standard-sized containers with handles or access doors make packaging more user-friendly and easier on workers, resulting in fewer strains and musculoskeletal disorders.

  According to the Occupational Safety and Health Administration (OSHA), material handlers are 3.85 times more likely to suffer injury. Manufacturers spend $15-20 billion annually on claims for these kinds of injuries, with indirect costs and productivity losses adding an estimated $60 billion each year. [11]

In addition, reusable packaging eliminates injuries from box cutters, staples and broken pallets, as well as "slip and fall" injuries from in-plant debris, stray cardboard and loose banding. CAMI Automotive, saw worker injuries reduced after converting to reusable packaging in the late 1990s. [9] Incidents of lacerations from opening corrugated boxes, and strains from heavy lifting, went way down with CAMI's change to small-lot plastic containers that are delivered every 15 minutes to its assembly line.

And, at Big 5 Corporation, a major sporting goods retailer with 240 stores in the Western U.S., converted to nestable plastic pallets and eliminated injuries and equipment damage from wood pallets falling apart. This not only improved ergonomics and made for cleaner facilities, but also increased worker productivity and saved space in the warehouse.

- **Improves velocity through reduced cycle time** -- Using reusable packaging, companies are able to speed production. Parts are consistently presented in standardized containers. Workers spend less time handling and disposing of messy expendable packaging. Also, reusable packaging enables daily, just-in-time deliveries to optimize productivity.

  In an article for www.supplychainbrain.com, Ford's Jerry Joyce, director of global logistics stated, "We also have a huge demand for velocity in the supply chain to ensure that our transit times and frequency enable the overall order-to-delivery requirements of the build-to-order process," he adds. Another pressing matter is the need for an efficient reverse logistics network for the hundreds of reusable containers that daily flow into the assembly plants. The number is expected to rise steadily as Ford moves to 100 percent reusable containers." [12]

Will Reusable Packaging Work for You?

A systematic, well-planned reusable packaging program makes sense for all types of operations, particularly those with 3 or more of the following:

- A well-managed supply chain (interdependent relationships)
- Relatively short logistical cycle (time and distance)
- Tightly controlled closed-loop or a well managed open-loop shipping system

- Multiple component parts
- Complicated assembly operations
- Expensive expendable packaging
- High product damage rates
- High part-usage rates
- High inventory velocity
- Under-utilized trailer space in transportation
- High waste disposal costs
- Concern about clean environment or part cleanliness/hygiene
- Need to optimize line space
- Worker safety or ergonomic issues
- Desire for "visual plant"
- Product shipped to/from regional distribution centers
- Need for unitization
- Direct-to-store delivery shipments

Collaboration is the KEY to Getting Started with Reusable Packaging

How much time is spent on packaging? According to the Ohio State University Supply Chain Management Research Groups' 2003 Survey of Career Patterns in Logistics, logistics professionals have a 60% degree of authority over packaging, but spend just 5% of their time on it. [13]

According to John Anderson of Ford Motor Company, "Packaging cannot be considered as an end in its own right. It exists as part of the material system (supply chain) and must be engineered with that in mind." [14]

A well-planned plastic reusable packaging program requires expertise and an in-depth understanding of the specific operation, the entire supply chain and the marketplace trends that face the company. Careful collaboration with an experienced reusable packaging provider will ease integration.

1. **ANALYZE** The process should begin with a careful analysis of the entire operation and supply chain to identify the product/material flow, the packaging application (work-in-process, storage, distribution, etc.) and packaging objectives (protection, improved transportation efficiencies, etc.)

2. Before a reusable packaging decision can be made, it is important to demonstrate and **PROVE** how the packaging and related support services translate into measurable efficiencies. The potential return on investment can be calculated. Metrics like time, cost reductions, safety, cleanliness and warehouse utilization are documented for benchmarking.

3. Next is **DESIGN**....After discovering the specific needs of the entire operation, a comprehensive reusable packaging program is planned. The objective is to optimize the supply chain whenever and wherever possible. To validate the solution, a pilot packaging program is conducted.

4. **IMPLEMENT** Once the reusable packaging program is planned, the specific packaging is delivered and seamlessly integrated into the system. Leading packaging partners oversee the entire implementation to ensure long-term system success. (i.e. automated equipment interface, worker acceptance, proper handling, etc.)

5. It doesn't end there. Supply chain systems are dynamic and the packaging programs that support them must **EVOLVE** with them. New product launches, quality improvements, changing production process and new labor practices may require new and more innovative packaging. Experienced packaging providers will continually re-evaluate for future opportunities for optimization.

What are the Challenges?

Stakeholder Acceptance and Endorsement

As with any supply chain based project, the true success of the reusable packaging program depends on stakeholders across the supply chain embracing the benefits.

Forty-six percent of supply chain executives cited resistance to process change as the major factor that will impede their supply chain performance. [3]

Although it's possible to physically implement reusable packaging rapidly, but the biggest pitfall is lack of acceptance from people who are affected by the change.

Packaging is one of the few areas that impact almost every function in an organization. All of the people who touch the part or package should be represented and educated as part of implementation. Experienced packaging providers are available to provide on-site support to help plan and facilitate a smooth and most cost-efficient transition.

In most organizations, accomplishing this involves planning, training and testing to ensure that all the players embrace the new processes and work effectively with the new system.

Initial investment

The initial investment in plastic reusable packaging is different than the simple purchase of traditional packaging like corrugated boxes and wood pallets. A cost analysis conducted for one major tier one automotive supplier cited that with a $448,000 initial investment, they would experience a return on their investment in just 4-5 months. Additionally, they would reduce line-side space requirements by 44% and eliminate 280 tons of waste!

Check Printers, of Nashville, Tenn., realized that the one-time use corrugated boxes could be replaced by reusable plastic containers with a long service life. In fact, when initially implementing 7,000 plastic containers in their operation, financial payback occurred within just 9 months, with a Return on Investment of over 430%, over a 5 year service life.

If the initial investment is a concern, companies may be able to achieve immediate, significant savings by leasing or pooling their packaging. Leasing enables the usage of reusable packaging without an up-front investment. Operating leases are available in 36- or 48-month terms. Companies can achieve all the benefits of reusable

packaging without adding debt, assets or capital expenditures to their balance sheet.

Overcoming the Challenges

Begin with a pilot program

Depending on your organization, it often is beneficial to start your reusable packaging roll-out with a pilot program, then learn from it, adjust the process and take the next step. By choosing to begin with a specific supplier, production line or delivery route, the organization can adjust operations gradually while still seizing the cost-savings opportunity. Moving step by step gives employees a chance to adapt to the new process, and see visible signs of success that builds momentum and preserves morale.

Involve Suppliers and Share the Savings

Multiple players in the supply chain are affected by a change to reusable packaging. To achieve a smooth transition, it is important that suppliers understand how the change benefits them. It's only reasonable to allow suppliers some economic benefit if they are expected to convert to reusable packaging, and the best way to come to agreement is to share an honest perspective of why the change makes financial sense. Freight and handling charges, reverse logistics, container management and tracking are among the issues that should be addressed with suppliers.

Manage Packaging for Long-Term Benefit

Once they implement reusable packaging and reap the immediate benefits, some organizations can become complacent about following the procedures that sustain long-term value from their packaging investment. Collaborating with an experienced reusable packaging provider will ensure long-term success. Leading providers will continue to evaluate your system for additional benefits. For example, they can provide services to track the use of reusable packaging in the operation to ensure that the system is providing the right amount of packaging to the right supplier or customer locations, at the right

time. Or they can coordinate washing or sorting services, oversee any equipment changes and address other issues necessary to manage the program.

Plan Ahead

Don't wait until the last minute to consider the packaging portion of the supply chain equation. It's important to start planning the packaging and pursuing potential supply chain impact as soon as a change is anticipated. Be sure to allow time to test prototypes of the containers in the supply chain, and to work with and adjust various areas of the plant to facilitate the flow of goods. In order to maximize the line-side use of a hand-held reusable tote, for example, be sure to consider material handling needs, such as leaving enough space for containers to be delivered to the line by the appropriate equipment. If line-side space is configured too tightly, it can interrupt the movement of goods to the line. And, plastic containers and pallets should be tested to ensure they interface with high-speed automated equipment, to ensure ease of use.

In Conclusion: Packaging for Supply Chain Optimization

Forrester projects that the total spending on supply network process improvement initiatives in the U.S. will rise from $2.4 billion in 2003 to $9.1 billion in 2008. [3]

When the entire supply chain is considered, a carefully conceived, well-planned reusable packaging program will eliminate waste, optimize inventory management and improve the flow of product…and improving profitability all along the way.

And, with a rapid return on investment (ROI) in just 6-12 short months, the packaging program will continue to perform and yield cost savings for many years.

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ORBIS Corporation., a subsidiary of Menasha Corporation, uses proven expertise, industry-leading knowledge, innovation and superior products (containers, pallets and dunnage) to implement plastic reusable packaging systems. ORBIS helps world-class customers move their product faster, better, safer and more cost-effectively throughout the supply chain. To learn more about plastic reusable packaging, contact ORBIS at 888-307-2185 or www.orbiscorporation.com.

ORBIS Corporation
1055 Corporate Center Drive
Oconomowoc, WI USA
800-999-8683